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BASELINE CHARACTERIZATION OF EMISSIONS FROM FIBERGLASS BOAT MANUFACTURING FOR NATIONAL MARINE MANUFACTURERS ASSOCIATION

Prepared for
National Marine Manufacturers Association
3050 K Street, N.W., Suite 145
Washington, D.C. 20007

Prepared by
Stelling Engineering, P.A.
1319 Arnette Avenue
Durham, North Carolina 27707

Air-Tech Environmental LLC
P.O. Box 12353
Research Triangle Park, North Carolina 27709

Radian International LLC
P.O. Box 13000
Research Triangle Park, North Carolina 27709

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Dennis Pearson, who, as our U.S. Marine site coordinator, provided constant oversight and help in scheduling space, personnel, molds, and materials; Dennis also spearheaded the design and fabrication of the temporary total enclosure, which exceeded all expectations for a test enclosure of its size;

Larry Dargitz, U.S. Marine's lead lamination training specialist, who conducted the boat lamination work during this program;

Ken Warren, U.S. Marine gelcoating specialist, who conducted all gelcoating runs during the program; and

Don Barnhill, who extended the invitation and ensured daily that the program had everything needed.

We wish to express appreciation to Research Triangle Institute and the U.S. Environmental Protection Agency for funding the supplemental testing of flow chopper technology. We also appreciate the support of this program by the EPA through its audit of our technical systems.

Finally, we wish to thank John McKnight, the NMMA Project Manager, for his continued support of this testing program before, during, and after the field work.

1.0 INTRODUCTION

Under contract to the National Marine Manufacturers Association (NMMA), Stelling Engineering, Air-Tech Environmental, and Radian International conducted testing in April 1997 to characterize baseline emissions from gelcoating and lamination of fiberglass boats. Testing was conducted in accordance with the *Quality Assurance Project Plan for the National Marine Manufacturers Association Baseline Emissions Testing Project* (QAPP) approved by the U.S. Environmental Protection Agency (EPA) in March 1997. A quality assurance (QA) audit was performed by the EPA during this program. Visits by state regulatory authorities and other interested parties were also made during testing.

The test program was designed to be as representative as possible of actual fiberglass boat manufacturing. Testing was conducted at the U.S. Marine (Bayliner) fiberglass boat manufacturing, research, and development facility in Arlington, Washington, in an enclosure (inside a wooden model fabrication area) made available for this purpose. The volatile organic compounds (VOC) measured during this program were generated from operations identical to those in actual production, that is, using actual boat part molds, spray equipment, resins and gelcoat, and laminating procedures and techniques typical of the industry. Experienced manufacturing personnel conducted the lamination and gelcoating. Only a few runs incorporated a mold or spray techniques not typical of the industry; such runs were designed to produce data for comparison with previous emission tests.

During this sampling program, Research Triangle Institute (RTI) conducted a research program to ascertain the viability of measuring emissions from lamination and gelcoating operations using a mass balance approach. RTI's program was funded by the EPA's Office of Research and Development (ORD) and will be reported independently.

1.1 Background

Within the past two years, several important sampling and analysis programs have sought to determine styrene emissions from open molding of polyester resin fabricated parts. Most important among these studies were the studies conducted by RTI for the EPA and by Dow Chemical USA for the Composite Fabricators Association (CFA). The results from these programs raise questions about the emission factors published in the EPA's compendium of emission factors, AP-42, especially for molding of large parts manufactured by the marine industry.

Still, none of the tests to date adequately represent industry practice or conclusively demonstrate the effect of mold size and styrene content of resin on emissions. For example, the results of this test program indicate that the relationship between emissions of styrene as percent of available styrene in the resin and increasing styrene content does not appear to be constant. Further, an increase in mold size resulted in increased flux emissions (pounds styrene per square foot of surface area of mold) but decreased normalized emissions (pounds styrene per 1000 lb resin per square foot of mold surface area). Also, none of the previous tests included gelcoat containing methyl methacrylate (MMA), which is common in the boat building industry.

1.2 Purpose of Testing

The primary project objective was to characterize total hydrocarbon (THC), styrene, and MMA emissions from the open molding process that is representative of fiberglass boat manufacturing, specifically spray up gelcoat application and resin application. Hand lay-up, defined as the application of glass and resin that are mixed manually and applied by brush, was not part of this study. A technique comparable to hand lay-up found in the industry is the use of a flow chopper, a glass chopper similar to the resin chopper gun but equipped with a low-pressure, non-atomized resin delivery system resembling a nozzle not unlike a shower head that exudes catalyzed resin. The principal difference between this technique and conventional spray up application is that resin atomization is avoided. Sampling during lamination using a flow chopper was conducted to augment the test matrix planned for this program; this supplemental sampling was funded by the EPA through RTI.

This study was designed to produce data for estimating emissions from lamination and gelcoating in fiberglass boat manufacturing plants. The data and analyses reported in this document are intended to be useful to plants in compiling emission inventories and assessing permit needs or changes.

1.3 Testing

Sampling was completed by Darrell Doerle of Air-Tech Environmental and John Stelling of Stelling Engineering. Testing was coordinated with U.S. Marine personnel by John McKnight, NMMA's project manager. Larry Dargitz of U.S. Marine operated the resin application equipment, and Ken Warren of U.S. Marine applied gelcoat for those experiments.

Tests were also coordinated with Bob Wright, Emery Kong, and Mark Bahner of RTI. RTI conducted a study in an adjacent enclosure under contract to the EPA's ORD to measure emissions from the same lamination operations as conducted for this program but applied to a small panel. The goal of their program was to develop a simplified material balance approach for determining emissions from fiberglass lamination.

1.3.1 Test Enclosure

The testing was carried out at the U.S. Marine manufacturing and research facility in Arlington, Washington. The test area was located in a wooden model fabrication area where tool plugs are fabricated. A large test enclosure (20 ft by 45 ft by 14 ft) meeting the total temporary enclosure (TTE) requirements of EPA Method 204 (included in Appendix A) was erected in this 27-ft by 50-ft area to accommodate tools (i.e., molds) ranging from 18 to 28 ft in length. Sufficient space was provided in the enclosure to allow technicians to work around the tool and to move the tool as needed to apply gelcoat and resin. A description of the TTE is contained in Appendix B. Natural draft openings (NDOs) were arranged in accordance with EPA Method 204. Measurements were made to ensure that the air velocity across the mold surface was comparable to that measured in the manufacturing area.

The exhaust system for the entire model preparation room comprised a dual pick-up system at one end of the room (near the constructed enclosures) exhausting to a single induced draft fan. The fan had 20,000-cfm capacity, far more than needed to exhaust the two enclosures. At the start of the program, some of the pick-ups were closed to develop sufficient draw through the enclosures. The flow rate was balanced with both enclosures in use so that the turnover through the large enclosure used for NMMA testing was comparable to that in the manufacturing areas on site (i.e., about 16 room changes per hour). On-site checks in the production area verified this range.

The enclosure was equipped with two 10-in. plena for exhausting the enclosure. Three-inch openings were installed every 3 ft in each plenum and covered with spun fiberglass filter media. Air was supplied to the enclosure through a 12-in. plenum in the ceiling of the enclosure. This plenum was open on both ends, limiting the NDO associated with the inlet air plenum to 1.571 ft^2. The enclosure was equipped with a door (which remained closed during testing) and a zippered end for changing application equipment and molds between tests. Thus, the openings on both ends of the inlet air plenum were the only NDOs. The openings in this plenum satisfied the requirements of Method 204 for a TTE, representing only 0.043 percent of the total surface area of the enclosure. Also, considering a flow rate of 2,600 to 3,300 cfm, the velocity at the NDO was at least 1,655 ft/min, also satisfying Method 204 requirements. Air coming into the enclosure was monitored continuously for hydrocarbon concentration during each test run in accordance with Method 204; these data were recorded with other continuous monitoring data.

1.3.2 Process

The polyester resin spray-up application process commonly used in the boat building industry uses a "chopper gun" to apply a laminate. The chopper gun dispenses polyester resin, catalyst, and chopped glass fibers.

Continuous strand fiberglass roving is fed to a chopper unit mounted on the spray gun and is cut into chopped fiber lengths of approximately 1.5 in. long. The chopped fiber is ejected from the chopper unit and is captured by the resin fan pattern a short distance from the spray gun. The mixture of the catalyzed resin and chopped fiber is deposited on the mold by the spraying action. Typical of fiberglass boat manufacture, woven roving (a fabric material) was used with resin application by spray gun and flow chopper for the addition of this reinforcement. A Venus Gusmer GO3 low pressure airless air-assisted slave arm internal mix chopper gun equipped with a 5003 tip, typical of guns used in the industry, was used for spray application of resin and chopped glass during this program.

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Resin was supplied to the chopper gun and the flow chopper by a Venus Gusmer system at a pump ratio of 11 to 1. The methyl ethyl ketone peroxide (MEKP)/dimethyl phthalate (DMP) catalyst was internally mixed for both chopper gun and flow chopper, with the catalyst delivered by a slave pump system. The flow chopper was also a Venus Gusmer design. The resin is delivered at a much lower pressure and no air is used to dispense the resin into the chopped glass. The glass is chopped into lengths using the same method as in the chopper gun, but because there is no atomizing air, the dispersion pattern of glass and resin mixture is more narrow.

Gelcoat is applied in the boat building industry using a spray gun, typically an airless air-assisted spray gun. For this program, gelcoat was delivered to the spray gun using a Glas-Craft pump system at a pump ratio of 23 to 1. Catalyst, delivered using a metered feed pump, was mixed externally. A Poly-Craft 775 airless air-assisted spray gun (equipped with a 0.026 tip size) was used during this program.

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Gelcoat is applied in the boat building industry using a spray gun, typically an airless air-assisted spray gun. For this program, gelcoat was delivered to the spray gun using a Poly-Craft pump system at a pump ratio of 23 to 1. Catalyst, delivered using a metered feed pump, was mixed externally. A Poly-Craft 755 airless air-assisted spray gun (equipped with a 0.026 tip size) was used during this program.

Spray application was conducted using techniques common to the industry. This study was not intended to compare spray techniques. Therefore, skilled technicians from a manufacturing line operated the gelcoat and chopper guns in all tests, except those included to produce data that could be more directly compared to previous tests.

1.3.3 Sampling Methods and Parameters

Method 25A, continuous monitoring of THC, was used as the primary technique to measure emissions. From the Method 25A results, emissions were calculated using the measured THC concentration as propane, the molecular weight of propane, and the exhaust gas flow rate measured in accordance with Method 2. These results are presented in terms of THC emissions (as propane) for lamination or gelcoating.

Speciation of styrene and MMA emissions (needed during gelcoating) was effected through Method 18 analysis using a gas chromatograph (GC) with flame ionization detector (FID). Method 18 analysis was conducted concurrent with the Method 25A monitoring. The Method 18 results were used primarily to establish the ratio of styrene emissions to MMA emissions during gelcoating. This ratio allowed partitioning of the THC emission rate (as propane) into styrene and MMA components. The Method 18 results were also used as a check on the Method 25A results.

Other measurements made during this program included those variables determined from other studies to have more significant influence on emissions (Table 1-1).

1.3.4 Molds

Four molds were used in this program, three of which are boat part molds in actual use by U.S Marine. Two hull molds represented the typical size hulls common to the industry: an 18-ft runabout and a larger 28-ft cruiser. An 18-ft deck mold for a bow rider model was used to represent a more convex-shaped mold. The mold used during Phase I testing by the CFA was included in this program to provide data for comparison with the results of that previous study. Surface areas of these molds (Table 1-2), determined from engineering drawings and in previous studies, were used to calculate flux and normalized emissions.

Table 1-1
Parameters Studied

Parameter	Test Variable	Measured/Fixed
Resin application method	Yes (2)	Fixed
Tool shape	Yes (2)	Fixed
Resin styrene content	Yes (2)	Measured (vendor)
Tool size	Yes (2)	Fixed
Gel time	No	Measured
Applied thickness	No	Measured
Resin density[a]	No	Measured (vendor)
Resin percent non-volatile[a]	No	Measured (vendor)
Resin viscosity[a]	No	Measured (vendor)
Resin peak exotherm[a]	No	Measured (vendor)
Resin thixotropic index[a]	No	Measured (vendor)
Resin flow rate[a]	No	Measured
Air flow rate	No	Measured

[a]These parameters apply to resin and gelcoat.

Table 1-2
Surface Area of Molds Used in Test Program

Mold	Surface Area (ft^2)
18-ft Deck	171.09
18-ft Hull	220.5
28-ft Hull	454
CFA Phase I Mold (controlled spray)	28.06
CFA Phase I Mold (uncontrolled spray)	37.28[a]

[a]Uncontrolled spray of this mold inevitably coated flange extensions, effectively increasing the surface area of the final laminate structure.

1.3.5 Materials

Materials chosen for this program are typical of those used in fiberglass boat manufacturing (Table 1-3). Two styrene polyester resins were used, one with a nominal 35 percent styrene by weight content and the other with a nominal 42 percent styrene by weight content. The gelcoat was a white on white gelcoat containing nominally 32 percent styrene and 5 percent MMA. The formulations used are considered most representative of the range of resin styrene and gelcoat contents in the industry. Based on a survey of industry representatives, the marine industry uses gelcoat that contains MMA as an inhibitor to degradation by exposure to ultraviolet (UV) light. MEKP in a DMP base is the most common catalyst used in the industry for both gelcoat and resin; MEKP/DMP was used in this program.

Table 1-3
Properties of Gelcoat and Resin Materials

	Gelcoat	Resin 1		Resin 2	
Product number	954WP53	80.654-NMMA		80.604-NMMA	
Manufacturer	Cook Composites and Polymers Co.	Alpha/Owens Corning		Alpha/Owens Corning	
Styrene content, %	32	35.1		42.2	
MMA content, %	5	0		0	
Specific gravity	1.32	1.082		1.09	
Thixotropic index	5.5	4.9		5.71	
Viscosity, cps		RVF #2@ 20 rpm-700		RVF #2@ 20 rpm-700	
	LVF #4@ 6 rpm-14500	RVF #2@ 2 rpm-3400		RVF #2@ 2 rpm-4000	
MEKP catalyst ratio	2%	1.5%	2%	1.5%	2%
Gel time, min	16.5	23.22	17.98	23.48	18.70

1.3.6 Schedule

Testing was conducted from April 2 to April 19, 1997. Set up at the site began March 30, continuing to April 1 (Table 1-4). One to three runs were made each day. Sampling was coordinated with the U.S. Marine personnel supporting the lamination and gelcoating operations and with RTI personnel conducting sampling in an adjacent Method 204 enclosure.

1.4 Organization of the Report

The complete report including all appendices and separately bound field data contains all data from the testing program. The text of the report is intended to stand alone to provide the essence of the results from the sampling and analysis program. This introduction (Section 1) provides a brief

Table 1-4
Test Schedule

Date	Test	Description	Run
2-Apr	NMMA-6-P	18-ft Deck Gelcoat	0402-01
3-Apr	NMMA-8-1	28-ft Hull Gelcoat	0403-01
3-Apr	NMMA-4-1	18-ft Deck 35 % Styrene Resin	0403-02
4-Apr	NMMA-7-1	28-ft Hull 35 % Styrene Resin	0404-01
4-Apr	NMMA-3-1	18-ft Hull Gelcoat	0404-02
5-Apr	NMMA-8-2	28-ft Hull Gelcoat	0405-01
5-Apr	NMMA-1-1	18-ft Hull 35 % Styrene Resin	0405-02
7-Apr	NMMA-7-2	28-ft Hull 35 % Styrene Resin	0407-01
8-Apr	NMMA-6-1	18-ft Deck Gelcoat	0408-01
8-Apr	NMMA-3-2	18-ft Hull Gelcoat	0408-02
8-Apr	NMMA-4-2	18-ft Deck 35 % Styrene Resin	0408-03
9-Apr	NMMA-1-2	18-ft Hull 35 % Styrene Resin	0409-01
9-Apr	NMMA-11-1G	CFA Mold Gelcoat	0409-02
9-Apr	NMMA-11-1	CFA Mold 35 % Styrene Resin	0409-03
10-Apr	NMMA-14-1	18-ft Deck 35 % Styrene Resin - Flow Chopper	0410-01
10-Apr	NMMA-13-1	18-ft Hull 35 % Styrene Resin - Flow Chopper	0410-02
10-Apr	NMMA-11-2	CFA Mold 35 % Styrene Resin	0410-03
11-Apr	NMMA-6-2	18-ft Deck Gelcoat	0411-01
11-Apr	NMMA-14-2	18-ft Deck 35 % Styrene Resin - Flow Chopper	0411-02
11-Apr	NMMA-13-2	18-ft Hull 35 % Styrene Resin - Flow Chopper	0411-03
12-Apr	NMMA-11-3	CFA Mold 35 % Styrene Resin	0412-01
12-Apr	NMMA-5-1	18-ft Deck 42 % Styrene Resin	0412-02
12-Apr	NMMA-2-1	18-ft Hull 42 % Styrene Resin	0412-03
14-Apr	NMMA-5-2	18-ft Deck 42 % Styrene Resin	0414-01
14-Apr	NMMA-2-2	18-ft Hull 42 % Styrene Resin	0414-02
15-Apr	NMMA-16-1	18-ft Deck 42 % Styrene Resin-Flow Chopper	0415-01
15-Apr	NMMA-15-1	18-ft Hull 42 % Styrene Resin-Flow Chopper	0415-02
16-Apr	NMMA-16-2	18-ft Deck 42 % Styrene Resin-Flow Chopper	0416-01
16-Apr	NMMA-15-2	18-ft Hull 42 % Styrene Resin-Flow Chopper	0416-02
17-Apr	NMMA-12-1	CFA Mold 42 % Styrene Resin	0417-01
18-Apr	NMMA-9-1	28-ft Hull 42 % Styrene Resin	0418-01
18-Apr	NMMA-12-2	CFA Mold 42 % Styrene Resin	0418-02
19-Apr	NMMA-9-2	28-ft Hull 42 % Styrene Resin	0419-01

introduction to the purpose of the testing and the schedule for completing the on-site activities. The results of the sampling program are presented in Section 2. Results are presented in tabular format and graphically to simplify review. Section 3 describes the methods used in the sampling program, including those used to quantify parameters not varied during the program, such as gel time and styrene content. Quality control (QC) measures and QA data are presented in Section 4.

Data and material supporting the test report are contained in the appendices, as follows:

- Reference Methods
- Construction of a Temporary Total Enclosure for Volatile Organic Compound Emission Assessment During Manufacture of Fiberglass Boats
- Calculations
- Procedure for and Results of Gel Time Determination
- Material Safety Data Sheets
- Certifications for Gas Standards and Equipment Calibrations
- Bag Standards
- Location and Results of Air Flow over the Mold Measurements
- Comparison of NMMA Results with Those from Other Studies

Copies of all raw data generated by the GC and the THC analyzer, organized by day, and including pertinent process data (spray gun calibrations), have been bound separately for archive at NMMA offices.

2.0 RESULTS

The results of emission testing at the U.S. Marine site in Arlington, Washington, are presented in this section with comparison of the data between tests and with the results of the CFA Phase I studies; further comparison of these results with other studies is appended. The results are presented in terms of emissions as a percent of available compound (i.e., styrene, MMA, and total volatiles), as emissions per unit area of mold surface, and as normalized emissions, that is, emissions per unit mass of resin per unit area of mold surface. All calculations done for these analyses are appended (Appendix C), including a sample calculation showing the complete analysis of data from test runs.

Results demonstrate that the enclosure constructed at the site provided good capture of emissions from the molding process and that all emissions were accounted for in the sampling. The styrene evaporation tests demonstrated that the emission monitoring system provided a good measure of the actual losses. Testing of emissions from lamination of the box mold from the Phase I CFA studies demonstrated that the techniques used in the two studies (i.e., CFA's study and the portion of this study designed to reproduce some of the testing done in the CFA study) were comparable. Results of duplicate testing for each test case provided good closure, within the acceptance criteria specified in the QAPP. In accordance with the plans outlined in the QAPP, all tests of boat mold use were completed with only two runs. A third run was done for one of the test conditions to incorporate the CFA study mold.

2.1 Summary of Results

Table 2-1 presents the average values from the sixteen emission tests conducted at U.S. Marine's Arlington, Washington, site. Three of the tests were conducted using the same box mold used by CFA/Dow during their Phase I studies (to provide data for comparison with those studies); all other tests were conducted using boat molds and procedures typical of U.S. Marine's boat manufacturing processes. The results of this study are taken as representative of industry practice.

The amount of resin used per part during these studies was much greater than the amounts used in previous studies (Table 2-1). This relative scale of material use and measurement contributed to the consistency of results.

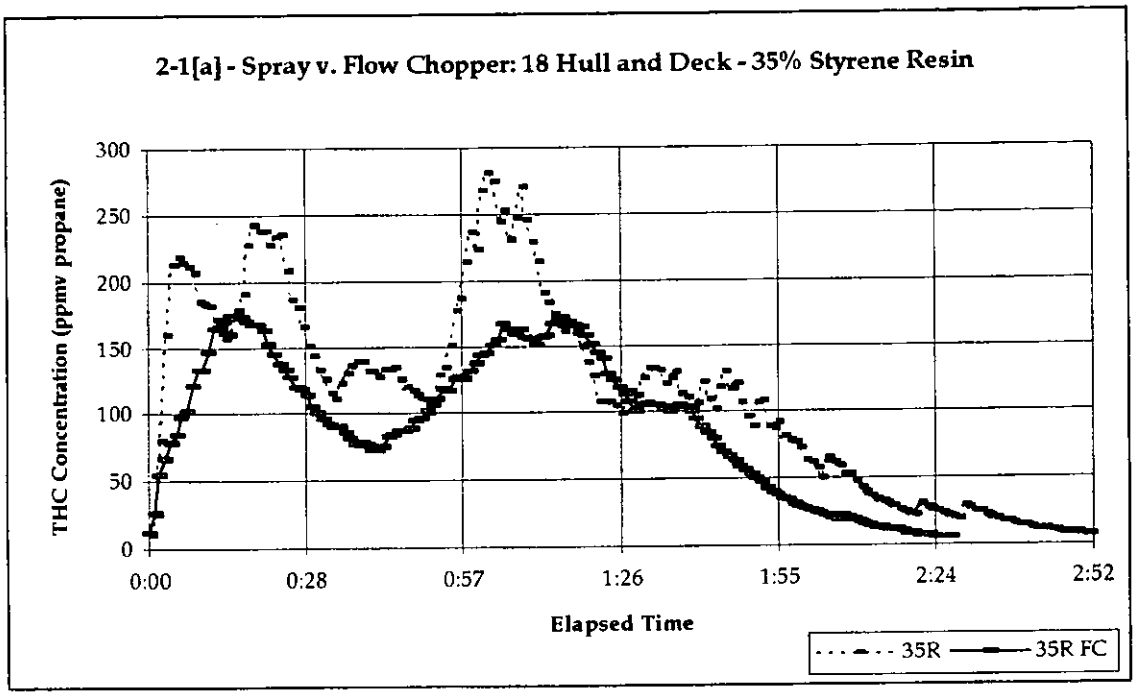
Table 2-1
Summary of Test Results

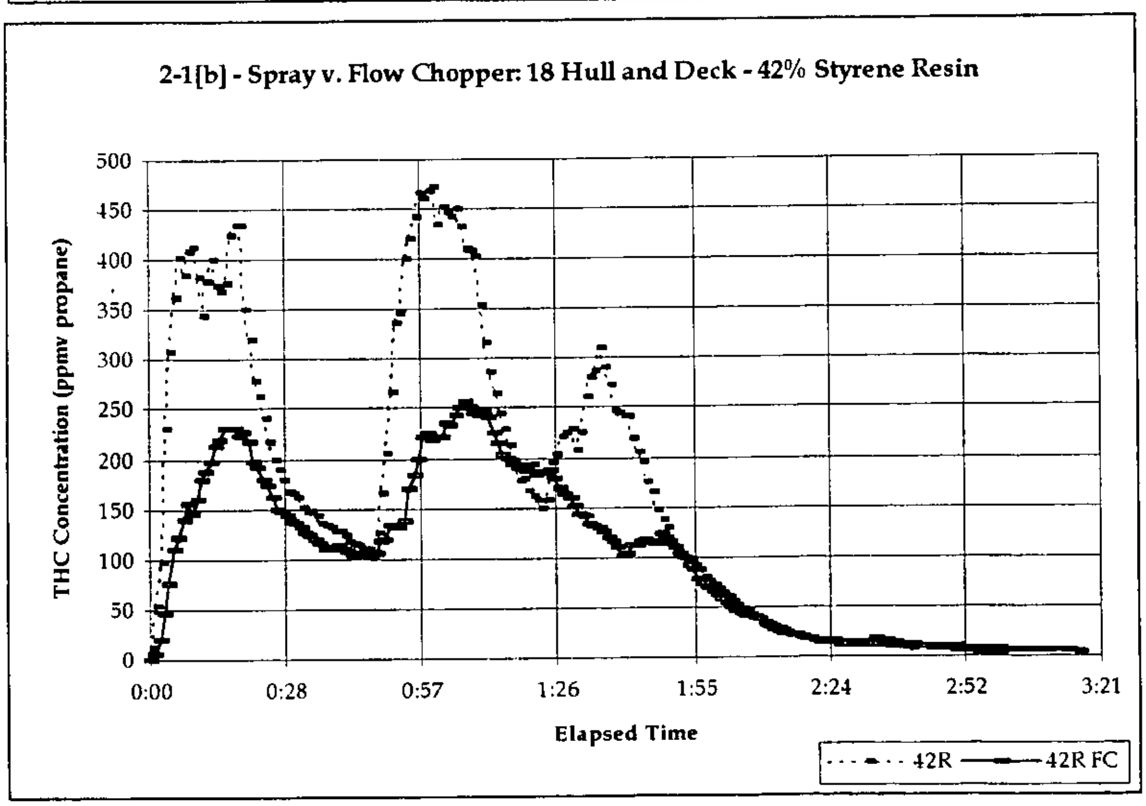
Description[a]	Resin Use (lb)	Emissions as Percent of Available			Emission Flux (lb/SF)	Normalized Emissions (lb/1000 lb/SF)
		Styrene	MMA	Volatiles		
CFA Gel	3.2	41.1%	84.0%	46.9%	0.0203	6.36
18 Deck Gel	20.0	42.3%	75.6%	46.9%	0.0228	1.14
18 Hull Gel	25.7	46.4%	73.2%	50.0%	0.0261	1.03
28 Hull Gel	65.7	50.4%	78.6%	54.3%	0.0389	0.59
CFA 35R	8.1	41.8%		41.8%	0.0345	4.89
18 Deck 35R	124.6	12.9%		12.9%	0.0130	0.11
18 Hull 35R	144.5	14.8%		14.8%	0.0143	0.10
28 Hull 35 R	354.4	17.3%		17.3%	0.0234	0.07
18 Deck 35R - FC[b]	114.7	11.9%		11.9%	0.0092	0.08
18 Hull 35R - FC	141.7	10.8%		10.8%	0.0072	0.05
CFA 42R	5.1	48.7%		48.7%	0.0324	6.28
18 Deck 42R	111.8	21.1%		21.1%	0.0284	0.25
18 Hull 42R	142.9	20.7%		20.7%	0.0272	0.19
28 Hull 42R	304.2	23.3%		23.3%	0.0357	0.12
18 Deck 42R-FC	122.2	13.4%		13.4%	0.0125	0.10
18 Hull 42R-FC	154.9	11.4%		11.4%	0.0089	0.06

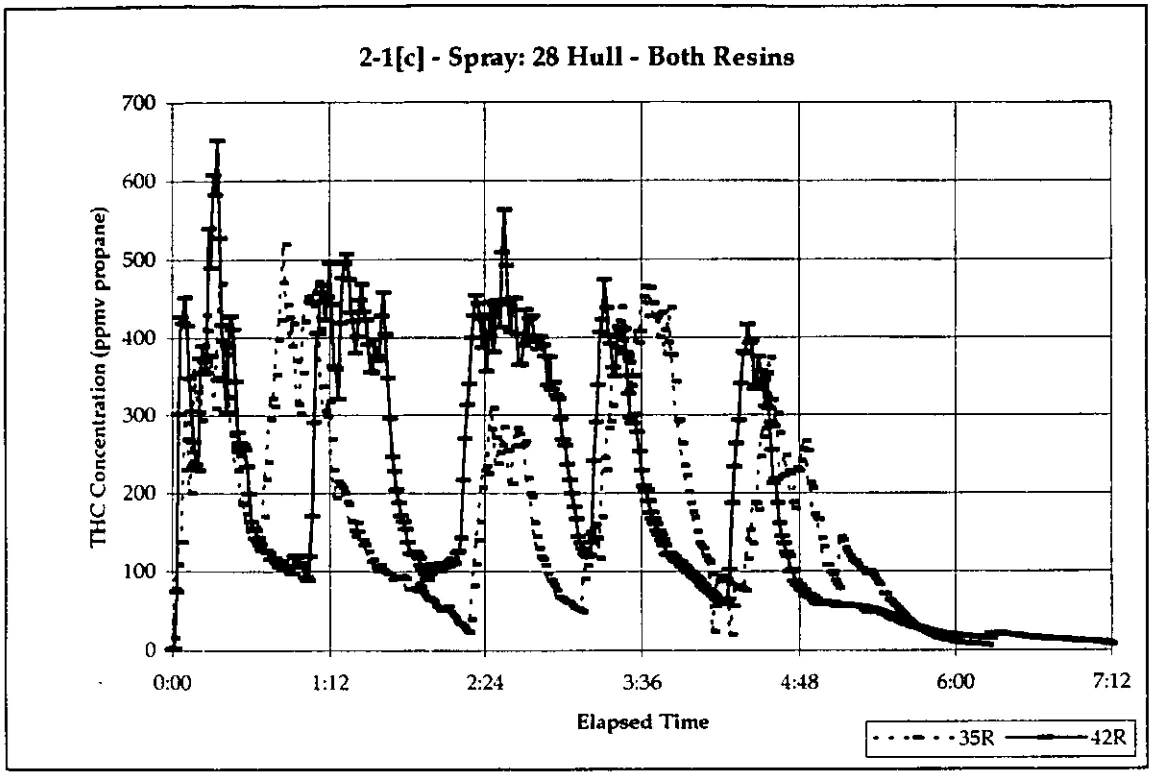
[a]See Table 1-4 for full description.
[b]Application using flow chopper.

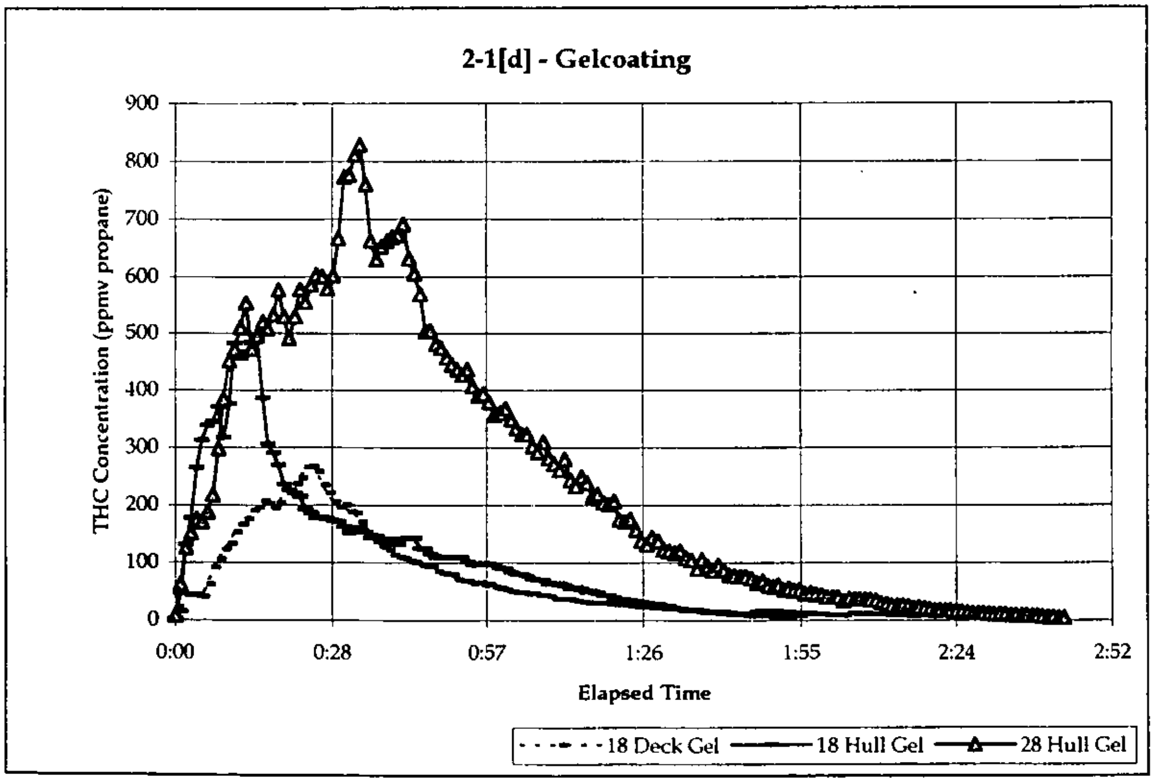
The THC measurements made during this program serve as the principal basis for estimating emissions. Figure 2-1 presents summary

Figure 2-1
Summary Concentration Traces for Boat Lamination and Gelcoating






2-1[c] - Spray: 28 Hull - Both Resins
THC Concentration (ppmv propane)
700
600
500
400
300
200
100
0
0:00
1:12
2:24
3:36
4:48
6:00
7:12
Elapsed Time
35R
42R


2-1[d] - Gelcoating
THC Concentration (ppmv propane)
900
800
700
600
500
400
300
200
100
0
0:00
0:28
0:57
1:26
1:55
2:24
2:52
Elapsed Time
18 Deck Gel
18 Hull Gel
28 Hull Gel

concentration profiles for the testing conducted during the April 1997 deployment. Each of the four frames presents THC concentration traces derived by averaging data from the individual test runs. This figure illustrates some of the differences in the data summarized in Table 2-1.

For example, the data from sampling the exhaust during lamination of the 18-ft mold illustrates the differences between spray up application and application by flow chopper, as well as the increased THC concentrations in the exhaust noted when laminating with a higher styrene content resin (42.2 percent styrene). The data from the 28-ft mold lamination test show that, although the peak concentrations using the two resins were essentially the same, the concentration trace for the 42 percent styrene resin has broader peaks, corresponding to greater mass emission rates.

The summary illustration of the gelcoat data shows the effect of geometry on the concentrations measured. The greater THC concentrations in the exhaust noted during lamination of the 28-ft mold are likely the result of the broader strokes used in gelcoating the part and the distance between the operator and the part during gelcoating. The atomized gelcoat remains airborne for a longer period of time, resulting in greater volatilization and emissions of VOC. The operator can stand closer to the 18-ft hull and make shorter strokes to apply the gelcoat. Also, the operator can coat half of the 18-ft mold surface in a single pass, rather than the minimum two passes required to coat the 28-ft hull mold; this difference is noted in the differences in peak widths. Finally, the 18-ft deck mold is relatively flat, with complex geometry requiring the operator to work close to the mold surface and coat some portions of the mold by brush, reducing the amount of gelcoat atomized.

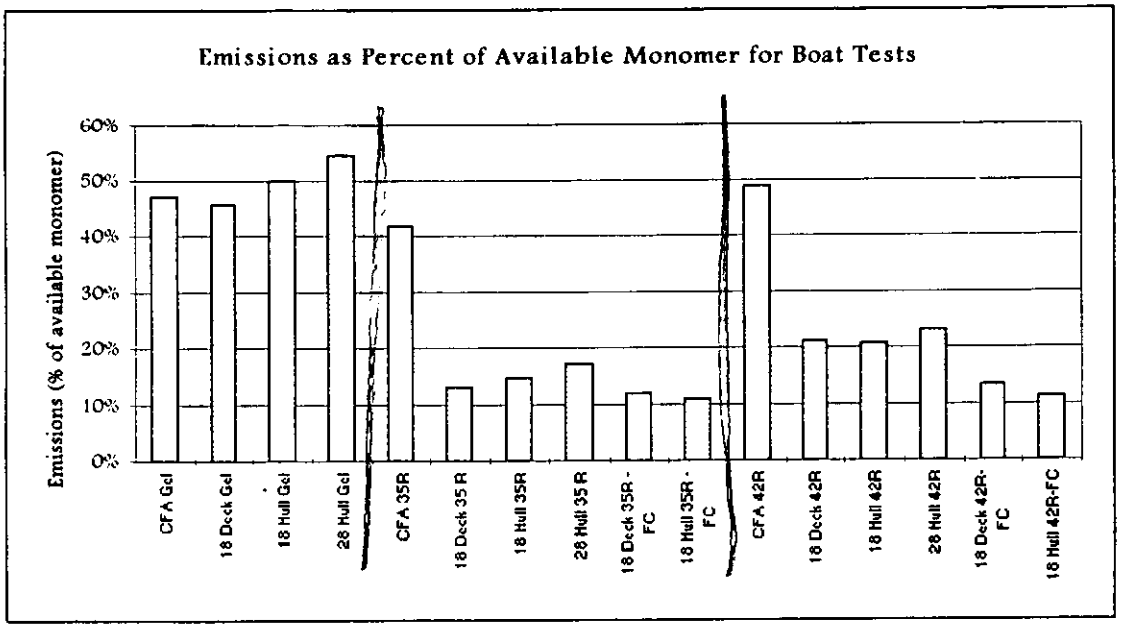
The results presented in the tables and figures in this report reflect the exclusion from testing of emissions in the long, low-concentration "tail" in each THC trace for each run. This phenomenon has been noted in previous studies and was highlighted in the QAPP as a concern for completing this testing in a timely fashion. Section 2.2 presents the results from some of the early test runs that illustrate that elimination of the "tail" has little if any effect on the results reported herein.

All the data related to emissions from boat gelcoating and lamination derived from this NMMA testing program are summarized in Figure 2-2. This figure presents the results for all tests in terms of emissions as a percent of available monomer. As the results clearly indicate, emissions from gelcoating differ from those associated with resin lamination. Sections 2.4 and 2.5 contain more detailed presentations of the results from gelcoating and resin lamination emission testing.

2.2 Evaluation of Emissions from Continuing Trace Concentrations

The QAPP included the evaluation of a cutoff concentration in the exhaust stream that would allow cessation of sampling before the concentration of THC in the enclosure exhaust reached the background concentration, provided at least 95 percent of total emissions were characterized before cessation of sampling. The first test runs were used for this assessment. The assessment determined that 95 percent of total emissions from lamination and gelcoat operations would be characterized by the time the exhaust concentration reached 75 ppmv as propane. Ceasing sampling at this concentration would reduce run sampling by about 1 hour per run, allowing more sampling runs per day.

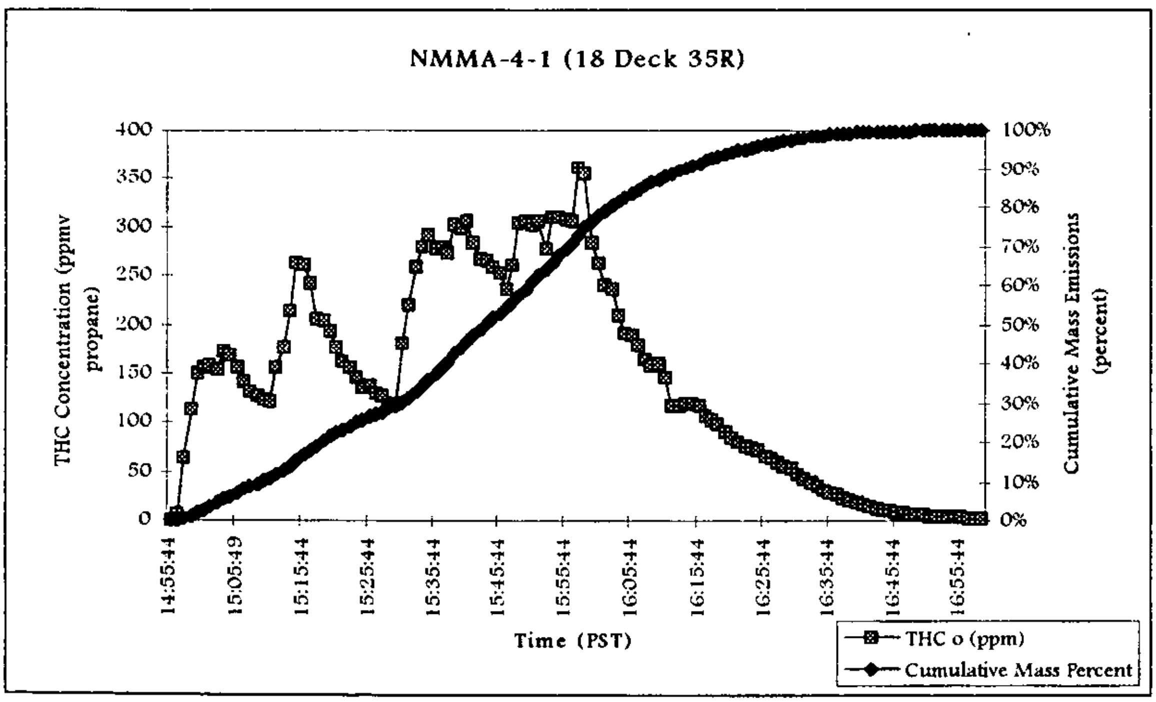
Figure 2-2
Emissions as Percentage of Available Monomer



As it turned out, it was practical to continue the test runs until concentrations measured about 7 ppmv as propane. Because the background concentration was about 2-4 ppmv, the difference in concentration was about 4 ppmv, relating to less than 2 ppmv as styrene and representing only 0.2 percent of emissions.

The assessment of the concentration trace for NMMA-4-1 (lamination of an 18-ft deck with 35 percent styrene resin) illustrates this analysis. The concentration trace for run NMMA-4-1 (Figure 2-3) shows the typical pattern of concentration peaks and valleys as resin is applied systematically to the sides of the mold. Resin and glass are applied to the first side, and the mixture is rolled out to remove air bubbles. After the initial coat on this half of the mold begins to gel, the mold is rotated and the first coat is applied to the second side. After the coat on the second side begins to gel, the mold is rotated again and the second layer of glass and resin is applied to the first side, with some of the glass being woven roving. This process continues until the specified thickness is achieved. As part of the manufacturing procedure, each layer of glass and resin are rolled out. After the final coat of resin is applied and the peak exotherm of the polymerization reaction is achieved, the concentration of styrene in the exhaust stream begins to decrease. All the glass and resin were applied to this mold in about 1 hour. The styrene concentration in the exhaust stream decreased to near background levels in about 1 hour after that point.

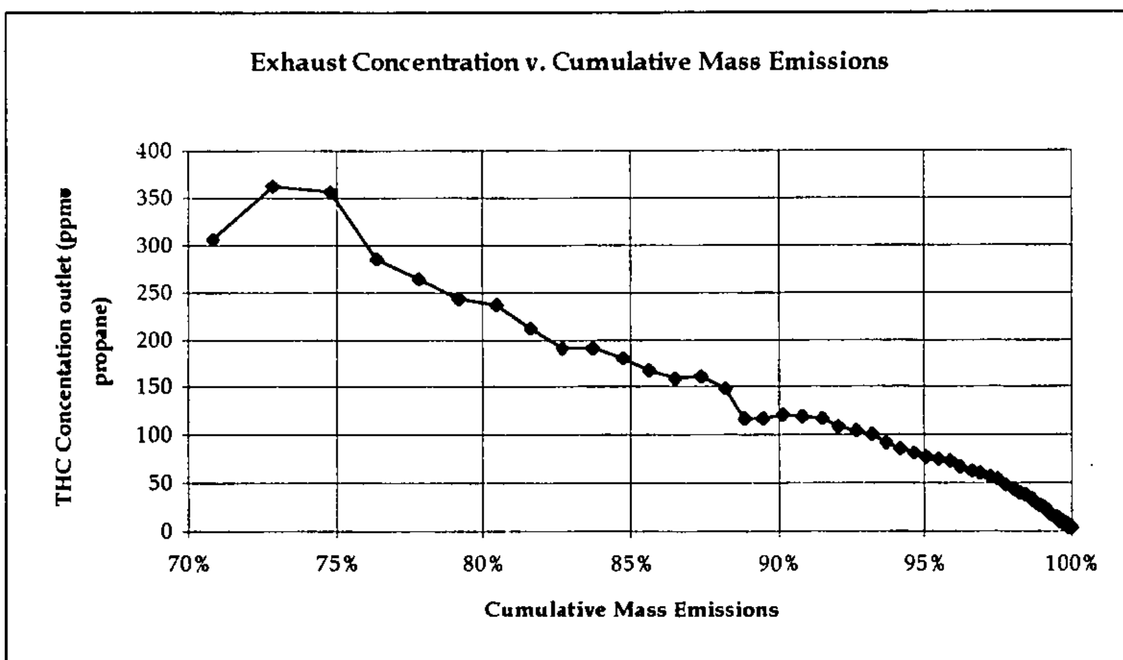
Figure 2-3
Total Hydrocarbon Concentration Trace for NMMA-4-1



Because the THC associated with the latter part of the concentration trace (from 7 to 4 ppmv) represents about 0.2 percent of emissions, the emissions associated with sampling completely to background levels from the cutoff concentration were less than 0.015 lb. Even this amount represents a worst case assessment (i.e., greatest emissions in the tail) because it assumes that emissions from all tests are the same, whereas the total emissions from laminating the 18-ft deck mold were less than the emissions from laminating either other part evaluated. The 0.015-lb total would represent a larger portion of emissions for smaller parts, however, such as those included in the previous CFA/Dow and EPA/RTI studies.

Another approach to assessing an appropriate cutoff concentration is depicted in Figure 2-4, a plot of outlet concentration and cumulative emissions. This figure, developed from the same NMMA-4-1 test run, shows that 95 percent of total emissions from lamination were quantified when the exhaust concentration decreased to about 75 ppmv as propane.

Figure 2-4
Concentration v. Cumulative Mass Emissions (NMMA-4-1)



2.3 CFA Mold Results

Part of the test matrix for this program included lamination of the mold used in the CFA Phase I study so that results of both studies could be compared. Testing was conducted using the 35 percent styrene and 42 percent styrene resins, nearly identical to the styrene contents in the resins used in the CFA Phase I study. The initial test run using 35 percent resin (NMMA-11-1R) was conducted using the techniques employed by experienced laminators during actual boat manufacturing. This approach resulted in lower emissions than those measured during the CFA study. To allow comparison to the CFA study, subsequent tests were conducted using methods that resulted in "uncontrolled" spray, including one run during lamination by a completely inexperienced operator (NMMA-11-2R), as evinced by the 10.1 lb of resin used. Although not included among the planned tests, one gelcoat run (NMMA-11-1G) was also conducted by an experienced operator using good technique.

The results of testing during coating of the CFA mold (Table 2-2 and Figure 2-5) indicate an average loss of 38.0 percent of available styrene during lamination using 35 percent styrene resin (not using Run 11-1R in the average) and 48.7 percent of available styrene loss during lamination using 42 percent styrene resin. The results show a higher degree of variability than the results for lamination on the boat molds, largely as a result of the high degree of variability in application technique for inexperienced operators and the influence of the resin weight measurement. The resin extraction equipment disproportionately affected the measurement of small quantities of resin use (Section 3.2.4). Although the results of the various test runs met acceptance criteria, they were not as consistent as the results of emission testing during use of boat molds. Emissions measured during CFA mold lamination in this study were about twice those of comparable tests from the CFA study.

Table 2-2
Emissions Measured During Application of Resin to CFA Mold

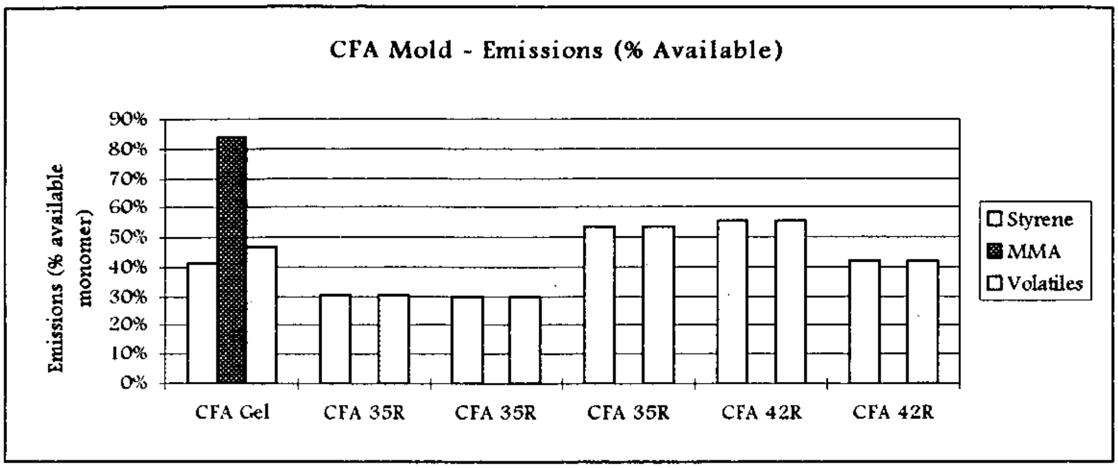
Run	Material	Content	Resin (lb)	Percent of Available	Flux (lb/ft²)	Normalized (lb/1000lb/ft²)
11-1G	Gelcoat	37.0	3.2	46.9	0.0203	6.36
11-1R-Ctrl	Resin	35.1	3.5	30.6	0.0114	3.25
11-2R-Unc	Resin	35.1	10.1	29.9	0.0233	2.31
11-3R-Unc	Resin	35.1	6.1	53.6	0.0456	7.48
12-1R-Unc	Resin	42.2	5.4	55.7	0.0441	8.16
12-2R-Unc	Resin	42.2	4.73	41.7	0.0208	4.39

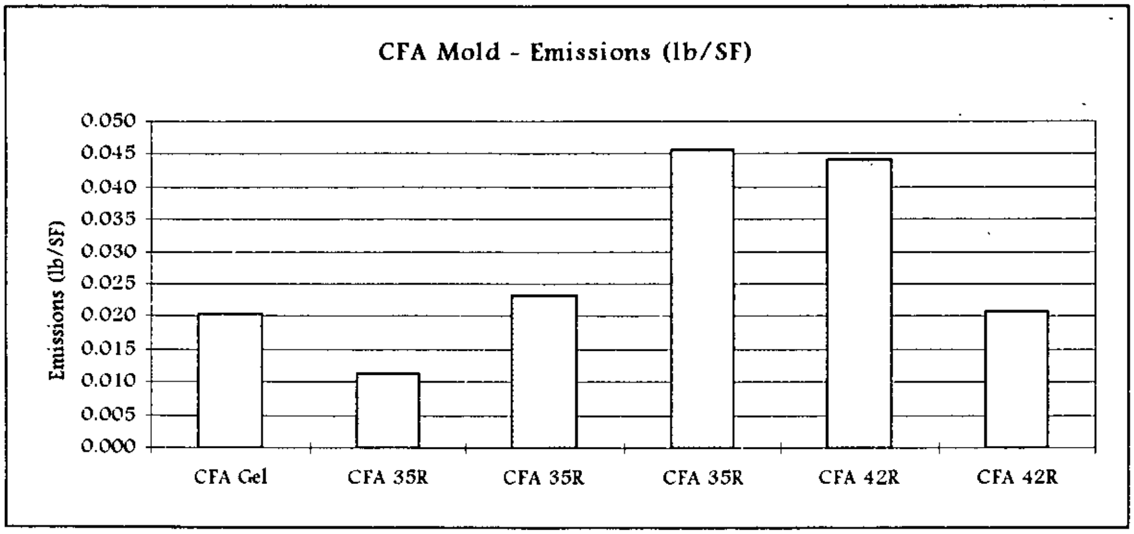
Styrene losses were also considered in terms of emissions per unit area and normalized emissions. Average losses per unit mold surface area (flux) were 0.0268 lb/ft^2 and 0.0325 lb/ft^2 for the 35 and 42 percent styrene resins, respectively. Normalized losses averaged 4.35 $lb/1000\ lb/ft^2$ for the 35 percent styrene lamination and 6.28 $lb/1000\ lb/ft^2$ for the 42 percent styrene resin. Like the results in terms of percent of available styrene, these results indicate greater losses from use of greater styrene content resins than would be proportional to the actual styrene content. The flux losses show a different trend, but comparison of the emissions in this format is inconclusive because of the only slight difference in averages and the difficulty in consistent resin weight measurement.

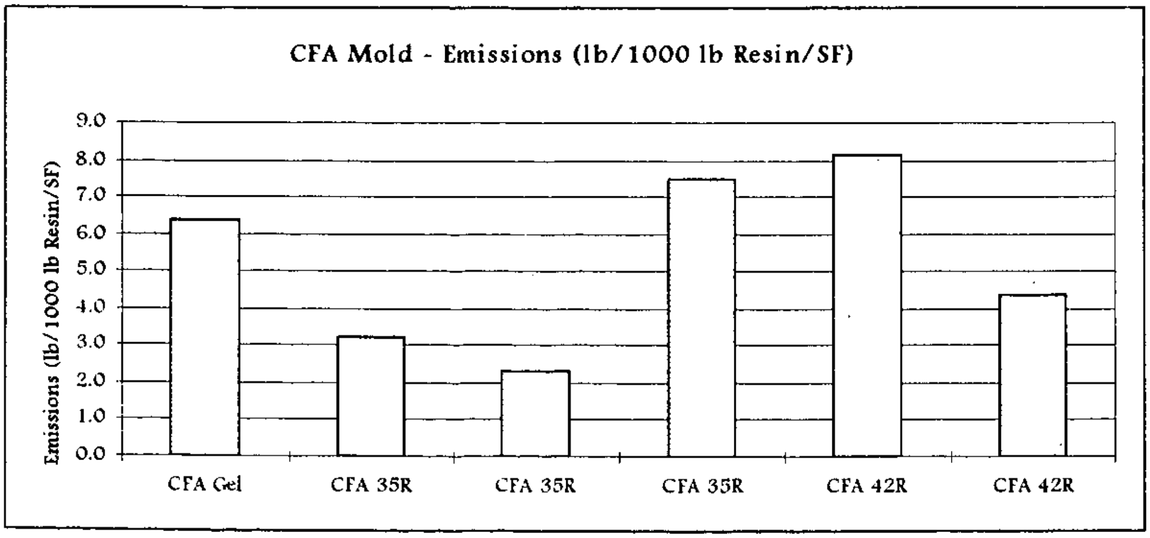
In this test series of the program (i.e., using the CFA mold), emission measurements were not always comparable to the amount of resin used, i.e., the emissions as percent of available monomer was not always consistent. The equipment was set up to measure large quantities of resin and gelcoat continuously. The expected quantities were between 100 and 300 lb resin for each test run. The scale selected, therefore, had an accuracy of 0.5 lb, which was satisfactory for the boat lamination and gelcoating tests, but which did not

Figure 2-5

Emissions from Lamination and Gelcoating of the CFA Mold







prove to be adequate for measuring the small quantities of resin (on the order of only 3.5 lb) used to laminate the CFA mold. Thus, the precision of the scale used for resin and gelcoat led to some results from CFA mold testing that were more variable than results from boat testing.

2.4 Results of Gelcoat Application Testing

All gelcoat application was done to a uniform thickness of 20 mils with a gelcoat containing 32 percent styrene and 5 percent MMA. A preliminary test run (NMMA-6-P) was made using a U.S. Marine production gelcoat supplied by the same supplier for the test gelcoat. Although the production gelcoat had different styrene content (approximately 31 percent), the results generated were included in this report because they are very consistent with the other results from gelcoat testing in this study (Figure 2-6).

Results for boat gelcoating are presented in terms of losses of styrene, MMA, and total volatiles (Figure 2-6). The total emissions measured for the deck and two hull sizes are consistent (especially for styrene and total volatiles), with slightly greater emissions resulting from gelcoating the hulls, and the greatest emissions resulting from gelcoating the larger hull (Table 2-3). The most notable finding of this testing is the relative contribution to emissions of the individual constituents in the gelcoat. From 60 to 80 percent of the MMA in the gelcoat is lost as emissions in the gelcoat process. MMA is more volatile than styrene and, thus, is lost at a much greater rate than the styrene. Only one test run resulted in MMA losses of less than 60 percent of available MMA. That run (NMMA-6-1) was discarded from the average values presented in Table 2-3 as unrepresentative because of variability of the GC response factors.

Figure 2-6
Gelcoat Emissions as Percent of Available Volatiles

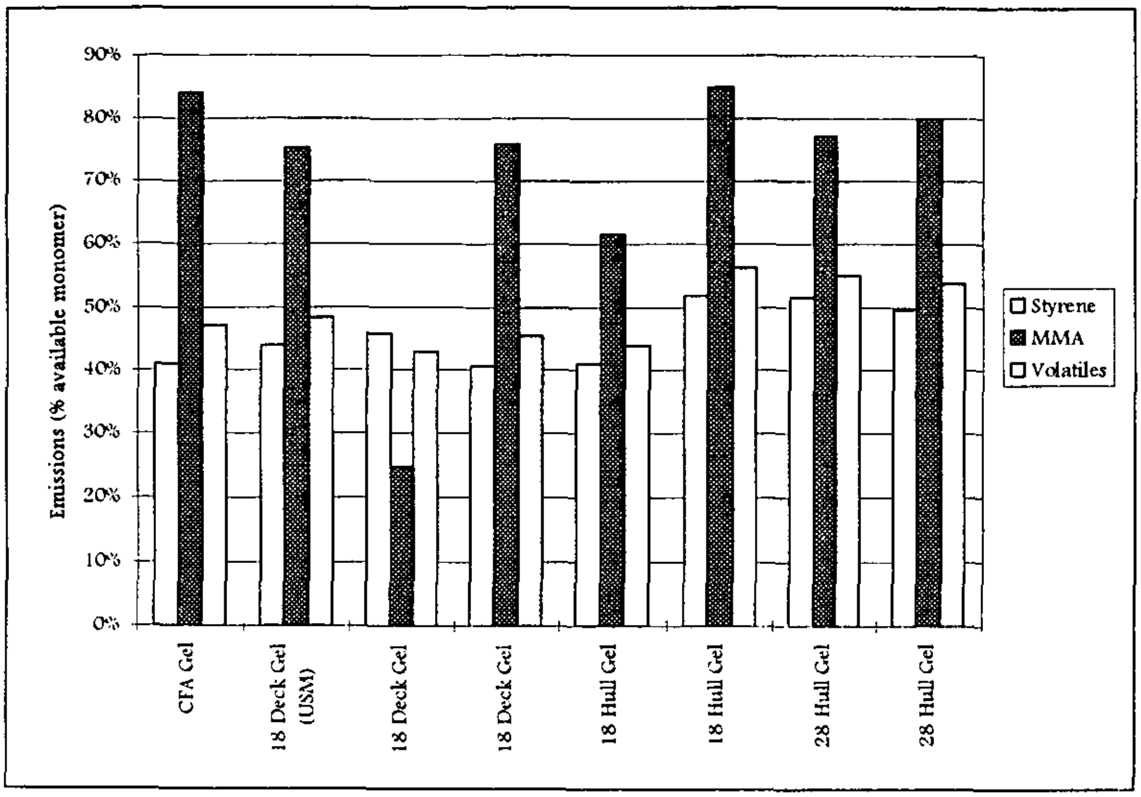


Table 2-3
Emissions from Gelcoating as Percentage of Available Volatiles

	Gelcoat Use (lb)	Percent of Available Styrene	Percent of Available MMA	Percent of Available Volatiles
18-ft Deck	20.0	42.3	75.6	46.9
18-ft Hull	25.7	46.4	73.2	50.0
28-ft Hull	65.7	50.4	78.6	54.3

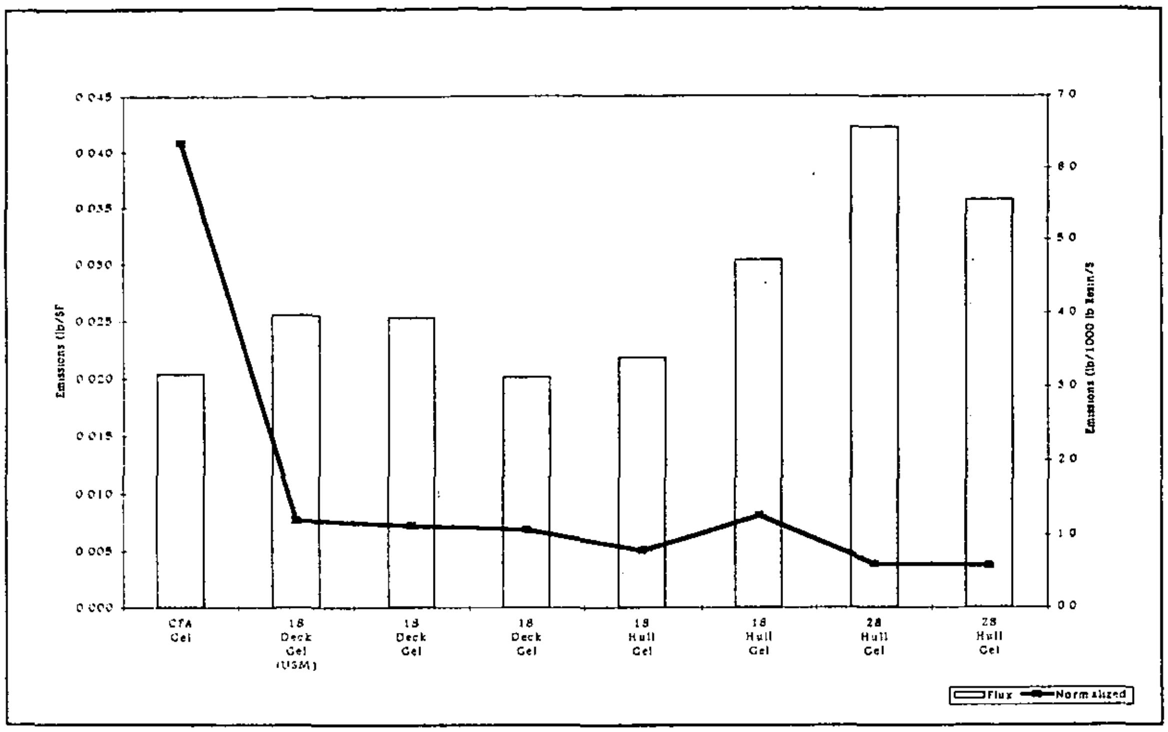
The results from the first test run on the 18-ft deck after the preliminary test using gelcoat (the second run for the 18-ft deck) yielded a loss of available MMA that was substantially less than all other measurements made during all other gelcoat test runs, only about 25 percent compared with 60 to 85 percent of available MMA. Excluding that one run (NMMA-6-1) provides an average MMA loss of 75.6 percent of available MMA, a value that is very consistent with the MMA loss values for the 18-ft and 28-ft hulls. The average styrene loss for this test was relatively unchanged as a result of excluding that one run; likewise, the total volatile loss was relatively unchanged, owing to the contribution of styrene losses to the total volatile loss.

Gelcoating results evaluated in terms of loss per unit mold surface area and normalized emissions (i.e., emissions per unit mass of resin per unit mold surface area) show some interesting trends (Table 2-4 and Figure 2-7). As would be expected, the emissions from the 18-ft molds are essentially equal, owing to nearly equal resin use and surface area. Normalized emissions appear to be inversely related to mold area, assuming the same thickness of the gelcoat is applied. Normalized emissions show the general trend of increasing emissions with decreasing mold surface area. This trend was also evident from the emission testing for resin lamination.

Table 2-4
Total Emissions from Gelcoating Related to Mold Surface Area

	Gelcoat Use (lb)	Mold Area (ft^2)	Emissions (lb/ft^2)	Emissions ($lb/1000\ lb/ft^2$)
18-ft Deck	20.0	171.09	0.0228	1.14
18-ft Hull	25.7	220.5	0.0261	1.03
28-ft Hull	65.7	454	0.0389	0.59

Figure 2-7
Emissions from Gelcoating Related to Mold Surface Area



2.5 Results of Resin Lamination Testing

Testing was conducted during lamination of three mold size and shape combinations selected to be representative of the majority of resin use in the industry. Because the quantities of resin used for each test are much greater than those used in previous testing, the results were very reproducible (Table 2-5).

Figures are provided to illustrate the tabulated data. All tests are shown in the figures and are grouped by resin (styrene content) to allow comparison of the results across the different mold sizes and shapes.

Table 2-5
Emissions Measured During Resin Lamination

Test	Resin Use (lb)	Emissions		
		Percent of Available Styrene	Flux (lb/ft²)	Normalized (lb/1000 lb/ft²)
18 Deck 35 R	124.6	12.9	0.0130	0.11
18 Deck 35 R FC	114.7	11.9	0.0092	0.08
18 Deck 42 R	111.8	21.1	0.0284	0.25
18 Deck 42 R FC	122.2	13.4	0.0125	0.10
18 Hull 35 R	144.5	14.8	0.0143	0.10
18 Hull 35 R FC	141.7	10.8	0.0072	0.05
18 Hull 42 R	142.9	20.7	0.0272	0.19
18 Hull 42 R FC	154.9	11.4	0.0089	0.06
28 Hull 35 R	354.4	17.3	0.0234	0.07
28 Hull 42 R	304.2	23.3	0.0357	0.12

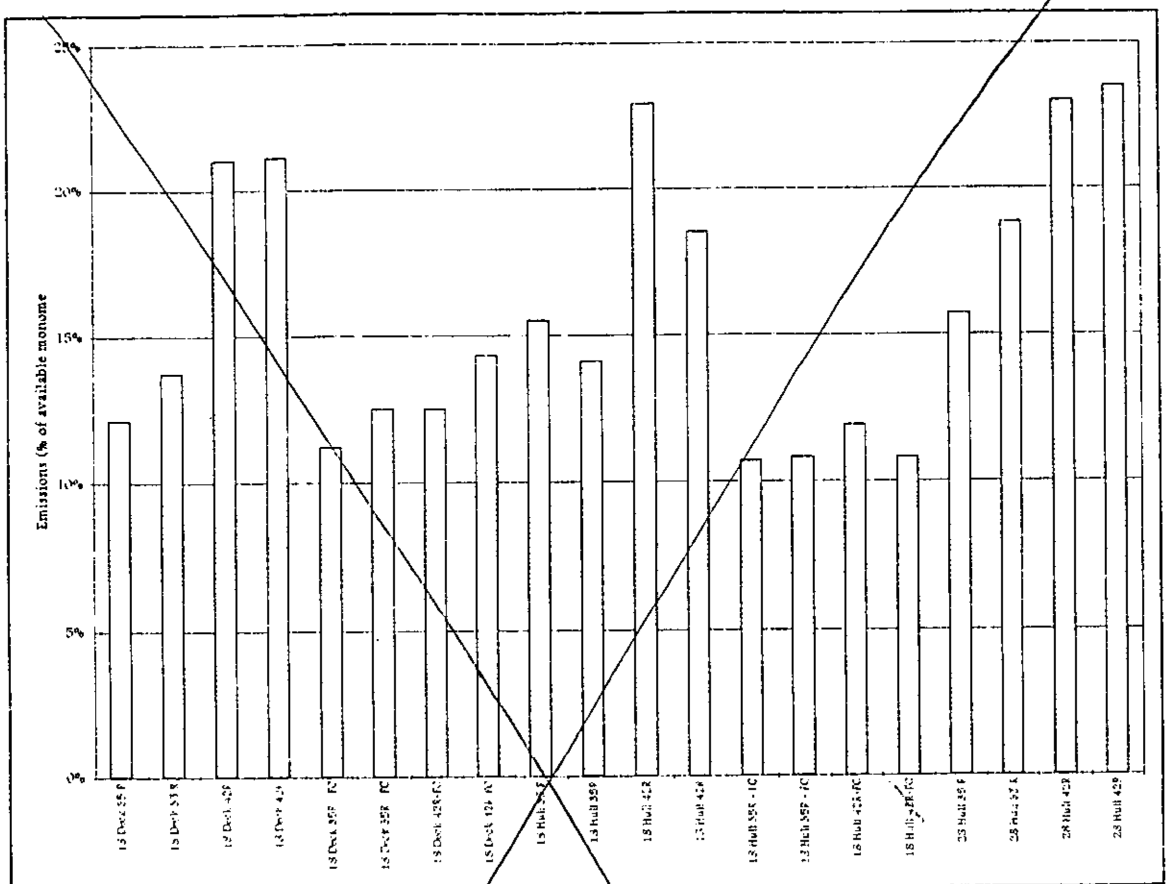
all 3 columns were revised by this 9-4-97 version
MR 1-5-98

2.5.1 Emissions as Percent of Available Styrene

Figure 2-8 presents the data for emissions as a function of available styrene. In each set of test runs for a given mold size and shape, the same pattern of emissions is seen: the emissions from the 42 percent styrene resin lamination are greater than the emissions from lamination using 35 percent styrene resin, and the use of a flow chopper to apply the resin does result in less emissions. The latter effect is likely the result of not atomizing styrene in the spray up process. Based on these measurements, the effect of flow chopper use on emissions is greater for the higher styrene content resins.

The greatest emissions in terms of percent available styrene were measured for the larger mold size and the greater styrene content resin. An average loss of 23.3 percent of available styrene was measured from laminating the 28-ft hull with 42 percent styrene resin. Only 17.3 percent loss was measured for the same hull using 35 percent resin. Because this format of presenting

Figure 2-8
Emissions from Lamination as Function of Available Styrene



emissions should account for differences in the resin styrene content, the results indicate that emissions are not directly proportional to resin styrene content, as might have been inferred from an emission factor based on percent available styrene.

Same - not changed by 9-4-97 version.

The comparisons become clearer when the same data are reviewed in terms of the various molds and tests for the different resins. Figure 2-9 presents emissions as a percentage of available styrene in the resin for the two resins tested. One observation from these results is that emissions as a percentage of available styrene for a given styrene content in the resin increase with surface area of the mold for surface areas substantially greater (i.e., the 28-ft

Table 2-5
Emissions Measured During Resin Lamination

Test	Resin Use (lb)	Emissions		
		Percent of Available Styrene	Flux (lb/ft²)	Normalized (lb/1000 lb/ft²)
18 Deck 35 R	124.6	14.0	0.0354	0.29
18 Deck 35 R FC	114.7	11.6	0.0272	0.24
18 Deck 42 R	111.8	20.6	0.0569	0.51
18 Deck 42 R FC	122.2	13.1	0.0393	0.32
18 Hull 35 R	144.5	14.6	0.0336	0.23
18 Hull 35 R FC	141.7	10.5	0.0237	0.17
18 Hull 42 R	142.9	20.2	0.0551	0.39
18 Hull 42 R FC	154.9	11.1	0.0330	0.21
28 Hull 35 R	354.4	17.2	0.0472	0.13
28 Hull 42 R	304.2	22.9	0.0648	0.21

2.5.1 Emissions as Percent of Available Styrene

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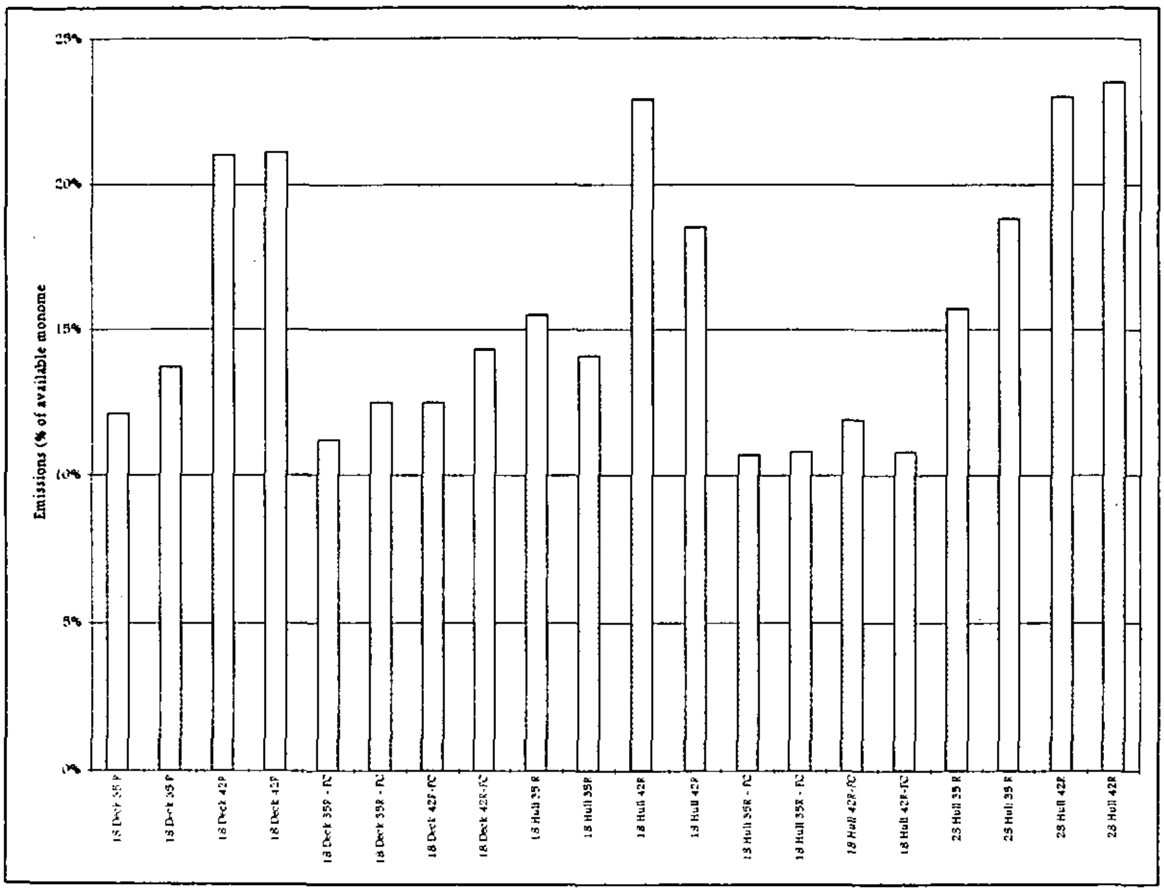
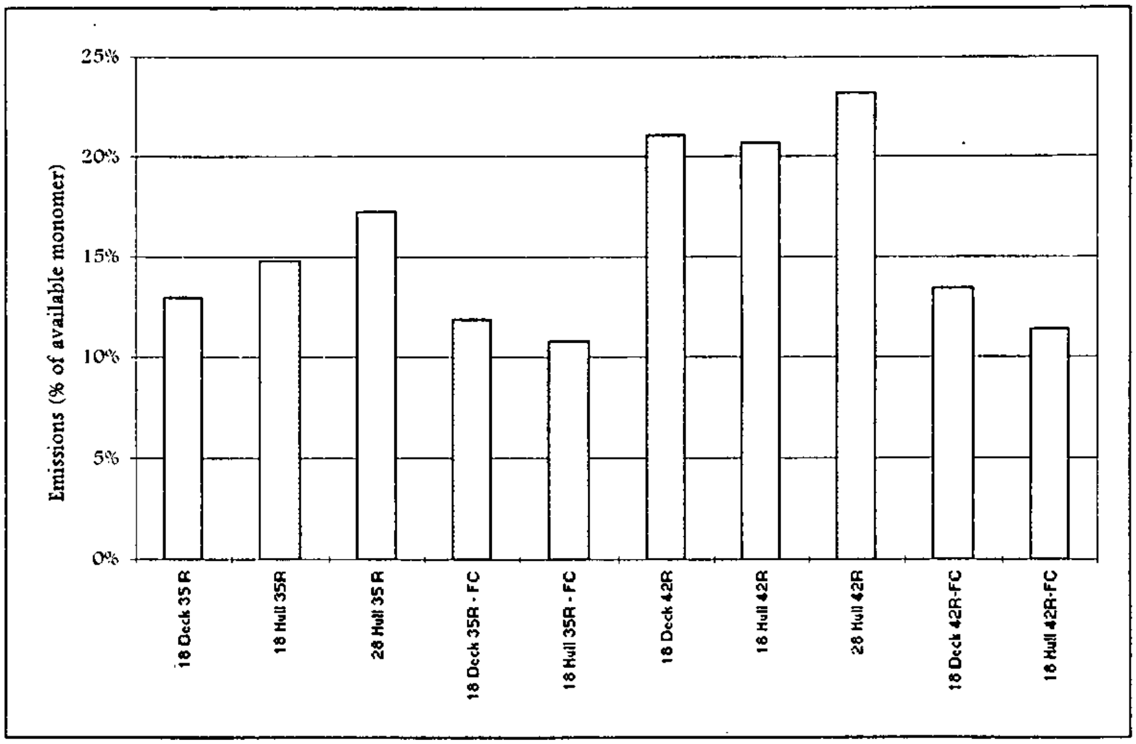
Figure 2-8
Emissions from Lamination as Function of Available Styrene



emissions should account for differences in the resin styrene content, the results indicate that emissions are not directly proportional to resin styrene content, as might have been inferred from an emission factor based on percent available styrene.

The comparisons become clearer when the same data are reviewed in terms of the various molds and tests for the different resins. Figure 2-9 presents emissions as a percentage of available styrene in the resin for the two resins tested. One observation from these results is that emissions as a percentage of available styrene for a given styrene content in the resin increase with surface area of the mold for surface areas substantially greater (i.e., the 28-ft hull). This trend is apparent for the two styrene content resins tested. Also, the use of a flow chopper to apply resin reduces the percentage of available styrene emitted for a given mold size or shape. Greater reductions are noted for the greater percentage styrene content resin, but in general, reductions of 8 to 45 percent are noted: from about 12.9 percent available to 11.9 percent available for the 35 percent styrene resin (18-ft deck) and from 20.7 percent available to 11.4 percent available for the 42 percent styrene resin (18-ft hull).

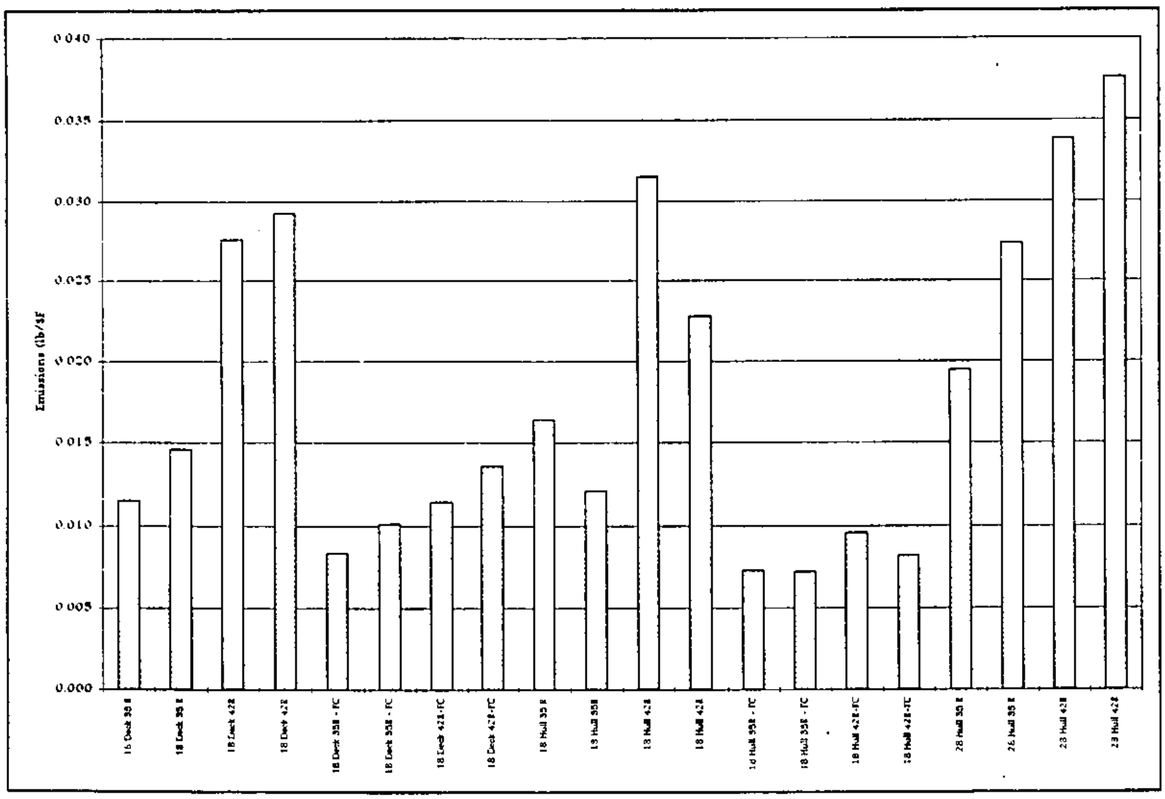
Figure 2-9
Comparison of Results by Test



2.5.2 Flux Emissions

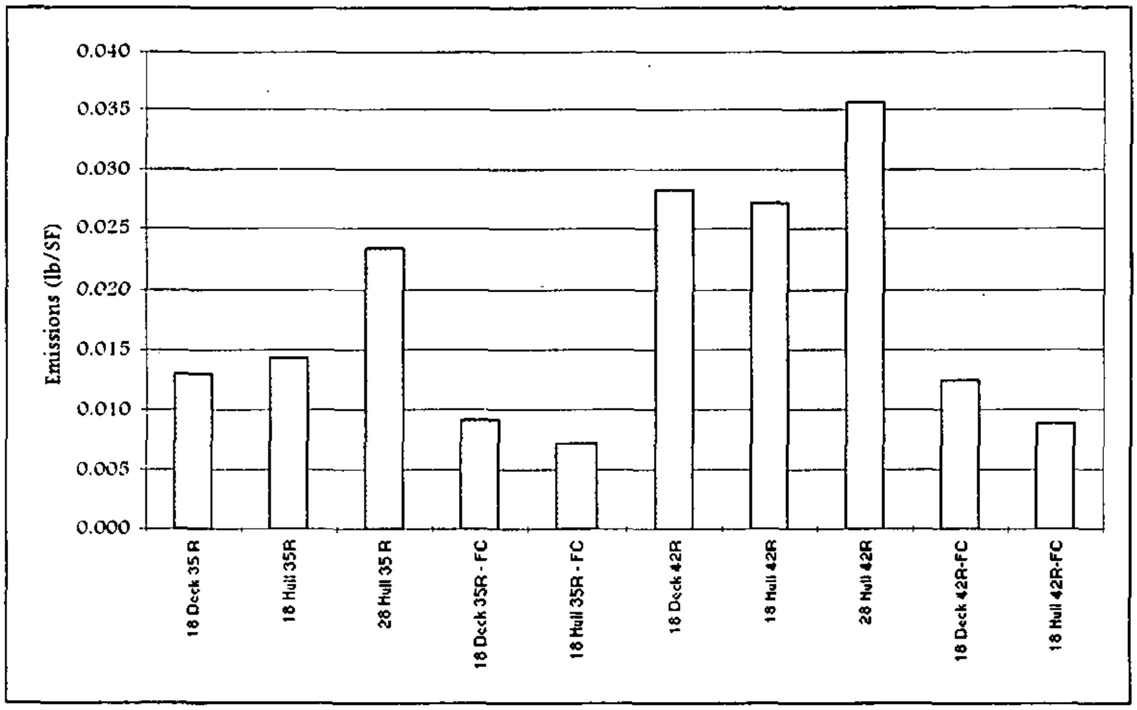
Emissions per unit area of mold surface (Figure 2-10) show the consistency of the runs made for testing and indicate general trends in the data. . For example, emissions per unit surface area increase with the increase in resin styrene content. Also, the results are fairly consistent for the two 18-ft mold types, despite the difference in configuration. The hull is a concave mold and the deck (a bow rider design) has convex character.

Figure 2-10
Emissions from Resin Lamination as Flux Measurement



The same data, reduced to averages for each test set, are presented in Figure 2-11 for the two different styrene resins tested. These results again illustrate that emissions from the 42 percent styrene resin are greater than the emissions from the 35 percent styrene resin lamination. In this case, because the mold surface areas are more nearly equal, flux emissions from the surface of the two 18-ft molds are almost equal. Figure 2-11 also shows that emissions from lamination using a flow chopper are less than the baseline cases.

Figure 2-11
Average Emission Flux Measurements for Two Resins

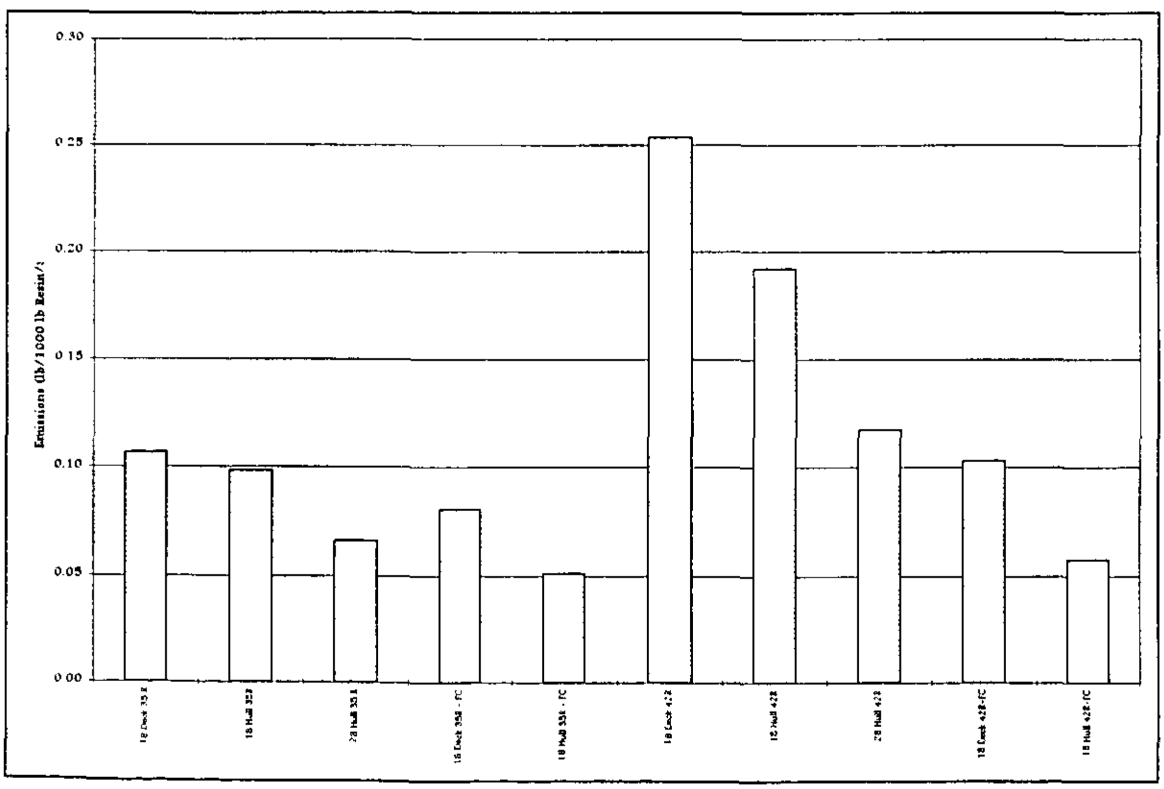


2.5.3 Normalized Emissions

Figure 2-12 compares results from all resin lamination test runs presented as normalized emissions (mass of emissions per mass of resin per surface area). For both resins, the normalized emissions decrease with increasing surface area, indicated by the 18-ft deck to the 18-ft hull to the 28-ft hull. Normalized emissions were about 80 percent greater from lamination with 42 percent styrene resin. Similar trends are noted for the emissions from lamination using a flow chopper; normalized emissions decrease with increasing mold surface area and are always less than the normalized emissions for the *corresponding spray up operation.*

The differences between emissions generated using spray devices and those generated using flow choppers can be seen in Figure 2-1, which compares the concentration traces for 18-ft hull and deck mold lamination using two different styrene content resins and these two application methods. The difference in the concentration profile is due to the application devices. The utility of the flow chopper in reducing the amount of styrene atomized in application is much greater for the higher styrene content resin. As Figure 2-1 illustrates, the concentration tail after resin is applied is nearly identical for these two application methods.

Figure 2-12
Normalized Emissions from Resin Lamination



3.0 CALIBRATION AND SAMPLING PROCEDURES

The extensive battery of tests conducted and measurements made for this program includes those that were repeated routinely, either daily or during every test run, and those that were repeated only once or twice over the course of the whole program (Table 3-1). This section describes the procedures for all the tests conducted and measurements made during this program, including QC procedures (calibrations) and QA procedures followed to produce data for assessing the quality of the other measurements. The procedures are presented in terms of those associated with the process of manufacturing the part (i.e., hull or deck) and those associated with the measurement of emissions. Additional measurements (i.e., of air flow over the mold and styrene recovery) and data handling are also addressed in this section.

Table 3-1
Measurements During Test Program

Measurement	Designation	Frequency
THC Concentration	Method 25A	Continuous
Styrene (MMA) Concentration	Method 18	Intermittent (6-15 min intervals)
Wet Laminate Thickness	Wet Mil Gauge	Each Test Run
Wet Film Thickness	Wet Mil Gauge	Each Test Run
Styrene (MMA) Content	Manufacturer's Method	Per Batch Delivered
Gel Time	U.S. Marine Method	Per Batch Delivered
Resin Flow Rate	Spray Gun Calibration	Pre/Post Test Daily
Air Flow	Hot Wire Anemometer	For Each Mold
Air Temperature	Exhaust Gas Temperature	Continuous
Exhaust Flow Rate	Vent Stack Air Flow Rate	One traverse set per test; continuous point measurement
Styrene Recovery	Material Balance/Method 25A	Pre/Post Program
Resin/Gelcoat Weight	Precision Balance	Pre/Post Test; continuous measurement

Two test runs were made most test days; the number of tests completed in a day was dictated by the duration of the test and the availability of material, molds, and personnel to construct the parts. On some days, only a single test run was completed, while on other days, as many as three test runs were completed. The procedures implemented most test days include the following:

- Morning spray equipment calibration;
- Morning leak check and calibration of the THC analyzer and the GC;
- Measurements made during the test runs, including THC, styrene and MMA (using the GC), flow rate, weight of material (resin or gelcoat) used during the run, and temperature;
- Post-test quality control measurements (calibrations);
- Measurements for second test run (THC, styrene and MMA, flow rate, weight, and temperature);
- Post-test quality control measurements; and
- Evening spray gun flow rate calibration.

Additional tests conducted include measuring the rate of air flow over the mold and mass balance styrene recovery checks (QA).

3.1 Process Procedures and Measurements

The procedures used to apply the resin were those used by the skilled U.S. Marine staff in applying gelcoat or resin/glass in the manufacturing operation. Resins and gelcoat selected for this program had characteristics typical of industry use and meeting the goals of this program (Section 1.3.5). Staff used to manufacture molds and to train lamination staff performed all gelcoating and lamination during this program. Additional personnel assisted when glass was rolled out or woven roving added to the mold.

3.1.1 Application Procedures

After the morning calibrations were completed, monitoring of air flow was established, materials to be applied were weighed, and lamination (by spray up or flow chopper) or gelcoating of a part in the TTE commenced. Skilled operators applied resin and gelcoat as they would in normal production. The operators measured laminate and gelcoat thickness periodically as the material was applied, using a chop mil gauge for laminate thickness and a gelcoat mil gauge for gelcoat thickness. During the application of both materials, multiple readings were taken at three locations along the length of the mold as the operators fabricated the part. The operators did not record gauge readings but applied material to the desired thickness, in accordance with normal operating procedures.

Gelcoat was applied using spray guns with a distance of 18-24 in. from spray tip to mold surface for smaller (18-ft) parts. The distance was greater for gelcoating the 28-ft hull mold, reaching 4-5 ft at the greatest distance from the application equipment to the keel of the hull. When gelcoating, a fog coat was applied first to one side of the mold and then a thicker layer was applied to bring the coating to a nominal thickness of 20 mils. Using typical gelcoating procedure, the operator checked the gelcoat thickness several times in at least three locations on each side of the mold to ensure uniform thickness. After one side was coated, the mold was rotated, and the process was repeated to coat the other half of the mold surface. Complex portions of some molds, such as encountered on the 18-ft deck mold, were coated using a cup and brush technique. These portions were typically inaccessible with the spray equipment.

A similar procedure was used to apply resin and glass to the 18-ft hull and deck and the 28-ft hull molds. In this procedure, though, a skin coat of resin and glass of about 90 mil thickness was applied first and allowed to cure almost entirely before applying additional layers of the laminate. Additional layers were then added by alternating resin/glass chop and resin/woven roving. The chopped glass was rolled out at every layer. The laminate thicknesses for the hulls and decks were much greater than the laminate thicknesses used in previous studies. For example, a laminate thickness of 414 mils was used in the bottom of the 28-ft hull (including three layers of woven roving, each about 48 mil thickness), and a thickness of 198 mils was used for the sides and transom of the same hull (including one roving). A 0.010-in. thickness gauge was used to make the measurements.

3.1.2 Spray Equipment Calibration

The spray gun resin or gelcoat flow rate was determined at the beginning of every test day and confirmed at the end of every test day, that is, before the first test and after the last test. The spray equipment flow rate was adjusted (resin pump pressure was adjusted and spray tip sizes changed) by the operator to provide the normal resin and gelcoat output for manufacturing operations, and the flow rate was recorded. The flow rate calibration consisted of spraying resin (or gelcoat) into a pre-weighed container for 15 seconds, recording the material weight, and calculating the rate in pounds per minute. For spray-up application, the glass content was adjusted to the required resin flow rate; after the resin flow rate was established, the chopper speed was adjusted to provide the proper glass ratio. The spray pattern was evaluated by the experienced operators by spraying resin and glass onto a cardboard panel. Adjustments were made based on the visual pattern to achieve the desired result.

The resin/gelcoat-to-catalyst ratio was calibrated by comparing the catalyst volume measurement to flow rate and adjusting the catalyst ratio by the slave pump setting. Both resin and catalyst are delivered to the applicator head by positive displacement pumps. Because the air-actuated piston pumps deliver a fixed amount of material with every stroke, the amount of catalyst delivered to the applicator head can be accurately set based on the stroke count. The amount of catalyst delivered to the applicator is very small compared with the amount of resin delivered, so the amount of resin is set first and calibration completed. Then the stroke count of the resin pump is set to the desired catalyst ratio. The catalyst ratio is adjusted after application of the skin coat and then these stroke count settings were maintained throughout each day.

3.1.3 Gel Time

Gel time was measured on site for each batch of resin used (Table 3-2). The procedure used to measure gel time (Appendix D) is the same procedure used by U.S. Marine in determining gel time for production resin and gelcoat. Gel time for gelcoat was determined using a 2 percent 925 clear catalyst (MEKP); a gel time of about 16.5 minutes is typical for the gelcoat. Two gel times are common for lamination, one for the skin coat and another for the bulk of the lamination. The skin coat gel time for the 35 percent styrene resin was about 18 minutes using a 2 percent Red 925 MEKP catalyst; the remainder of the lamination was done using a gel time of about 23.2 minutes with a 1.5 percent Red 925 MEKP catalyst. The latter materials achieved a peak gel temperature in 26 (for the 1.5 percent catalyst) to 34 minutes (for the 2 percent catalyst). Comparable gel measurements were made for the 42 percent styrene resin.

Table 3-2
Gel Time Results

	1.5% Catalyst	2% Catalyst	2.5% Catalyst
Gelcoat			
Gel time @ 77°F		16:30	
35% Resin			
Gel time	23:13	17:59	15:38
Gel time to 150°F	6:05	5:06	3:09
Time to Peak Temperature	33:57	26:18	22:11
Peak Temperature (°F)	350	360	376
42% Resin			
Gel time	23:29	18:42	16:38
Gel time to 150°F	6:17	5:05	5:04
Time to Peak Temperature	35:55	28:47	27:08
Peak Temperature (°F)	320	352	367

3.1.4 Styrene and Methyl Methacrylate Content

Styrene and MMA content of the resins and gelcoat used during this study were determined by the resin suppliers: Alpha/Owens-Corning for the resin and Cook Composites and Polymers for the gelcoat. Industry procedures were followed and certifications of styrene and MMA content provided (Table 3-3). Material safety data sheets with material certifications are in Appendix E.

Table 3-3
Styrene and MMA Contents

Material	Styrene Content (wt. %)	MMA Content (wt. %)
Laminating Resin (35 R)	35.1	0.0
Laminating Resin (42 R)	42.2	0.0
Test Gelcoat	32.0	5.0
Production Gelcoat (USM)	30.95	4.95

3.2 Emission Testing Equipment and Procedures

This section describes the equipment used to sample emissions from the enclosure and to measure other critical test parameters such as flow rate from the enclosure, temperature of the exhaust stream, and amount of resin applied. QC checks made on the sampling system are also presented in this section.

Samples were collected from the enclosure's exhaust duct through Teflon® sample tubing at ambient temperature using a sample pump. This sample was fed continuously to a THC analyzer and to the GC used to speciate the organic compounds in the exhaust stream. The THC data were collected continuously and recorded in a computer data acquisition system (DAS) through a Dianachart data logger. GC data were collected separately.

The following data were collected continuously:

- TTE outlet THC concentration,
- TTE inlet THC concentration,
- Velocity pressure head in the exhaust duct,
- Temperature of the exhaust stream, and
- Weight of the gelcoat or resin used.

3.2.1 Leak Check and Instrument Calibration

Leak checks and bias checks were incorporated into the calibration and response factor procedures, respectively. Calibration gases were introduced at the probe inlet, and calibration responses were obtained using the same procedures as those used for sample responses. Certifications for all gas standards are included in Appendix F. No vacuum leak checks were performed because any leaks, if present, would be small enough to be "calibrated out" and stable enough to have a negligible effect on post-test drift measurements. Any bias introduced by the system was similarly subsumed in the response factor determinations because they were performed with the entire sampling system.

Instrument calibration checks were also made at the instrument and the results compared with the overall calibration checks made at the sample probe tip. The two sets of results were consistent, indicating that there was little or no bias in the sampling system. Checks by the EPA during their technical system audit verified the findings of the NMMA checks.

3.2.1.1 Total Hydrocarbon Analyzer

THC was measured at the outlet and inlet of the enclosure using an FID in accordance with EPA Method 25A (Appendix A). Analysis of the outlet gas stream was made using a Thermo Electron Model 51H THC analyzer. A Ratfisch Model 52RF analyzer was used to monitor THC content in the inlet air to the enclosure. A second Ratfisch was held on stand-by in case one of the other instruments failed. Both instruments were calibrated using the same procedure.

Before testing each day, the calibration of the FID was verified using zero, low span (30 percent), mid-span (60 percent), and 90 percent span gases. Only one detection range, 1000 ppmv as propane, was used, which covered concentrations of styrene from 0 to approximately 416 ppmv. Calibration was simplified by using the DAS instead of recalibrating the two instruments. That is, instead of using adjustment potentiometers on the instruments themselves, the response signal to the DAS computer was adjusted in the computer program. This approach, which basically acknowledges that the

DAS is an integral part of the entire sampling, analysis, and data acquisition system, allowed more rapid calibration of the system each morning. An advantage, beyond mere simplification of the process, was that calibration incorporating the DAS allowed calibration of the entire system, including sampling lines, instrument, and data systems, incorporating potential biases created by sample extraction equipment, instrument response, and the DAS into a single system response. The acceptable calibration error of less than 10 percent was met for both instruments for all tests (Section 4.1.1).

The FID was calibrated with propane. Instrument response factors were periodically developed for styrene and MMA by analyzing known concentrations of the target compounds in a manner identical to that employed for propane calibration. This procedure generated a correlation of relative response of the compounds on the THC instrument, a factor needed to compare the results of Method 18 sampling with Method 25A sampling.

After the first test of the day, the instrument drift of the analyzer was checked using zero, 30 percent, and 60 percent span gases. When the drift was within the acceptable range, testing proceeded; otherwise, the instrument was recalibrated. The post-test calibration drift was recorded before any recalibration took place. The results of these measurements are reported in Section 4.1.1.

Printouts of raw continuous emission monitoring data are included by run in the field data bound separately. Monitoring data printouts with reduced data are included with other calculations (Appendix C).

3.2.1.2 Gas Chromatograph

Concentrations of the two specific organic compounds expected in the exhaust from the enclosure (styrene and MMA) were measured to provide speciation of their emissions during gelcoat operations and to provide a check on the Method 25A emission measurements using Method 18. Specific concentrations of styrene and MMA were determined using periodic measurements by GC using a Hewlett Packard Model 5890 with a Model 3396 Series II integrator. A Supelco GP 10% 1,2,3-tris(2-cyanoethoxy)propene on 80/100 Chromosorb PAW column (1/8-in diameter X 6 ft long stainless steel) was used for these analyses. Hydrogen at 25 psi was provided to the instrument for the flame; air (at 33 psi) and nitrogen (at 50 psi) were also provided to the instrument to support the flame and as a carrier gas (35 cc/min) for the sample. The instrument was maintained at 130°C for all GC analyses.

Measurements and calibration were conducted in accordance with EPA Method 18 specifications (Appendix A). Sample gas was continuously fed to the GC using the sampling system from the enclosure exhaust duct. Part of the sample stream was sent to the THC analyzer, with another portion of the stream flowing to the GC. At least GC four measurements per hour were to be made in accordance with the QAPP; more often, data were collected every 6 to 8 minutes.

The GC was calibrated according to Method 18 procedures using styrene and MMA to indicate the retention time and the area counts. Styrene gas standards in cylinders were used to provide styrene for these calibrations. MMA standards were prepared in Tedlar® bags (Appendix G) using the procedure detailed in Method 18. After establishing the retention time for styrene and MMA, the integrator was programmed to identify the two compounds (by retention time) and used the response factor determined daily to calculate the concentrations of each compound. Area counts for the instrument responses were recorded and concentrations calculated off-line in spreadsheets. A linear relationship between concentration and area count was generated for each calibration to calculate concentrations. (These calibration "curves" are included with the calculations in Appendix C.) All chromatograms generated during daily tests have been bound separately with the other field data. Records and reductions for every run are included in Appendix C.

Day to day calibration checks met the acceptance criteria or the instrument was recalibrated. Results of instrument calibration are presented in Section 4.1.2. The audit of the GC system that the EPA conducted is discussed in Section 4.7.

3.2.2 Flow Rate Measurements

Air flow rate from the enclosure was measured using EPA Method 2 protocols once per test. Flow rate was also monitored continuously at a single point in the TTE exhaust duct using a standard (Type L) pitot tube by recording the velocity pressure head at the centroid of the duct. The pressure head was logged through the Dianachart data logger to the computer DAS with other parameters, such as temperature, resin weight, and THC concentrations at the inlet and outlet to the enclosure. The Method 2 velocity traverse was performed for each test run using the same standard pitot tube to monitor air flow through the duct.

A velocity for each recorded THC measurement was calculated based on a ratio of the average pressure head readings. The constant velocity monitor reading at the time of the traverse was noted. This reading was scaled to the instantaneous reading (recorded in the DAS) and to the flow rate measured using a complete traverse. The average of each calculated 1-min flow rate reading based on 1-min velocity head readings was used in calculating an average volumetric flow rate over the entire sampling period of the test run. The change in flow rate over the course of any test run was less than 3 percent.

3.2.3 Temperature

The type K thermocouple used for DAS and flow measurements was calibrated on site at two points: ice bath (32°F) and boiling water (212°F). Air temperature within the enclosure was monitored continuously at the location of the fixed pitot. Therefore, this temperature reflects the temperature at the sampling location rather than the temperature within the enclosure. Air flow velocities within the exhaust duct were approximately 30-35 ft/sec. The TTE exhaust temperature was therefore measured within two seconds of leaving the enclosure. The temperature of the well-mixed TTE exhaust provided a better measurement of the average TTE temperature than a single fixed point within the TTE because of the short retention time in the exhaust duct and the small temperature differential between ambient and exhaust air. The temperature was monitored continuously using the DAS calibrated at two points.

3.2.4 Weight of Material Used

The weight of the resin or gelcoat used during a test run was determined by weighing the container of material on a platform balance immediately before and after application to the mold. The balance was equipped with an analog output that allowed changes in weight to be tracked on the DAS.

A small degree of variability in the weight measurement was noted during the testing on the CFA mold, where only 3.5 to 10 lb of resin were used.

The variability resulted from the movement of the ancillary equipment associated with the resin and catalyst delivery systems. As indicated by the weigh scale calibration checks (Section 4.6) and audit (Section 4.7.2), the scale met the desired performance criteria and provided accurate measurements of the resin and gelcoat use during testing on boat parts.

The weight of the catalyst was determined from the resin (or gelcoat) weight and the established catalyst-to-resin ratio. These ratios were set based on stroke count of the positive displacement piston pumps used for both materials. The amount of catalyst was insignificant compared to resin or gelcoat use.

The balance used to determine weight of resin and gelcoat used during lamination was calibrated by Weigh Tronics in Seattle before it was delivered to the site. All adjustments were made at the signal output and DAS; no adjustment was made to the scale that would have affected its calibration. Calibration certification is included with other certifications in Appendix F.

Calibration of the scale was checked periodically during the testing program. These results are presented in Section 4.6. The precision and accuracy of the balance was checked during the on-site technical system audit conducted by the EPA. The results of this audit are presented in Section 4.7.2.

3.3 Air Flow Over the Mold

Air flow over the mold in the TTE was measured to enhance the documentation of the experiments conducted, but no adjustment was made to the rate of air flow through the enclosure based on the measurement. The more important adjustment was the flow rate through the enclosure to simulate the number of room volume exchanges found in the U.S. Marine production area (an integral part of the TTE design). The velocities over the parts were measured merely to provide a record.

To support the validity of the measured velocities over the parts, measurements were made (with a hot wire anemometer) early in the test program to determine the range of velocities over parts encountered in the production environment. Air flow velocities in a production lamination area used for laminating large boats and large parts for those boats ranged from 20–25 ft/min near the air pick-ups at the exhaust plenum to 34–40 ft/min in the center of the lamination area. (In this production area, air was supplied through air handlers at one side of the room and exhausted from pick-up plena on the opposite side of the room.) Velocities near 200 ft/min were measured on covered molds (convex architecture) near the exhaust from the air handlers servicing the lamination area. This higher velocity was not typical in the lamination area.

Measurements made in the testing enclosure showed that velocities of 20-24 ft/min were typical for the enclosure. These velocities were typical of measurements for induced draft environments, such as those found nearer the exhaust plenum in the lamination room. Measurements on the part (near the door to the enclosure) showed that the bulk velocity into the enclosure was approximately 40 ft/min. (Velocities at the NDOs to the TTE were much greater than the required 200 ft/min, as noted in Section 1.3.1.)

Air flow over the mold was first evaluated for the 18-ft deck mold. Measurements at five locations on the mold surface ranged from 20-24 ft/min on the lower portion of the mold to 30-35 ft/min at the upper region of the mold, nearer the air intakes for the enclosure. Velocities were checked on the 28-ft hull mold at seven locations; velocities ranged from 20 to 36 ft/min. Measurements were made parallel to the surface of the mold, where the maximum velocity was noted on the readout from the hot wire anemometer. Sketches from the log book showing locations of measurements and results are found in Appendix H.

During the site audit by the EPA and its contractor Midwest Research Institute (MRI), air velocity measurements at the mold surface were made to verify that the velocity was in the range typical of the industry (and plant) practice. Measurements made by MRI (Appendix H) corroborate the measurements made on the molds.

Velocities were not measured during each test or run. These velocities were not key measurements of the program; further, the velocities would not be expected to vary during the program because the flow rate through the enclosure was not a variable during this program and the geometry of the molds did not vary.

3.4 Mass Balance Styrene Recovery Check

In accordance with the QAPP, styrene evaporation tests (the towel tests) were conducted to evaluate the capture and recovery of styrene by the sampling system. Two tests were completed, one at the initiation of the testing program and one at its conclusion.

A covered container was loaded with a large pan, a collapsible clothes drying rack, towels, and a gallon of styrene and was weighed on a precision scale outside the TTE. (The scale used for this test was used by RTI in their testing to measure smaller quantities of materials.) The container was then placed inside the TTE, the rack erected in the pan, towels draped over the bars, and, with the flow rate and emissions being measured, the styrene was poured over the towels and into the pan. A fan was used to induce flow over the towels and accelerate styrene evaporation. After about 30 minutes, the equipment was repacked into the container and the TTE allowed to clear of styrene (while emission monitoring continued). When emissions reached background concentrations, the container was removed from the TTE and reweighed.

Emissions were measured using the THC analyzer and the GC during the first styrene recovery check, but using only the THC analyzer during the second. Recoveries are based on THC results, and the sampling system's capture and recovery of styrene was assessed by comparing the quantity of styrene evaporated (determined from weight loss of the container) with the quantity of styrene measured in the exhaust (calculated from the average styrene concentration and exhaust flow rate). The results of these tests, reported in Section 4.7.4, indicate good agreement between the measured evaporative loss and the measured mass emission quantity.

3.5 Data Custody

Because all emission measurements were made using continuous monitors that vent emission streams after analysis, no sample retention was necessary, or possible. Data collected in the field include gel time, spray gun calibration, quantity of resin material used, temperature of the exhaust, static pressure of the exhaust stream, pressure head of the exhaust stream, THC concentration of the inlet stream to the enclosure, THC concentration on the outlet stream from the enclosure, and concentrations of specific compounds in the exhaust from the enclosure. Test runs are designated by day, for example, 0408-01 indicates the first run on April 8, 1997. Test numbers are designated with "NMMA" prefix, for example, NMMA-1-1 indicates test condition 1, assessment 1 (Table 1-1). Thus, a test can be identified by date or by type using the total description: 0405-01, NMMA-8-2 indicates a second replicate of a 28-ft hull gelcoating and was the first run on April 5, 1997.

4.0 QUALITY CONTROL AND QUALITY ASSURANCE

Quality control/quality assurance (QC/QA) guidelines outline pertinent steps to be followed during the production of gas composition data to ensure the reliability and acceptance of the data generated. QC, in the context of this report, refers to a system of activities designed to achieve a level of precision and accuracy as specified in the project plan. The QC procedures are targeted at maintaining a level of quality but in themselves are not a measure of the degree of quality achieved. QA, as used in this report, refers to the system of activities implemented to measure the effectiveness of the QC system.

The QC/QA procedures implemented during this test program were presented in the *Quality Assurance Project Plan for the National Marine Manufacturers Association Baseline Emission Testing Project* (QAPP), which was approved by the EPA before the on-site sampling program. This section presents the results of the measurements taken to demonstrate adherence to the data quality objectives for critical measurements, as presented in Section 3 of the QAPP.

4.1 Concentration Measurements

The measurements taken for the characterization of THC content of the TTE exhaust gas stream were made according to the procedures of EPA Method 25A; this approach was the same as that used in previous studies, ensuring comparablity with those previous tests. Styrene and MMA concentration measurements were made according to Method 18 procedures. Previous studies have not evaluated resins containing MMA. Method 18 results are critical to speciation of THC from the gelcoat testing where these two species are measured. No other compound was identified in the Method 18 chromatograms. The QA measures and the acceptance criteria used for this test program, which were approved by the EPA in the QAPP, are presented in Table 4-1.

Table 4-1
Acceptance Criteria for Concentration Measurements

Method	Measurement	Acceptance Criteria
25A	Calibration Error	≤ 10 percent of calibration gas value
25A	Calibration Drift	≤ 10 percent of calibration gas value
18	Calibration Error	≤ 10 percent of calibration gas value
18	Calibration Drift	≤ 5 percent of calibration gas value

Note: Calibration error measurements were substituted for performance audits because no audit materials were provided for routine assessment.

4.1.1 Total Hydrocarbon Measurements (Method 25A)

Tables 4-2 and 4-3 present the results of the Method 25A calibration error and drift tests for all the test runs. Detailed results are presented in Appendix C. Both assessments of instrument performance were made before and after each test. The calibration errors presented in Table 4-2 are within the acceptance criteria presented in the QAPP. The results of instrument drift assessments demonstrate similar results; all post-test assessments are well within 10 percent of pre-test values. Based on review of these Method 25A calibration assessments, all the data presented in this report are accurate to within 10 percent of the values reported, with a variability in precision of no greater than 10 percent.

Because Shirley Wasson of the ORD during her review of the QAPP expressed concerns about the stability of styrene stored in cylinders, THC instrument calibrations were performed using propane. Response factors were then determined for instrument response to styrene and MMA in terms of

Table 4-2
Calibration Error Measurements for Total Hydrocarbon Analyzer
(Percent Actual Gas Value)

			Actual Gas Concentration (ppmv)								
			Inlet Instrument				Outlet Instrument				
Date	Test	Run	0	15	30.4	45.5	0	297	600	914	1604
10-Apr	NMMA-14-1	0410-01	N.A.	0.0	0.0	-0.7	N.A.	1.3	2.3	0.0	
11-Apr	NMMA-14-2	0411-02	N.A.	0.7	0.0	-0.4	N.A.	-0.4	1.4	-2.1	
15-Apr	NMMA-16-1	0415-01	N.A.	2.7	2.3	0.4	N.A.	-0.8	-0.1	-3.4	
16-Apr	NMMA-16-2	0416-01	N.A.	2.0	2.3	0.2	N.A.	-0.9	0.1	0.0	
2-Apr	NMMA-6-P	0402-01	N.A.	0.7	1.3	-1.5	N.A.	-0.3	-0.7	-0.3	
8-Apr	NMMA-6-1	0408-01	N.A.	-1.3	0.0	-0.4	N.A.	0.7	2.3	0.0	
11-Apr	NMMA-6-2	0411-01	N.A.	3.3	4.3	0.4	N.A.	-0.5	0.3	-0.1	
3-Apr	NMMA-4-1	0403-02	N.A.	-0.7	-0.3	0.0	N.A.	1.8	3.0	0.2	
8-Apr	NMMA-4-2	0408-03	N.A.	-1.3	0.0	-0.4	N.A.	0.7	2.3	0.0	
12-Apr	NMMA-5-1	0412-02	N.A.	2.0	1.3	0.2	N.A.	-0.6	0.3	-0.1	
14-Apr	NMMA-5-2	0414-01	N.A.	2.0	1.3	0.2	N.A.	0.7	1.9	-1.2	
10-Apr	NMMA-13-1	0410-02	N.A.	0.0	-0.7	0.2	N.A.	2.0	2.8	-0.1	
11-Apr	NMMA-13-2	0411-03	N.A.	0.7	0.0	-0.4	N.A.	-0.4	1.4	-2.1	
15-Apr	NMMA-15-1	0415-02	N.A.	2.7	2.3	0.4	N.A.	-0.8	-0.1	-3.4	
16-Apr	NMMA-15-2	0416-02	N.A.	2.0	2.3	0.2	N.A.	-0.9	0.1	0.0	
4-Apr	NMMA-3-1	0404-02	N.A.	-1.3	-0.7	0.0	N.A.	-0.3	-0.7	-0.3	
8-Apr	NMMA-3-2	0408-02	N.A.	-1.3	0.0	-0.4	N.A.	0.7	2.3	0.0	
5-Apr	NMMA-1-1	0405-02	N.A.	-4.7	-1.3	0.4	N.A.	2.5	4.8	2.8	
9-Apr	NMMA-1-2	0409-01	N.A.	0.7	0.3	0.2	N.A.	-0.8	0.2	0.0	
12-Apr	NMMA-2-1	0412-02	N.A.	2.0	1.3	0.2	N.A.	-0.6	0.3	-0.1	
14-Apr	NMMA-2-2	0414-03	N.A.	2.0	1.3	0.2	N.A.	0.7	1.9	-1.2	
10-Apr	NMMA-13-1	0410-02	N.A.	0.0	-0.7	0.2	N.A.	2.0	2.8	-0.1	
11-Apr	NMMA-13-2	0411-03	N.A.	0.7	0.0	-0.4	N.A.	-0.4	1.4	-2.1	
18-Apr	NMMA-9-1	0418-01	N.A.	0.7	1.0	0.0	N.A.	0.0	0.0	-0.1	-1.7
19-Apr	NMMA-9-2	0419-01	N.A.	-1.3	0.7	-0.4	N.A.	-0.7	0.8	0.1	
3-Apr	NMMA-8-1	0403-01	N.A.	-0.7	-0.3	0.0	N.A.	1.8	3.0	0.2	
5-Apr	NMMA-8-2	0405-01	N.A.	-1.3	4.6	-4.8	N.A.	4.7	4.8	1.1	
4-Apr	NMMA-7-1	0404-01	N.A.	-1.3	-0.7	0.0	N.A.	0.5	2.6	-0.4	
7-Apr	NMMA-7-2	0407-01	N.A.	-4.7	-3.9	0.7	N.A.	3.0	5.2	0.0	
9-Apr	NMMA-11-1	0409-03	N.A.	0.7	0.3	0.2	N.A.	-0.8	0.2	0.0	
10-Apr	NMMA-11-2	0410-03	N.A.	0.0	-0.7	0.2	N.A.	2.0	2.8	-0.1	
12-Apr	NMMA-11-3	0412-01	N.A.	-1.3	-1.3	-0.9	N.A.	2.8	3.8	0.6	
14-Apr	NMMA-12-1	0417-01	N.A.	3.3	2.6	0.2	N.A.	-0.1	0.7	-0.1	-0.1
18-Apr	NMMA-12-2	0418-02	N.A.	0.7	1.0	0.0	N.A.	-0.9	0.0	-0.1	-1.7

Table 4-3
Calibration Drift Measurements for Total Hydrocarbon Analyzer (Percent Span)

			Actual Gas Concentration (ppmv)								
			Inlet Instrument				Outlet Instrument				
Date	Test	Run	0	15	30.4	45.5	0	297	600	914	1604
10-Apr	NMMA-14-1	0410-01	0.0	-0.4	-1.0	-4.2	0.0	-0.2	0.5	1.9	
11-Apr	NMMA-14-2	0411-02	0.0	-0.2	0.2	-0.2	0.0	0.1	-0.3	-0.1	
15-Apr	NMMA-16-1	0415-01	0.0	-0.6	-1.2	N.A.	0.0	-0.6	-1.1	N.A.	
16-Apr	NMMA-16-2	0416-01	0.0	0.0	-1.6	N.A.	0.0	-0.4	-0.2	N.A.	
2-Apr	NMMA-6-P	0402-01	-0.6	-0.8	N.A.	2.4	0.0	0.1	N.A.	0.6	
8-Apr	NMMA-6-1	0408-01	0.2	0.4	-2.2	N.A.	0.0	0.2	0.8	N.A.	
11-Apr	NMMA-6-2	0411-01	0.2	-0.8	-2.6	-0.8	0.0	0.0	0.6	-1.9	
3-Apr	NMMA-4-1	0403-02	-1.0	-1.2	-1.6	-3.8	0.0	-0.2	-0.3	1.5	
8-Apr	NMMA-4-2	0408-03	0.0	-0.4	-1.8	-2.6	0.1	-0.2	0.0	2.1	
12-Apr	NMMA-5-1	0412-02	0.0	0.8	1.6	N.A.	0.0	-1.1	-1.6	N.A.	
14-Apr	NMMA-5-2	0414-01	-0.8	-1.4	-3.2	N.A.	0.0	-0.1	0.1	N.A.	
10-Apr	NMMA-13-1	0410-02	-0.4	-1.0	-1.2	N.A.	0.0	-0.8	-1.1	N.A.	
11-Apr	NMMA-13-2	0411-03	-0.2	-0.4	-0.6	N.A.	0.0	-0.2	-0.3	N.A.	
15-Apr	NMMA-15-1	0415-02	0.0	-0.2	-1.2	N.A.	0.0	-0.6	-0.9	N.A.	
16-Apr	NMMA-15-2	0416-02	-0.2	-0.2	-1.4	N.A.	0.0	0.0	0.6	N.A.	
4-Apr	NMMA-3-1	0404-02	-1.6	-1.2	-1.0	N.A.	0.0	0.1	N.A.	0.6	
8-Apr	NMMA-3-2	0408-02	0.0	-0.2	-1.4	N.A.	0.0	-0.4	-0.3	N.A.	
5-Apr	NMMA-1-1	0405-02	-1.2	1.0	1.4	N.A.	0.0	0.3	0.4	N.A.	
9-Apr	NMMA-1-2	0409-01	0.0	-0.6	-0.6	N.A.	0.0	-0.2	0.0	N.A.	
12-Apr	NMMA-2-1	0412-02	-0.2	-0.6	-0.6	N.A.	0.0	-0.9	-1.5	N.A.	
14-Apr	NMMA-2-2	0414-03	-0.2	-2.0	-2.6	N.A.	0.0	-0.1	0.1	N.A.	
10-Apr	NMMA-13-1	0410-02	-0.4	-1.0	-1.2	N.A.	0.0	-0.8	-1.1	N.A.	
11-Apr	NMMA-13-2	0411-03	-0.2	-0.4	-0.6	N.A.	0.0	-0.2	-0.3	N.A.	
18-Apr	NMMA-9-1	0418-01	-0.2	-0.2	-1.2	N.A.	0.0	N.A.	0.0	0.5	N.A.
19-Apr	NMMA-9-2	0419-01	-1.0	-0.4	-2.0	N.A.	0.0	0.1	0.1	N.A.	
3-Apr	NMMA-8-1	0403-01	-1.2	0.8	N.A.	N.A.	0.0	N.A.	0.5	N.A.	
5-Apr	NMMA-8-2	0405-01	-3.8	-0.8	0.8	N.A.	0.0	-0.6	0.0	1.6	
4-Apr	NMMA-7-1	0404-01	-0.2	-0.6	N.A.	-1.8	0.0	-0.2	N.A.	2.3	
7-Apr	NMMA-7-2	0407-01	-2.6	0.8	-2.8	N.A.	0.0	0.4	0.9	N.A.	
9-Apr	NMMA-11-1	0409-03	-0.2	-1.2	-0.8	-3.0	0.0	0.0	0.4	-0.2	
10-Apr	NMMA-11-2	0410-03	-0.4	-0.6	-0.8	N.A.	0.0	-0.4	-0.8	N.A.	
12-Apr	NMMA-11-3	0412-01	-0.4	-2.2	-0.6	N.A.	0.0	-0.1	0.5	N.A.	
14-Apr	NMMA-12-1	0417-01	-0.2	0.4	3.2	N.A.	0.0	0.1	0.5	1.3	N.A.
18-Apr	NMMA-12-2	0418-02	0.0	-0.4	-1.0	N.A.	0.0	0.2	0.4	0.8	N.A.

response to propane. The response factors, determined for the outlet THC analyzer only, are listed in Table 4-4. The variation in instrument response factors serves as a measure of the day to day precision of the measurements as well as a correlation to styrene concentrations. The average relative response factor determined as the average of the daily average relative response factors for seven days of measurements, including values determined for all styrene calibration standards brought on site, is 2.40, with a standard deviation of 0.053 (±2.2 percent). The issue of daily variation in response factors was not addressed in the QAPP and no criterion for data acceptance has been suggested. The standard deviation of the response factors is within the precision requirement for the THC calibration and drift criteria.

Table 4-4
Specific Compound Relative Response Factors for the Total Hydrocarbon Analyzer[a]

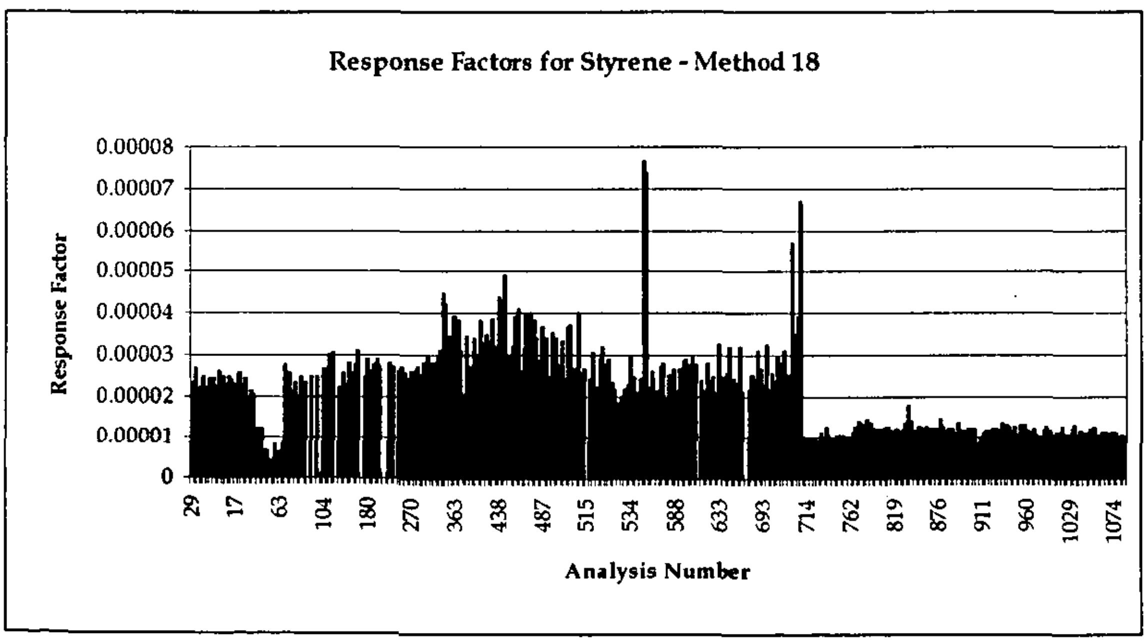
Date	Styrene Concentration (ppmv)	THC Response (ppmv)	Relative Response Factor	MMA Concentration (ppmv)	THC Response (ppmv)	Relative Response Factor
1-Apr	204	487.7	2.39			
3-Apr				45.6	62.7	1.38
7-Apr	204	506.8	2.48			
9-Apr	122	300.1	2.46			
9-Apr	204	490.3	2.40			
12-Apr	204	468.5	2.30			
12-Apr	59.2	148.4	2.51			
15-Apr	59.2	138.5	2.34			
16-Apr	59.2	137.6	2.32			
19-Apr	59.2	141.5	2.39	139.6	166.8	1.19
19-Apr	122	304.3	2.49			
Average			2.40			1.28

[a]Relative response factor is the THC instrument measurement divided by the calibration gas concentration, e.g., ppm propane/ppm styrene.

4.1.2 Organic Compound Concentrations (Method 18)

Method 18 calibrations were conducted every morning before starting a test run. Calibrations were checked after each run to ensure that the instrument remained in calibration for the test series. A measure of calibration is provided by the response factors (Figures 4-1 and 4-2), which are simply the calibration gas concentration divided by the area counts from the chromatogram (i.e., the GC response). As the figures indicate, there was more variability in the response factors early in the sampling program. This variability resulted from leaking of the gas injection valve during these early runs. On April 12, the valve was replaced, and the response factor variation was reduced (after Analysis No. 714).

Figure 4-1
Method 18 Response Factors for Styrene



Method 18 data for this program have been used primarily to determine the relative quantities of styrene and MMA emitted during gelcoating. The Method 18 results are also useful for comparison with the results of Method 25A testing. The relative concentrations of these two compounds in the TTE exhaust is important. An assessment of the ratio of the average response factors for styrene and MMA before and after April 12 (Analysis No. 712) shows that the leaking valve had little or no effect on the determination of the relative concentrations of these two compounds (Table 4-5) on average.

Figure 4-2
Method 18 Response Factors for Methyl Methacrylate

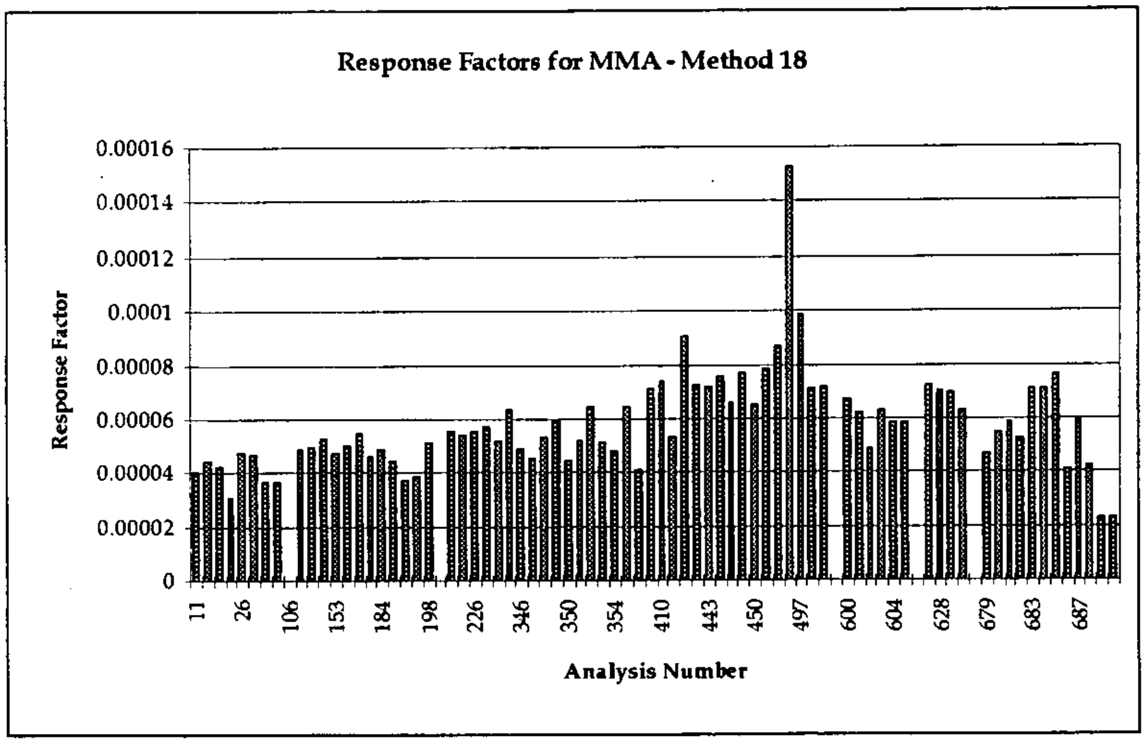
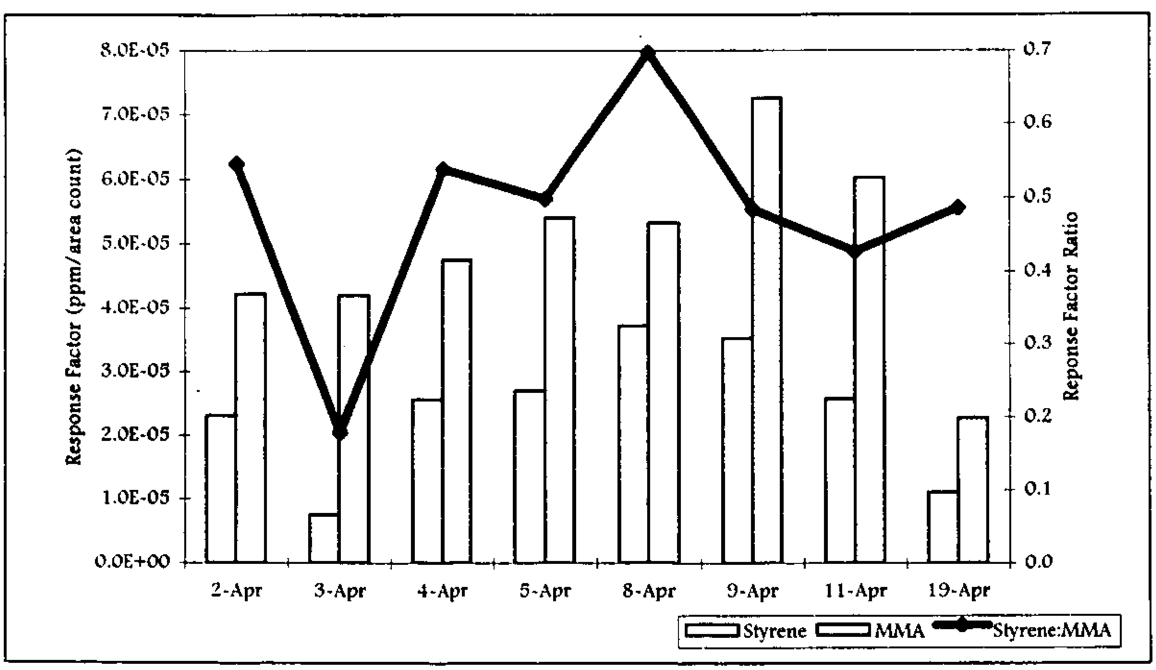


Table 4-5
Method 18 Response Factors for Target Compounds

	Before April 12	After April 12
Styrene	2.78E-05	1.17E-05
MMA	5.87E-05	2.27E-05
Styrene:MMA	0.473	0.516

Daily response factor ratios were also assessed (Figure 4-3). Only those days when styrene and MMA results were needed, and the final check conducted on April 19, are presented in the assessment. The figure illustrates the variability seen in the individual measurements, although the degree of variability is lessened through the averages. The ratio of the response factors (important in apportioning emissions to styrene and MMA for gelcoating test runs) was relatively constant for all gelcoat test days except April 3 and April 8. The results for April 3 appear to be consistent with other days; so the difference in response factor ratio did not appear to affect results for that test. The results from April 8, however, indicate much lower concentrations of MMA than noted for all other gelcoat test runs. Styrene results for that test run were consistent with other measurements and Method 25A results were typical. The abnormally low reading for MMA is attributed to poor response for that calibration.

Figure 4-3
Method 18 Response Factors for Selected Test Days



The relative concentrations of styrene and MMA were determined using the following approach. Area counts based on chromatographic analyses were determined for each compound at varying levels of gas concentrations. An average response factor was then determined for various gas standards. A point to point calibration curve was generated plotting area count against gas concentration assuming a linear function from point to point. These calibration curves (Appendix C) were then used to determine the relative concentrations of styrene and MMA in each sample analyzed.

Table 4-6 lists the QC measurements and their results. These measurements pertain only to styrene calibrations, because all gelcoating runs (i.e., the only runs involving MMA) had been completed by the time of equipment repair (April 12). All the pretest measurements of precision met the criteria defined for this program (within 10 percent of mean value). Drift exceeded the acceptance criteria of less than 5 percent of pretest values on four days; all these events occurred at the 59.2 ppmv styrene level. Data comparisons made between GC and THC concentration measurements show a higher level of styrene measured by the GC than by the THC analyzer, largely because the THC results are average results and the GC reports the concentration of a grab sample, generally selected by the GC operator to analyze temporal peaks in concentration. Because the reported emissions were calculated from the Method 25A results, drift in Method 18 measurements has no effect on the reported emissions.

Table 4-6
Gas Chromatography Calibrations (after April 12)

Date	Analysis No.	Concn (ppmv)	Area Count	RF	Precision (%Mean)	Drift	Comment
12-Apr	713	59.2	5971597	9.91E-06			Pre 5-2
	714	59.2	6009331	9.85E-06	-0.31		Pre 5-2
12-Apr	729	59.2	5958909	9.93E-06			Post 5-2
	730	59.2	6291424	9.41E-06			Post 5-2
	731	59.2	6429882	9.21E-06	-1.09		Post 5-2
	732	122	10977608	1.11E-05			Post 5-2
	733	122	11537000	1.06E-05	-2.48		Post 5-2
	734	204	16097608	1.27E-05			Post 5-2
	735	204	14421208	1.41E-05			Post 5-2
	736	204	21264480	9.59E-06			Post 5-2
	737	204	19247328	1.06E-05			Post 5-2
	738	204	19026992	1.07E-05	0.58		Post 5-2
12-Apr	759	59.2	5525818	1.07E-05			Post 2-1
	760	59.2	5794490	1.02E-05	-2.37		Post 2-1
	761	122	11881808	1.03E-05			Post 2-1
	762	122	10850096	1.12E-05	4.54		Post 2-1
14-Apr	768	0	352953				pre 5-2
	769	0	203009				pre 5-2
	470	59.2	4755664	1.24E-05			pre 5-2
	471	59.2	4167498	1.42E-05			pre 5-2
	472	59.2	4384538	1.35E-05	-2.54		pre 5-2
	473	122	9803558	1.24E-05			pre 5-2
	474	122	8547834	1.43E-05			pre 5-2
	475	122	8905798	1.37E-05	-2.05		pre 5-2
	476	204	16823296	1.21E-05			pre 5-2
	477	204	16883072	1.21E-05			pre 5-2
	478	204	17030400	1.20E-05	-0.43		pre 5-2
14-Apr	796	204	17182512	1.19E-05			post 5-2
	797	204	16327544	1.25E-05			post 5-2
	798	204	16258032	1.25E-05		3.18	post 5-2
14-Apr	818	204	17429680	1.17E-05			post 2-2
	819	204	16991360	1.20E-05		-0.59	post 2-2
	820	59.2	5021901	1.18E-05			post 2-2
	821	59.2	5041053	1.17E-05		-15.07	post 2-2
	823	0	0				
	824	0	0				
15-Apr	826	0	176395	0.00E+00			pre 16-1
	827	0	213703	0.00E+00			pre 16-1
	830	59.2	4179248	1.42E-05			pre 16-1
	831	59.2	5030979	1.18E-05	-9.25		pre 16-1
	832	122	9615066	1.27E-05			pre 16-1
	833	122	9712975	1.26E-05	-0.51		pre 16-1
	834	204	17192032	1.19E-05			pre 16-1
	835	204	16329160	1.25E-05	2.57		pre 16-1
	854	204	17244432	1.18E-05		-2.87	post 16-1
	855	59.2	4923560	1.20E-05		-7.27	post 16-1
	875	59.2	4928013	1.20E-05			post 15-1
	876	59.2	4053978	1.46E-05		0.54	post 15-1
	877	59.2	4739386	1.25E-05			post 15-1
	878	204	17330048	1.18E-05		-3.35	post 15-1

Table 4-6 (continued)

Date	Analysis No.	Concn (ppmv)	Area Count	RF	Precision (%Mean)	Drift	Comment
16-Apr	879	0	0				pre 16-2
	880	0	0				pre 16-2
	881	59.2	4915139	1.20E-05			pre 16-2
	882	59.2	4863680	1.22E-05	0.53		pre 16-2
	883	122	10776440	1.13E-05			pre 16-2
	884	122	9171008	1.33E-05			pre 16-2
	885	122	10341320	1.18E-05			pre 16-2
	886	122	10572206	1.15E-05	-1.10		pre 16-2
16-Apr	905	59.2	4956816	1.19E-05			post 16-2
	906	59.2	4863680	1.22E-05		-0.42	post 16-2
	910	0	660	0.00E+00			post 16-2
	911	122	11027728	1.11E-05			post 16-2
	912	122	10367112	1.18E-05		-2.17	post 16-2
16-Apr	934	0	0				post 15-2
	935	122	10505456	1.16E-05			post 15-2
	936	122	10076096	1.21E-05		1.64	post 15-2
	937	59.2	4985315	1.19E-05			post 15-2
	938	59.2	5178906	1.14E-05		-3.76	post 15-2
17-Apr	939	0	0				pre 12-1
	940	0	2044				pre 12-1
	941	59.2	4324157	1.37E-05			pre 12-1
	942	59.2	4535176	1.31E-05			pre 12-1
	943	59.2	4768189	1.24E-05	-2.50		pre 12-1
	944	122	10597432	1.15E-05			pre 12-1
	945	122	9772608	1.25E-05	4.05		pre 12-1
17-Apr	960	204	17712032	1.15E-05			post 12-2
	961	204	18269232	1.12E-05	-1.55		post 12-2
	962	122	10231520	1.19E-05		-0.62	post 12-2
	963	59.2	5499240	1.08E-05			post 12-2
	964	59.2	5894784	1.00E-05		-18.30	post 12-2
18-Apr	978	0	1915				pre 9-1c
	979	0	3089				pre 9-1c
	980	59.2	5035434	1.18E-05			pre 9-1c
	982	59.2	5181651	1.14E-05	-1.43		pre 9-1c
	983	204	19345344	1.05E-05			pre 9-1c
	984	204	18797024	1.09E-05	1.44		pre 9-1c
18-Apr	1018	204	18110944	1.13E-05			post 9-1
	1020	204	19007808	1.07E-05		2.80	post 9-1
	1021	59.2	5687642	1.04E-05		-10.20	post 9-1
19-Apr	1035	59.2	4908355	1.21E-05			pre 9-2
	1036	59.2	4736861	1.25E-05	1.78		pre 9-2
	1037	204	18883424	1.08E-05			pre 9-2
	1038	204	19033904	1.07E-05	-0.40		pre 9-2
19-Apr	1070	204	18327536	1.11E-05			post 9-2
	1071	204	18467392	1.10E-05		3.05	post 9-2
	1072	122	11046080	1.10E-05			post 9-2
	1073	122	10864040	1.12E-05			post 9-2
	1074	122	11025512	1.11E-05		3.28	post 9-2
	1075	59.2	5985747	9.89E-06			post 9-2
	1076	59.2	5700285	1.04E-05	0.00	-17.44	post 9-2
19-Apr	1077	59.2	5780963	1.02E-05	0.01		Bias test
19-Apr	1078		6178867				MMA Bag 7
	1079		6176253				MMA Bag 7

4.1.3 Comparison of Methods in Determining Emissions

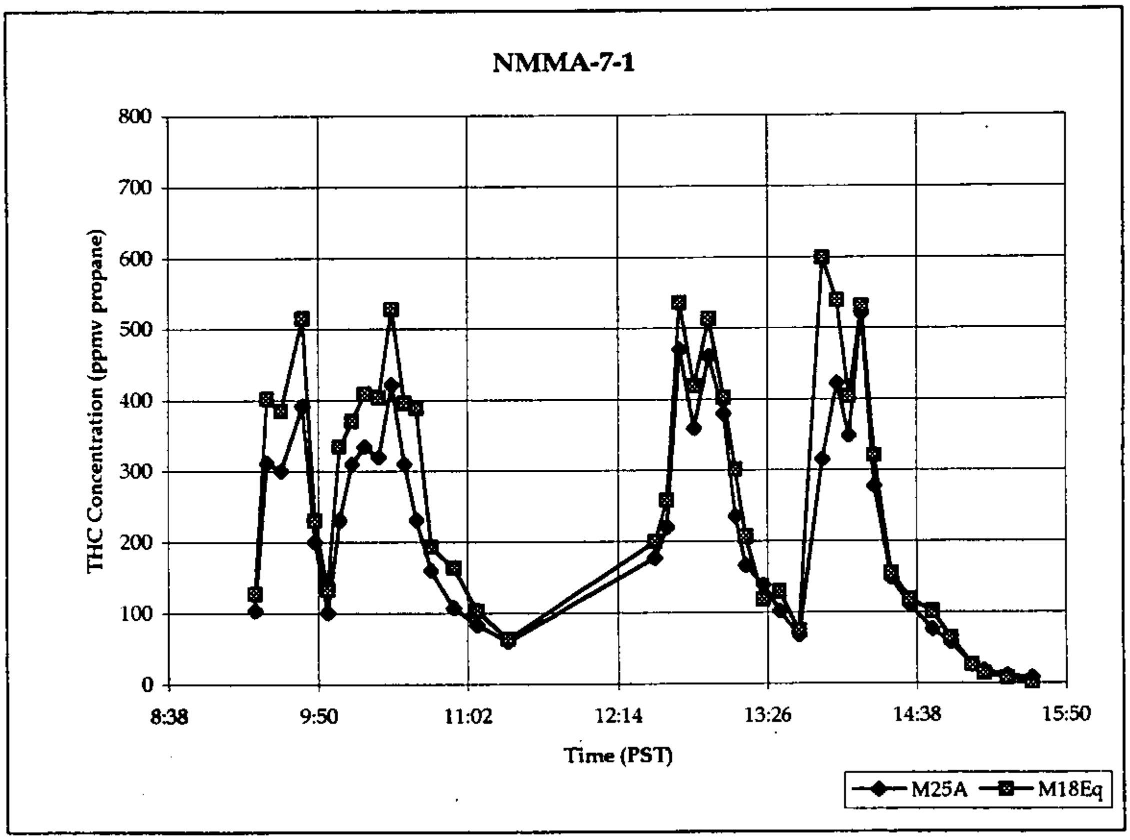
There is relatively good agreement between the results of the two methods, with most of the measurements within 6-8 percent. The runs that had more divergent results were typically those involving smaller molds. Table 4-7 presents a comparison of the results in terms of percent of available volatile material, which for most of the testing was styrene only.

Table 4-7
Comparison of Emission Results by Two Methods

Date	Test	Description	Emissions (% Available) - Method 25A	Emissions (% Available) - Method 18
2-Apr	NMMA-6-P	18 Deck Gel	47.0%	54.1%
4-Apr	NMMA-7-1	28 Hull 35 R	15.7%	18.2%
7-Apr	NMMA-7-2	28 Hull 35 R	18.8%	18.4%
8-Apr	NMMA-6-1	18 Deck Gel	42.3%	43.1%
8-Apr	NMMA-3-2	18 Hull Gel	54.2%	53.5%
8-Apr	NMMA-4-2	18 Deck 35 R	16.1%	16.1%
9-Apr	NMMA-1-2	18 Hull 35R	13.9%	13.2%
9-Apr	NMMA-11-1G	CFA Gel	43.4%	39.0%
9-Apr	NMMA-11-1R	CFA 35R	29.8%	37.1%
10-Apr	NMMA-14-1	18 Deck 35R - FC	11.1%	10.4%
10-Apr	NMMA-13-1	18 Hull 35R - FC	10.5%	11.0%
10-Apr	NMMA-11-2R	CFA 35R	28.8%	26.8%
11-Apr	NMMA-6-2	18 Deck Gel	45.2%	46.4%
11-Apr	NMMA-14-2	18 Deck 35R - FC	12.1%	11.1%
11-Apr	NMMA-13-2	18 Hull 35R - FC	10.5%	10.9%
12-Apr	NMMA-11-3R	CFA 35R	52.0%	44.8%
12-Apr	NMMA-5-1	18 Deck 42R	20.4%	14.1%
12-Apr	NMMA-2-1	18 Hull 42R	22.3%	24.1%
14-Apr	NMMA-5-2	18 Deck 42R	20.8%	22.4%
14-Apr	NMMA-2-2	18 Hull 42R	18.2%	14.2%
15-Apr	NMMA-16-1	18 Deck 42R-FC	12.2%	12.0%
15-Apr	NMMA-15-1	18 Hull 42R-FC	11.6%	11.7%
16-Apr	NMMA-16-2	18 Deck 42R-FC	14.0%	14.4%
16-Apr	NMMA-15-2	18 Hull 42R-FC	10.6%	10.8%
17-Apr	NMMA-12-1	CFA 42R	54.6%	44.8%
18-Apr	NMMA-9-1	28 Hull 42R	22.8%	25.5%
19-Apr	NMMA-9-2	28 Hull 42R	23.0%	23.5%
18-Apr	NMMA-12-2	CFA 42R	39.2%	38.2%

Certainly, the concentration measurements made using both approaches yielded consistent results. The THC concentration trace for Run NMMA-7-1 and an equivalent THC concentration trace generated using measured styrene and MMA concentrations and the response factors developed during this program (2.40 for styrene and 1.39 for MMA), although not identical, show fair agreement for the different FIDs (Figure 4-4).

Figure 4-4
Comparison of Total Hydrocarbon Traces by Two Methods



4.2 Gelcoat and Resin Flow Rate

Spray gun resin and gelcoat flow rates were determined at the start and end of each test day (Table 4-8). A single assessment was made during each flow rate check. Resin-to-glass ratios were assessed during the initial resin calibrations (Table 4-8). Catalyst-to-resin/gelcoat ratios were set according to the catalyst pump stroke rate. These ratios remained constant during testing.

Table 4-8
Spray Equipment Data Summary

Equipment	Date	Flow Rate (g/min) Pre test	Flow Rate (g/min) Post test	Percent Change	Resin (g)	Glass (g)	Percent Glass
Spray gun/ Resin	3-Apr				327	180	35.5
	4-Apr				324	128	28.3
	5-Apr	2888	2916	1.0	148	77	34.2
	7-Apr	2828	3092	9.3	277	149	35.0
	8-Apr	2792	2896	3.7	301	176	36.9
	9-Apr	2836	2776	-2.1	242	127	34.4
	10-Apr	2956	2784	-5.8	222	114	33.9
	12-Apr	2892	3100	7.2	218	117	34.9
	14-Apr	3192	3096	-3.0	378	201	34.7
	17-Apr	3100			317	152	32.4
	18-Apr	2944	2992	1.6	300	160	34.8
	19-Apr	3036	2904	-4.3	256	148	36.6
Flow Chopper	10-Apr	2956	2784	-5.8	222	114	33.9
	11-Apr	2556	2668	4.4	297	158	34.7
	15-Apr	3164	3388	7.1	406	192	32.1
	16-Apr	3084	3072	-0.4	317	162	33.8
Spray gun/ Gelcoat	3-Apr	1264	1256	-0.6			
	4-Apr	1256	1260	0.3			
	5-Apr	1264	1264	0.0			
	8-Apr	1260	1268	0.6			
	9-Apr	1272	1276	0.3			
	11-Apr	1256	1260	0.3			

4.3 Air Velocity over Mold Surface

Air flow over the mold surface was assessed twice during the test program. These measurements reflect a best assessment approach and no presumption of accuracy has been made. In addition to being difficult to assess accurately, air flow over the mold (i.e., velocity) was dependent on mold position in the TTE, a factor that changed every time a tool was brought into the enclosure or moved within the enclosure in the process of lamination or gelcoating. The velocities measured at the mold surface were consistent with measurements made over mold surfaces in the manufacturing area, taking into account that the TTE was designed for induced draft flow. Greater emphasis was placed on controlling air flow through the enclosure to reflect conditions found in the facility than on attempting to duplicate the velocities measured during previous studies using parts not typical of boat building.

Measurements made during a technical system audit performed by MRI and the EPA were consistent with the measurements made during this program. Their findings are reported in MRI's *Technical Systems Audit of a Laboratory Spray Booth at the U.S. Marine Facility in Arlington, Washington* (May 29, 1997).

4.4 Exhaust Flow Rate

Air flow rate through the enclosure was measured and monitored as described in Section 3.2.2. Accuracy of the velocity measurement can be assessed by observing the variability of the velocity head measurements (which were accurate to within 0.005 inches of water) during the test. This yields an assessment in terms of percent which can be compared with the acceptable criteria of the method. Variability measurements for all test runs are shown with the test averages (Table 4-9). The overall average variability in flow rate for the program was 2.9 percent, and no measure for an entire day was greater than 6.9 percent. The two instances of greatest variability were affected by the two measurements on April 4, early in the program, when TTE exhaust filters had been allowed to become partially blocked and were first being changed during the test runs.

Table 4-9
Variability Measures for Flow Rate During Test Runs

Date	Flow Rate Variability (%)			Average
	Run1	Run 2	Run 3	
2-Apr	1.0			1.0
3-Apr	2.5	3.2		2.9
4-Apr	4.9	8.9		6.9
5-Apr	2.2	1.2		1.7
7-Apr	2.5			2.5
8-Apr	1.4	3.3	1.8	2.2
9-Apr	3.2	3.5	0.9	2.6
10-Apr	2.3	2.8	3.0	2.7
11-Apr	2.9	4.5	3.7	3.7
12-Apr	4.3	4.2	3.7	4.1
14-Apr	3.2	2.4		2.8
15-Apr	3.3	3.5		3.4
16-Apr	2.1	1.7		1.9
17-Apr	2.5			2.5
18-Apr	2.7	2.4		2.5
19-Apr	2.3			2.3
Average				2.9

Flow rates during the test program were observed (based on the continuous, fixed point velocity head measurements) to vary based on filter collection and other operations. The exhaust plena on both longitudinal sides of the enclosure were equipped with filter media (spun fiberglass air filters). Flow rate decreased with time as these filters collected air-borne resin containing reactive styrene and MMA, which polymerized on the filter media. Periodically, these filters were replaced to ensure more consistent flow rates through the enclosure for all test runs. The build-up of material on the filters was one cause of the variability in flow rate measured during the overall program. To some smaller extent, this affected flow rate over the course of the test run, more so for the larger articles which required more resin. A second cause of the fluctuation in flow rate was activity in the building where the enclosure was located. Temperature was affected by the opening and closing of doors into the building. Changes in the system operated by RTI also had some effect on the measurement of flow because both systems were connected to the same exhaust system at the U.S. Marine facility. Changes made to accommodate their operation had some effect on exhaust system pressure, thus affecting flow rate through the larger enclosure.

4.5 Exhaust Air Temperature

As described in Section 3.2.3, enclosure air temperature was monitored continuously using a type K thermocouple at the location of the fixed pitot and the DAS, calibrated at two points. The accuracy of this measurement was 0.005°F (or 0.0001 mV). Measurements of precision were not made during the test program; however, literature suggests the precision of type K thermocouples, assessed in a laboratory environment, will yield a precision of 0.5°F, or within 1 percent of the measured values.

4.6 Resin/Gelcoat Balance

Balance calibration checks were often performed with barrels of resin still on the platform and always performed without zeroing the balance. Therefore, the calibration error was calculated in terms of percent of weight change rather than the displayed weight value (Table 4-10). All calibration results display a level of accuracy, measured as percent error, meeting the criteria of the QAPP (within 2 lb). Based on the maximum error measure of 0.2 percent and the high end of the scale measurements (i.e., 500 lb), the accuracy was within approximately 1 lb.

Table 4-10
Results of Balance Calibration Checks

Date	Tare Weight (lb)	Initial Scale Reading (lb)	Scale Response (lb)	Change in Weight (lb)	Error (% Tare)
6-Apr	0	0.0	0	0.0	NA
	500	0.0	500.1	500.1	0.02
	300	0.0	300.1	300.1	0.03
	100	0.0	100.1	100.1	0.10
8-Apr	0	0.0	-1.9	0.0	NA
	100	0.0	98.1	100.0	0.00
	200	0.0	197.9	199.8	-0.10
	300	0.0	297.8	299.7	-0.10
	400	0.0	397.6	399.5	-0.12
	500	0.0	497.5	499.4	-0.12
10-Apr	0	201.7	201.7	0.0	NA
	50	201.7	251.7	50.0	0.00
	100	201.7	301.7	100.0	0.00
	200	201.7	401.7	200.0	0.00
15-Apr	0	231.7	231.7	0.0	NA
	100	231.7	331.7	100.0	0.00
	200	231.7	431.9	200.2	0.10
	250	231.7	481.8	250.1	0.04
19-Apr	0	0.0	-1.33	0.0	NA
	100	0.0	98.5	99.8	-0.17
	200	0.0	198.7	200.0	0.02
	300	0.0	298.7	300.0	0.01
	400	0.0	398.8	400.1	0.03
	500	0.0	498.7	500.0	0.01
	100	0.0	98.9	100.2	0.23

4.7 Technical Systems Audit

The performance of the sampling system was assessed through an audit and styrene recovery tests. Audits of the THC sampling, balance, and flow measurement systems were performed. The system audit was conducted by

EPA/OAQPS and its contractor MRI. The EPA/OAQPS audit will report on this project, but the final report has not been released. Also, styrene recovery tests (styrene evaporation tests) were performed in accordance with the QAPP.

4.7.1 Total Hydrocarbon Measurement

The results of the Method 25A system audit are presented in Table 4-11. The audit gas was introduced in two manners during the performance of the audit. One method involved filling a Tedlar® bag with the audit gas and attaching it to the sampling probe. In the second method, the audit cylinder was connected to the calibration system and the gas was introduced to the sampling system in the same manner as all on-site calibrations were performed; the propane audit was performed only with this latter method. Both methods yield results representative of the system performance.

Table 4-11
Audit Results for Method 25A Measurements

Date	Analyzer Measurement (ppmv C_3H_8)	Result (ppmv as styrene)	Gas Standard (ppmv)	Compound	Result (%)	Notes
15-Apr	84.3	36.8	39.7[a]	Styrene	-7.3	b, c
16-Apr	85.3	36.8	39.7	Styrene	-7.3	b, d
	1000		999	Propane	+0.1	d

a. Gas standard reported at 41.7 ppmv; on site analysis by GC reported 39.7 ppmv.
b. Response factor to styrene is 2.289 on 4/15 and 2.318 on 4/16.
c. Test performed with audit gas in Tedlar® bag.
d. Test performed with audit gas in vented cylinder.

Conversion of THC concentration to equivalent concentrations of styrene was done using daily relative response factors determined from the THC analyzer (Method 25A) on the day of the audit. Using the pre-test analysis by Scott Specialty Gases (41.7 ppmv styrene), the analysis by THC analyzer was about 12 percent low. However, on-site analysis of the standard by GC indicated that the concentration in the audit sample was only 39.7 ppmv. Although this assessment does not meet the requirements of a protocol gas certification, the results indicate that the certified value of the audit cylinder may be slightly low. Comparing to concentration from this reanalysis of the standard shows that the THC analysis was only 7.3 percent low, within the criterion established for the program. This low recovery does not appear to be a system malfunction. The good results of the propane audit indicate the low results of the styrene audit sample are not a result of sampling system bias (leaks). Further, procedures in determining response factors included introduction of the gas at the probe, thus incorporating any system characteristics into the results. The results of the styrene audit indicate the sampling system, as used in the performance of the audit, results in an under reporting of styrene concentrations by less than 10 percent at a 40-ppmv concentration, or about 3 ppmv styrene.

4.7.2 Weigh Cell Balance

The results of the weigh cell balance audit performed on April 16 indicate that greater than 5 percent error results when weighing less than 3000 g, or approximately 6.6 lb, on an empty scale (Table 4-12). However, testing was conducted with a drum of resin or gelcoat or resin in place, meaning that the scale was used during the test program in its normal operating range. The results of the audit and the calibration checks (Table 4-10) demonstrate that even small weight changes can be measured accurately through the weight range experienced during this test program. Although the audit was conducted with an empty balance, the calibration checks were conducted with both empty and loaded scale (i.e., with a drum of resin in place). Data collected from the calibration check using certified weights on April 8 indicate that a less than 1 lb change in weight at an elevated balance response (512 lb) was accurately quantified. These data indicate the balance was capable of accurately measuring 500-g (1.1-lb) changes in weight in the range of operation, well within specifications of the QAPP (i.e., 2 lb). Two data points from the audit can be used to assess the precision of the weight measurements. The replicate weighing performed at 57 and 157 lb indicate a precision of greater than 0.2 lb, also within QAPP specifications.

Table 4-12
Results of Audit on Balance

Date	Audit Weight (g)	Scale Response (lb)	Scale Initial (lb)	Net Scale Response (lb)	Difference (lb)	% Error
8-Apr[a]	3000	504.3	497.6	6.7	0.086	1.30
	5000	508.7	497.6	11.1	0.077	0.70
	6000	510.9	497.6	13.3	0.072	0.55
	6500	512	497.6	14.4	0.070	0.49
	Audit Weight (lb)	**Scale Response (lb)**	**Scale Initial (lb)**	**Net Scale Response (lb)**	**Difference (lb)**	**% Error**
16-Apr[b]	0	-1.92	-1.92	0	0.00	NA
	0.002	-1.94	-1.92	-0.02	-0.022	-1007.18
	0.01	-1.96	-1.92	-0.04	-0.053	-402.39
	0.04	-1.99	-1.92	-0.07	-0.105	-298.45
	0.1	-1.86	-1.92	0.06	-0.086	-58.76
	0.4	-1.65	-1.92	0.27	-0.096	-26.22
	2.6	0.55	-1.92	2.47	-0.101	-3.91
	7	5.06	-1.92	6.98	0.000	0.00
	57	54.9	-1.92	56.82	-0.180	-0.32
	157	154.74	-1.92	156.66	-0.340	-0.22
	457	454.9	-1.92	456.82	-0.180	-0.04
	357	355	-1.92	356.92	-0.080	-0.02
	157	154.9	-1.92	156.82	-0.180	-0.11
	57	55	-1.92	56.92	-0.080	-0.14
	7	5	-1.92	6.92	-0.060	-0.86
	2.6	0.5	-1.92	2.42	-0.15	-5.86

[a]Calibration check using certified weights.
[b]Audit using certified weights.

4.7.3 Flow Measurement

The results of the flow rate audits were reported in the draft audit report. Comparison of the audit results to the measurements made for the test runs of the same days indicate good agreement for velocities and flow rates measured using Method 2 (Table 4-13). The preliminary velocity measurement by hot wire anemometer made by the auditor on April 14 indicated a greater velocity than calculated from pitot tube measurements. The differences are attributed to the hot wire anemometer velocity being a point measurement compared with an average velocity resulting from the pitot tube measurements and the presence of hydrocarbon in the stream, which can cause hot wire anemometer velocity readings greater than actual velocities.

Table 4-13
Results of Flow Rate Audit

Date	Test	Velocity (ft/min)	Flow Rate (cfm)
14-Apr	Audit-hot wire	1930	
	NMMA-5-2	1738	3071
	NMMA-2-2	1728	3053
15-Apr	Audit-pitot	1787	3157
	NMMA-16-1	1866	3297
	NMMA-15-1	1793	3168

4.7.4 Styrene Evaporation Test

In accordance with the QAPP, styrene evaporation tests (the towel tests) were conducted to evaluate the capture and recovery of styrene by the sampling system. Two tests were completed, one at the initiation of the testing program and one at the conclusion of the program. In both cases, the recovered quantity of styrene met the acceptance criteria for a good system (±10 percent) (Table 4-14).

Table 4-14
Results of Styrene Evaporation Tests

	Towel-1	Towel-2
Date	4/1/97	4/19/97
Material Losses (g)	1199	1095
Temperature (°F)	65.6	66
Flow rate (acfm)	3017	3306
Average THC Concentration (ppmv)	117.8	116.7
Duration (min)	66	59
Measured Emissions (g)	1202	1165
Percent Difference	0.21	6.4

The first test represents the best measure of the system and its operation because no testing had been conducted in the building and, therefore, no background styrene in building air or booth air interfered with the results. The results from the first test showed excellent agreement between the measured quantity of styrene evaporated from the apparatus (provided by RTI) and the emissions determined by measuring stack gas concentrations and flow rate. The closure between these two measurements is not as close for the final test, however. Although it is true that the flow rate through the enclosure was greater during the second test, the greater emissions measured are attributed more to the mold left in the enclosure after previous lamination testing. Although the measured styrene concentrations were adjusted for the concentration in the incoming air and attempts were made to account for the background concentration in the enclosure, it is likely that some of the styrene included in the measured emissions may have been generated by the mold and part left in the enclosure (i.e., residual curing emissions).

Appendix A

Reference Methods

METHOD 204—CRITERIA FOR AND VERIFICATION OF A PERMANENT OR TEMPORARY TOTAL ENCLOSURE

1. SCOPE AND APPLICATION

This procedure is used to determine whether a permanent or temporary enclosure meets the criteria for a total enclosure. An existing building may be used as a temporary or permanent enclosure as long as it meets the appropriate criteria described in this method.

2. SUMMARY OF METHOD

An enclosure is evaluated against a set of criteria. If the criteria are met and if all the exhaust gases from the enclosure are ducted to a control device, then the volatile organic compounds (VOC) capture efficiency (CE) is assumed to be 100 percent, and CE need not be measured. However, if part of the exhaust gas stream is not ducted to a control device, CE must be determined.

3. DEFINITIONS

3.1 **Natural Draft Opening (NDO).** Any permanent opening in the enclosure that remains open during operation of the facility and is not connected to a duct in which a fan is installed.

3.2 **Permanent Total Enclosure (PE).** A permanently installed enclosure that completely surrounds a source of emissions such that all VOC emissions are captured and contained for discharge to a control device.

3.3 **Temporary Total Enclosure (TTE).** A temporarily installed enclosure that completely surrounds a source of emissions such that all VOC emissions that are not directed through the control device (i.e. uncaptured) are captured by the enclosure and contained for discharge through ducts that allow for the accurate measurement of the uncaptured VOC emissions.

3.4 **Building Enclosure (BE).** An existing building that is used as a TTE.

4. SAFETY

An evaluation of the proposed building materials and the design for the enclosure is recommended to minimize any potential hazards.

5. CRITERIA FOR TEMPORARY TOTAL ENCLOSURE

5.1 Any NDO shall be at least four equivalent opening diameters from each VOC emitting point unless otherwise specified by the Administrator.

5.2 Any exhaust point from the enclosure shall be at least four equivalent duct or hood diameters from each NDO.

5.3 The total area of all NDO's shall not exceed 5 percent of the surface area of the enclosure's four walls, floor, and ceiling.

5.4 The average facial velocity (FV) of air through all NDO's shall be at least 3,600 m/hr (200 fpm). The direction of air flow through all NDO's shall be into the enclosure.

5.5 All access doors and windows whose areas are not included in section 5.3 and are not included in the calculation in section 5.4 shall be closed during routine operation of the process.

6 CRITERIA FOR A PERMANENT TOTAL ENCLOSURE

6.1 Same as sections 5.1 and 5.3 through 5.5.

6.2 All VOC emissions must be captured and contained for discharge through a control device.

7. QUALITY CONTROL

7.1 The success of this method lies in designing the TTE to simulate the conditions that exist without the TTE (i.e., the effect of the TTE on the normal flow patterns around the affected facility or the amount of uncaptured VOC emissions should be minimal). The TTE must enclose the application stations, coating reservoirs, and all areas from the application station to the oven. The oven does not have to be enclosed if it is under negative pressure. The NDO's of the temporary enclosure and an exhaust fan must be properly sized and placed.

7.2 Estimate the ventilation rate of the TTE that best simulates the conditions that exist without the TTE (i.e., the effect of the TTE on the normal flow patterns around the affected facility or the amount of uncaptured VOC emissions should be minimal). Figure 204-1 or the following equation may be used as an aid.

$$CE = \frac{Q_G C_G}{Q_G C_G + Q_F C_F} \qquad \text{Eq. 204-1}$$

Measure the concentration (C_G) and flow rate (Q_G) of the captured gas stream, specify a safe concentration (C_F) for the uncaptured gas stream, estimate the CE, and then use the plot in Figure 204-1 or Equation 204-1 to determine the volumetric flow rate of the uncaptured gas stream (Q_F). An exhaust fan that has a variable flow control is desirable.

7.3 Monitor the VOC concentration of the captured gas steam in the duct before the capture device without the TTE. To minimize the effect of temporal variation on the captured emissions, the baseline measurement should be made over as long a time period as practical. However, the process conditions must be the same for the measurement in section 7.5 as they are for this baseline measurement. This may require short measuring times for this quality control check before and after the construction of the TTE.

7.4 After the TTE is constructed, monitor the VOC concentration inside the TTE. This concentration should not continue to increase, and must not exceed the safe level according to Occupational Safety and Health Administration requirements for permissible exposure limits. An increase in VOC concentration indicates poor TTE design.

7.5 Monitor the VOC concentration of the captured gas stream in the duct before the capture device with the TTE. To limit the effect of the TTE on the process, the VOC concentration with and without the TTE must be within 10 percent. If the measurements do not agree, adjust the ventilation rate from the TTE until they agree within 10 percent.

8. PROCEDURE

8.1 Determine the equivalent diameters of the NDO's and determine the distances from each VOC emitting point to all NDO's. Determine the equivalent diameter of each exhaust duct or hood and its distance to all NDO's. Calculate the distances in terms of equivalent diameters. The number of equivalent diameters shall be at least four.

8.2 Measure the total surface area (A_T) of the enclosure and the total area (A_N) of all NDO's in the enclosure. Calculate the NDO to enclosure area ratio (NEAR) as follows:

$$NEAR = \frac{A_N}{A_T} \qquad \text{Eq. 204-2}$$

The NEAR must be £0.05.

8.3 Measure the volumetric flow rate, corrected to standard conditions, of each gas stream exiting the enclosure through an exhaust duct or hood using EPA Method 2. In some cases (e.g., when the building is the enclosure), it may be necessary to measure the volumetric flow rate, corrected to standard conditions, of each gas stream entering the enclosure through a forced makeup air duct using Method 2. Calculate FV using the following equation:

$$FV = \frac{Q_O - Q_I}{A_N} \qquad \text{Eq. 204-3}$$

where:

Q_O = the sum of the volumetric flow from all gas streams exiting the enclosure through an exhaust duct or hood.

Q_I = the sum of the volumetric flow from all gas streams into the enclosure through a forced makeup air duct; zero, if there is no forced makeup air into the enclosure.

A_N = total area of all NDO's in enclosure.

The FV shall be at least 3,600 m/hr (200 fpm). Alternatively, measure the pressure differential across the enclosure. A pressure drop of 0.013 mm Hg (0.007 in. H_2O) corresponds to an FV of 3,600 m/hr (200 fpm).

8.4 Verify that the direction of air flow through all NDO's is inward. If FV is less than 9,000 m/hr (500 fpm), the continuous inward flow of air shall be verified using streamers, smoke tubes, or tracer gases. Monitor the direction of air flow for at least 1 hour, with checks made no more than 10 minutes apart. If FV is greater than 9,000 m/hr (500 fpm), the direction of air flow through the NDOs shall be presumed to be inward at all times without verification.

9. DIAGRAMS

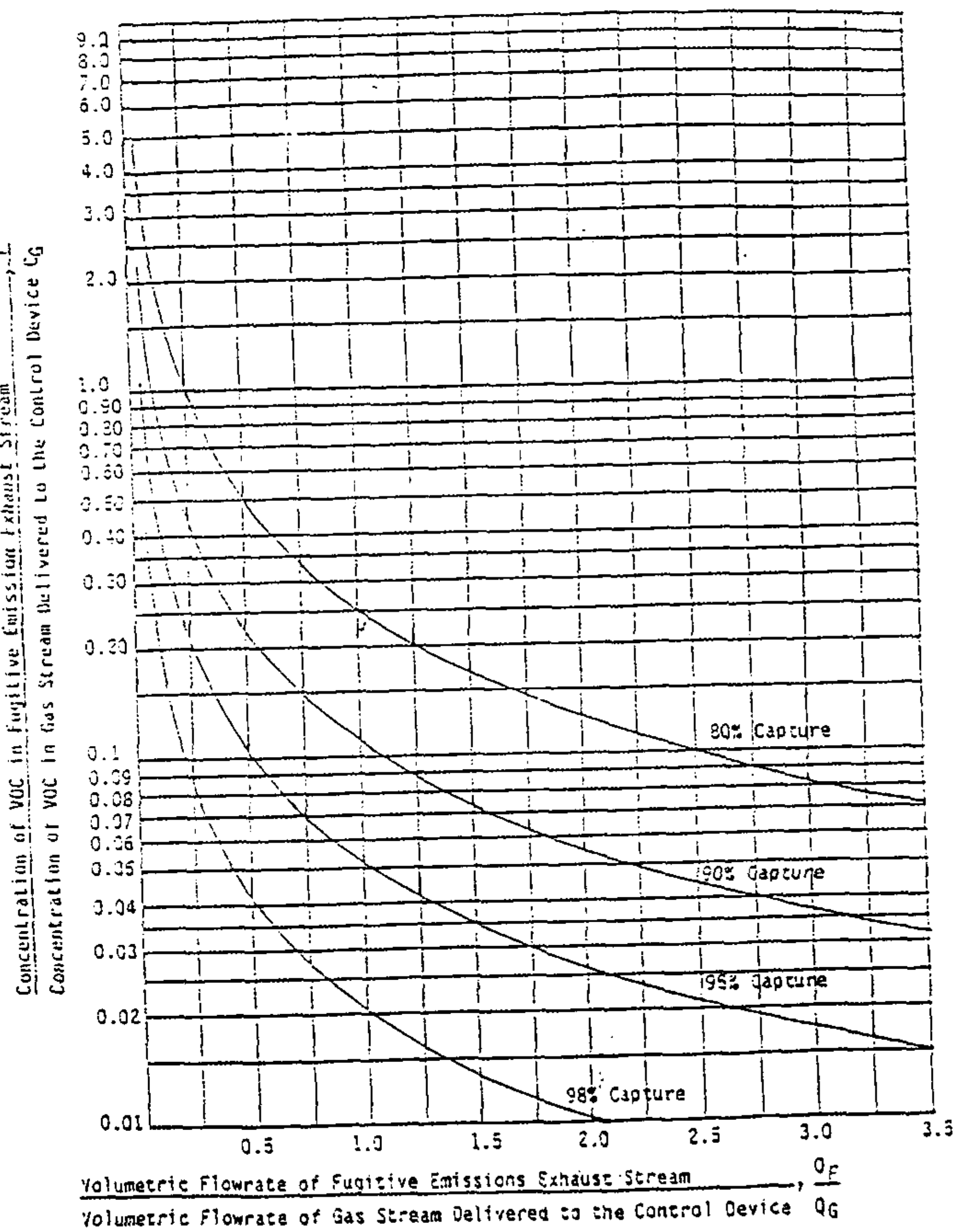


Figure 204-1. The crumpler chart.

7

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
NSPS TEST METHOD

(EMTIC M-25A, 6/23/93)

METHOD 25A-DETERMINATION OF TOTAL GASEOUS ORGANIC CONCENTRATION USING A FLAME IONIZATION ANALYZER

1. Applicability and Principle

1.1 **Applicability.** This method applies to the measurement of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon.

1.2 **Principle.** A gas sample is extracted from the source through a heated sample line, if necessary, and glass fiber filter to a flame ionization analyzer (FIA). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents.

2. Definitions

2.1 **Measurement Systems.** The total equipment required for the determination of the gas concentration. The system consists of the following major subsystems:

2.1.1 **Sample Interface.** That portion of the system that is used for one or more of the following: sample acquisition, sample transportation, sample conditioning, or protection of the analyzer from the effects of the stack effluent.

2.1.2 ***Organic Analyzer.*** That portion of the system that senses organic concentration and generates an output proportional to the gas concentration.

2.2 **Span Value.** The upper limit of a gas concentration measurement range that is specified for affected source categories in the applicable part of the regulations. The span value is established in the applicable regulation and is usually 1.5 to 2.5 times the applicable emission limit. If no span value is provided, use a span value equivalent to 1.5 to 2.5 times the expected concentration. For convenience, the span value should correspond to 100 percent of the recorder scale.

2.3 **Calibration Gas.** A known concentration of a gas in an appropriate diluent gas.

2.4 **Zero Drift.** The difference in the measurement system response to a zero level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.5 **Calibration drift.** The difference in the measurement system response to a midlevel calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair or adjustment took place.

2.6 **Response Time.** The time interval from a step change in pollutant concentration at the inlet to the emission measurement system to the time at which 95 percent of the corresponding final value is reached as displayed on the recorder.

2.7 **Calibration Error.** The difference between the gas concentration indicated by the measurement system and the known concentration of the calibration gas.

3. Apparatus

A schematic of an acceptable measurement system is shown in Figure 25A-1. The essential components of the measurement system are described below:

3.1 **Organic Concentration Analyzer.** A flame ionization analyzer (FIA) capable of meeting or exceeding the specifications in this method.

3.2 **Sample Probe.** Stainless steel, or equivalent, three-hole rake type. Sample holes shall be 4 mm in diameter or smaller and located at 16.7, 50, and 83.3 percent of the equivalent stack diameter. Alternatively, a single opening probe may be used so that a gas sample is collected from the centrally located 10 percent area of the stack cross-section.

3.3 **Sample Line.** Stainless steel or Teflon • tubing to transport the sample gas to the analyzer. The sample line should be heated, if necessary, to prevent condensation in the line.

3.4 **Calibration Valve Assembly.** A three way valve assembly to direct the zero and calibration gases to the analyzers is recommended. Other methods, such as quick-connect lines, to route calibration gas to the analyzers are applicable.

3.5 **Particulate Filter.** An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter should be heated to prevent any condensation.

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• Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

3.6 **Recorder.** A strip-chart recorder, analog computer, or digital recorder for recording measurement data. The minimum data recording requirement is one measurement value per minute, Note: This method is often applied in highly explosive areas. Caution and care should be exercised in choice of equipment and installation.

4. Calibration and Other Gases.

Gases used for calibrations, fuel, and combustion air (if required) are contained in compressed gas cylinders. Preparation of calibration gases shall be done according to the procedure in Protocol No. 1, listed in Citation 2 of Bibliography. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than "2 percent from the certified value. For calibration gas values not generally available (i.e., organics between 1 and 10 percent by volume), alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with prior approval of the Administrator.

Calibration gases usually consist of propane in air or nitrogen and are determined in terms of the span value. Organic compounds other than propane can be used following the above guidelines and making the appropriate corrections for response factor.

4.1 **Fuel.** A 40 percent H_2/60 percent N_2 gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

4.2 **Zero Gas.** High purity air with less than 0.1 parts per million by volume (ppmv) of organic material (propane or carbon equivalent) or less than 0.1 percent of the span value, whichever is greater.

4.3 **Low-level Calibration Gas.** An organic calibration gas with a concentration equivalent to 25 to 35 percent of the applicable span value.

4.4 **Mid-level Calibration Gas.** An organic calibration gas with a concentration equivalent to 45 to 55 percent of the applicable span value.

4.5 **High-level Calibration Gas.** An organic calibration gas with a concentration equivalent to 80 to 90 percent of the applicable span value.

5. Measurement System Performance Specifications

5.1 **Zero Drift.** Less than "3 percent of the span value.

5.2 **Calibration Drift.** Less than "3 percent of span value.

5.3 **Calibration Error.** Less than "5 percent of the calibration gas value.

6. Pretest Preparations

6.1 **Selection of Sampling Site.** The location of the sampling site is generally specified by the applicable regulation or purpose of the test; i.e., exhaust stack, inlet line, etc. The sample port shall be located at least 1.5 meters or 2 equivalent diameters upstream of the gas discharge to the atmosphere.

6.2 **Location of Sample Probe.** Install the sample probe so that the probe is centrally located in the stack, pipe, or duct and is sealed tightly at the stack port connection.

6.3 Measurement System Preparation. Prior to the emission test, assemble the measurement system following the manufacturer's written instructions in preparing the sample interface and the organic analyzer. Make the system operable.

FIA equipment can be calibrated for almost any range of total organics concentrations. For high concentrations of organics (>1.0 percent by volume as propane) modifications to most commonly available analyzers are necessary. One accepted method of equipment modification is to decrease the size of the sample to the analyzer through the use of a smaller diameter sample capillary. Direct and continuous measurement of organic concentration is a necessary consideration when determining any modification design.

6.4 Calibration Error Test. Immediately prior to the test series, (within 2 hours of the start of the test) introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Calculate the predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level responses. Then introduce low-level and mid-level calibration gases successively to the measurement system. Record the analyzer responses for low-level and mid-level calibration gases and determine the differences between the measurement system responses and the predicted responses. These differences must be less than 5 percent of the respective calibration gas value. If not, the measurement system is not acceptable and must be replaced or repaired prior to testing. No adjustments to the measurement system shall be conducted after the calibration and before the drift check (Section 7.3). If adjustments are necessary before the completion of the test series, perform the drift checks prior to the required adjustments and repeat the calibration following the adjustments. If multiple electronic ranges are to be used, each additional range must be checked with a mid-level calibration gas to verify the multiplication factor.

6.5 Response Time Test. Introduce Zero gas into the measurement system at the calibration valve assembly. When the system output has stabilized, switch quickly to the high-level calibration gas. Record the time from the concentration change to the measurement system response equivalent to 95 percent of the step change. Repeat the test three times and average the results.

7. Emission Measurement Test Procedure

7.1 Organic Measurement. Begin sampling at the start of the test period, recording time and any required process information as appropriate. In particular, note on the recording chart periods of process interruption or cyclic operation.

7.2 Drift Determination. Immediately following the completion of the test period and hourly during the test period, reintroduce the zero and mid-level calibration gases, one at a time, to the measurement system at the calibration valve assembly. (Make no adjustments to the measurement system until after both the zero and calibration drift checks are made.) Record the analyzer response. If the drift values exceed the specified limits, invalidate the test results preceding the check and repeat the test following corrections to the measurement system. Alternatively, recalibrate the test measurement system as in Section 6.4 and report the results using both sets of calibration data (i.e., data determined prior to the test period and data determined following the test period).

8. Organic Concentration calculations

Determine the average organic concentration in terms of ppmv as propane or other calibration gas. The average shall be determined by the integration of the output recording over the period specified in the applicable regulation. If results are required in terms of ppmv as carbon, adjust measured concentrations using Equation 25A-1.

$$C_c = K\ C_{meas} \qquad \text{Eq. 25A-1}$$

Where:

C_c = Organic concentration as carbon, ppmv.
C_{meas} = Organic concentration as measured, ppmv.
K = Carbon equivalent correction factor.
K= 2 for ethane.
K= 3 for propane.
K= 4 for butane.
K= Appropriate response factor for other organic calibration gases.

9. Bibliography

1. Measurement of Volatile Organic Compounds-Guideline Series. U.S. Environmental Protection Agency. Research Triangle Park, NC. Publication No. EPA-450/2-78-041. June 1978. p. 46-54.

2. Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol No. 1). U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory. Research Triangle Park, NC. June 1978.

3. Gasoline Vapor Emission Laboratory Evaluation-Part 2. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. EMB Report No. 75-GAS-6. August 1975.

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER

NSPS TEST METHOD

(EMTIC M-18, 9/8/92)

Method 18 - Measurement of Gaseous Organic Compound Emissions by Gas Chromatography

INTRODUCTION

This method should not be attempted by persons unfamiliar with the performance characteristics of gas chromatography, nor by those persons who are unfamiliar with source sampling. Particular care should be exercised in the area of safety concerning choice of equipment and operation in potentially explosive atmospheres.

1. APPLICABILITY AND PRINCIPLE

1.1 Applicability.

1.1.1 This method applies to the analysis of approximately 90 percent of the total gaseous organics emitted from an industrial source. It does not include techniques to identify and measure trace amounts of organic compounds, such as those found in building air and fugitive emission sources.

1.1.2 This method will not determine compounds that (1) are polymeric (high molecular weight), (2) can polymerize before analysis, or (3) have very low vapor pressures at stack or instrument conditions.

1.2 Principle. This method is based on separating the major components of a gas mixture with a gas chromatograph (GC) and measuring the separated components with a suitable detector. The retention times of each separated component are compared with those of known compounds under identical conditions. Therefore, the analyst confirms the identity and approximate concentrations of the organic emission components beforehand. With this information, the analyst then prepares or purchases commercially available standard mixtures to calibrate the GC under conditions identical to those of the samples. The analyst also determines the need for sample dilution to avoid detector saturation, gas stream filtration to eliminate particulate matter, and prevention of moisture condensation.

2. RANGE AND SENSITIVITY

2.1 Range. The range of this method is from about 1 part per million (ppm) to the upper limit governed by GC detector saturation or column overloading. The upper limit can be extended by diluting the stack gases with an inert gas or by using smaller gas sampling loops.

2.2 Sensitivity. The sensitivity limit for a compound is defined as the minimum detectable concentration of that compound, or the concentration that produces a signal-to-noise ratio of three to one. The minimum detectable concentration is determined during the presurvey calibration for each compound.

3. PRECISION AND ACCURACY

Gas chromatographic techniques typically provide a precision of 5 to 10 percent relative standard deviation (RSD), but an experienced GC operator with a reliable instrument can readily achieve 5 percent RSD. For this method, the following combined GC/operator values are required.

(a) Precision. Duplicate analyses are within 5 percent of their mean value.

(b) Accuracy. Analysis results of prepared audit samples are within 10 percent of preparation values.

4. INTERFERENCES

4.1 Resolution interferences that may occur can be eliminated by appropriate GC column and detector choice or by shifting the retention times through changes in the column flow rate and the use of temperature programming.

4.2 The analytical system is demonstrated to be essentially free from contaminants by periodically analyzing blanks that consist of hydrocarbon-free air or nitrogen.

4.3 Sample cross-contamination that occurs when high-level and low-level samples or standards are analyzed alternately, is best dealt with by thorough purging of the GC sample loop between samples.

4.4 To assure consistent detector response, calibration gases are contained in dry air. To eliminate errors in concentration calculations due to the volume of water vapor in the samples, moisture concentrations are determined for each sample, and a correction factor is applied to any sample with greater than 2 percent water vapor.

5. PRESURVEY AND PRESURVEY SAMPLING

A presurvey shall be performed on each source to be tested. The purpose of the presurvey is to obtain all information necessary to design the emission test. The most important presurvey data are the average stack temperature and temperature range, approximate particulate concentration, static pressure, water vapor content, and identity and expected concentration of each organic compound to be analyzed. Some of this information can be obtained from literature surveys, direct knowledge, or plant personnel. However, presurvey samples of the gas shall be obtained for analysis to confirm the identity and approximate concentrations of the specific compounds prior to the final testing.

5.1 Apparatus.

5.1.1 Teflon Tubing. (Mention of trade names or specific products does not constitute endorsement by the U.S. Environmental Protection Agency.) Diameter and length determined by connection requirements of cylinder regulators and the GC. Additional tubing is necessary to connect the GC sample loop to the sample.

5.1.2 Gas Chromatograph. GC with suitable detector, columns, temperature-controlled sample loop and valve assembly, and temperature programable oven, if necessary. The GC shall achieve sensitivity requirements for the compounds under study.

5.1.3 Pump. Capable of pumping 100 ml/min. For flushing sample loop.

5.1.4 Flow Meter. To monitor accurately sample loop flow rate of 100 ml/min.

5.1.5 Regulators. Used on gas cylinders for GC and for cylinder standards.

5.1.6 Recorder. Recorder with linear strip chart is minimum acceptable. Integrator (optional) is recommended.

5.1.7 Syringes. 1.O- and 10-microliter size, calibrated, maximum accuracy (gas tight) for preparing standards and for injecting head space vapor from liquid standards in retention time studies.

5.1.8 Tubing Fittings. To plumb GC and gas cylinders.

5.1.9 Septums. For syringe injections.

5.1.10 Glass Jars. If necessary, clean, amber-colored glass jars with Teflon-lined lids for condensate sample collection. Size depends on volume of condensate.

5.1.11 Soap Film Flowmeter. To determine flow rates.

5.1.12 Tedlar Bags. 10- and 50-liter capacity, for preparation of standards.

5.1.13 Dry Gas Meter with Temperature and Pressure Gauges. Accurate to +2 percent, for preparation of gas standards.

5.1.14 Midget Impinger/Hot Plate Assembly. For preparation of gas standards.

5.1.15 Sample Flasks. For presurvey samples, must have gas-tight seals.

5.1.16 Adsorption Tubes. If necessary, blank tubes filled with necessary adsorbent (charcoal, Tenax, XAD-2, etc.) for presurvey samples.

5.1.17 Personnel Sampling Pump. Calibrated, for collecting adsorbent tube presurvey samples.

5.1.18 Dilution System. Calibrated, the dilution system is to be constructed following the specifications of an acceptable method.

5.2 Reagents.

5.2.1 Water. Deionized distilled.

5.2.2 Methylene Dichloride.

5.2.3 Calibration Gases. A series of standards prepared for every compound of interest.

5.2.4 Calibration Solutions. Samples of all the compounds of interest in a liquid form, for retention time studies.

5.2.5 Extraction Solvents. For extraction of adsorbent tube samples in preparation for analysis.

5.2.6 Fuel. As recommended by the manufacturer for operation of the GC.

5.2.7 Carrier Gas. Hydrocarbon free, as recommended by the manufacturer for operation of the detector and compatability with the column.

5.2.8 Zero Gas. Hydrocarbon free air or nitrogen, to be used for dilutions, blank preparation, and standard preparation.

5.3 Sampling.

5.3.1 Collection of Samples with Glass Sampling Flasks. Presurvey samples can be collected in precleaned 250-ml double-ended glass sampling flasks. Teflon stopcocks, without grease, are preferred. Flasks should be cleaned as follows: Remove the stopcocks from both ends of the flasks, and wipe the parts to remove any grease. Clean the stopcocks, barrels, and receivers with methylene dichloride. Clean all glass ports with a soap solution, then rinse with tap and water. Place the flask in a cool glass annealing furnace, and apply heat up to 500EC. Maintain at this temperature for 1 hours. After this time period, shut off and open the furnace to allow the flask to cool. Grease the stopcocks with stopcock grease, and return them to the flask receivers. Purge the assembly with high- purity nitrogen for 2 to 5 minutes. Close off the stopcocks after purging to maintain a slight positive nitrogen pressure. Secure the stopcocks with tape.

Presurvey samples can be obtained either by drawing the gases into the previously evacuated flask or by drawing the gases into and purging the flask with a rubber suction bulb.

5.3.1.1 Evacuated Flask Procedure. Use a high-vacuum pump to evacuate the flask to the capacity of the pump; then close off the stopcock leading to the pump. Attach a 6-mm outside diameter (OD) glass tee to the flask inlet with a short piece of Teflon tubing. Select a 6-mm OD borosilicate sampling probe, enlarged at one end to a 12-mm OD and of sufficient length to reach the centroid of the duct to be sampled. Insert a glass wool plug in the enlarged end of the probe to remove particulate matter. Attach the other end of the probe to the tee with a short piece of Teflon tubing. Connect a rubber suction bulb to the third leg of the tee. Place the filter end of the probe at the centroid of the duct, and purge the probe with the rubber suction bulb. After the probe is completely purged and filled with duct gases, open the stopcock to the grab flask until the pressure in the flask reaches duct pressure. Close off the stopcock, and remove the probe from the duct. Remove the tee from the flask and tape the stopcocks to prevent leaks during shipment. Measure and record the duct temperature and pressure.

5.3.1.2 Purged Flask Procedure. Attach one end of the sampling flask to a rubber suction bulb. Attach the other end to a 6-mm OD glass probe as described in Section 5.3.1.1. Place the filter end of the probe at the centroid of the duct, and apply suction with the bulb to completely purge the probe and flask. After the flask has been purged, close off the stopcock near the suction bulb, and then close off the stopcock near the probe. Remove the probe from the duct, and disconnect both the probe and suction bulb. Tape the stopcocks to prevent leakage during shipment. Measure and record the duct temperature and pressure.

5.3.2 Flexible Bag Procedure. Tedlar or aluminized Mylar bags can also be used to obtain the presurvey sample. Use new bags, and leak check them before field use. In addition, check the bag before use for contamination by filling it with nitrogen or air, and analyzing the gas by GC at high sensitivity. Experience indicates that it is desirable to allow the inert gas to remain in the bag about 24 hours or longer to check for desorption of organics from the bag. Follow the leak-check and sample collection procedures given in Section 7.1.

5.3.3 Determination of Moisture Content. For combustion or water- controlled processes, obtain the moisture content from plant personnel or by measurement during the presurvey. If the source is below 50EC, measure the wet bulb and dry bulb temperatures, and calculate the moisture content using a psychrometric chart. At higher temperatures, use Method 4 to determine the moisture content.

5.4 Determination of Static Pressure. Obtain the static pressure from the plant personnel or measurement. If a type S pitot tube and an inclined manometer are used, take care to align the pitot tube 90E from the direction of the flow. Disconnect one of the tubes to the manometer, and read the static pressure; note whether the reading is positive or negative.

5.5 Collection of Presurvey Samples with Adsorption Tube. Follow Section 7.4 for presurvey sampling.

6. ANALYSIS DEVELOPMENT

Presurvey samples shall be used to develop and confirm the best sampling and analysis scheme.

6.1 Selection of GC Parameters.

6.1.1 Column Choice. Based on the initial contact with plant personnel concerning the plant process and the anticipated emissions, choose a column that provides good resolution and rapid analysis time. The choice of an appropriate column can be aided by a literature search, contact with manufacturers of GC columns, and discussion with personnel at the emission source.

Most column manufacturers keep excellent records on their products. Their technical service departments may be able to recommend appropriate columns and detector type for separating the anticipated compounds, and they may be able to provide information on interferences, optium operating conditions, and column limitations.

Plants with analytical laboratories may be able to provide information on their analytical procedures, including extractions, detector type, column types, compounds emitted, and approximate concentrations.

6.1.2 Preliminary GC Adjustment. Using the standards and column obtained in Section 6.1.1, perform initial tests to determine appropriate GC conditions that provide good resolution and minimum analysis time for the compounds of interest.

6.1.3 Preparation of Presurvey Samples. If the samples were collected on an adsorbent, extract the sample as recommended by the manufacturer for removal of the compounds with a solvent suitable to the type of GC analysis. Prepare other samples in an appropriate manner.

6.1.4 Presurvey Sample Analysis. Before analysis, heat the presurvey sample to the duct temperature to vaporize any condensed material. Analyze the samples by the GC procedure, and compare the retention times against those of the calibration samples that contain the components expected to be in the stream. If any compounds cannot be identified with certainty by this procedure, identify them by other means such as GC/mass spectroscopy (GC/MS) or GC/infrared techniques. A GC/MS system is recommended.

Use the GC conditions determined by the procedure of Section 6.1.2 for the first injection. Vary the GC parameters during subsequent injections to determine the optimum settings. Once the optimum settings have been determined, perform repeat injections of the sample to determine the retention time of each compound. To inject a sample, draw sample through the loop at a constant rate (100 ml/min for 30 seconds). Be careful not to pressurize the gas in the loop. Turn off the pump and allow the gas in the sample loop to come to ambient pressure. Activate the sample valve, and record injection time, loop temperature, column temperature, carrier flow rate, chart speed, and attenuator setting. Calculate the retention time of each peak using the distance from injection to the peak maximum divided by the chart speed. Retention times should be repeatable within O.5 seconds.

If the concentrations are too high for appropriate detector response, a smaller sample loop or dilutions may be used for gas samples, and, for liquid samples, dilution with solvent is appropriate. Use the standard curves (Section 6.3) to obtain an estimate of the concentrations.

Identify all peaks by comparing the known retention times of compounds expected to be in the retention times of peaks in the sample. Identify any remaining unidentified peaks which have areas larger than 5 percent of the total using a GC/MS, or estimation of possible compounds by their retention times compared to known compounds, with confirmation by further GC analysis.

***6.2* Calibration Standards.** If the presurvey samples are collected in an adsorbent tube (charcoal, XAD-2, Tenax, etc.), prepare the standards in the same solvent used for the extraction procedure for the adsorbent. Prepare several standards for each compound throughout the range of the sample.

6.2.1 Cylinder Calibration Gases. If available, use NBS reference gases or commercial gas mixtures certified through direct analysis for the calibration curves.

6.2.1.1 Optional Cylinder Approach. As an alternative procedure, maintain high and low calibration standards. Use the high-concentration (50- to 100-ppm) standard to prepare a three-point calibration curve with an appropriate dilution technique. Then use the low-concentration standard to verify the dilution technique. Use this same approach also to verify the dilution techniques for high-concentration source gases.

To prepare the diluted calibration samples, use calibrated rotameters to meter both the high concentration calibration gas and the diluent gas. Adjust the flow rates through the rotameters with micrometer valves to obtain the desired dilutions. A positive displacement pump or other metering techniques may be used in place of the rotameter to provide a fixed flow of high- concentration gas.

To calibrate the rotameters, connect each rotameter between the diluent gas supply and a suitably sized bubble meter, spirometer, or wet test meter. While it is desirable to calibrate the calibration gas flowmeter with calibration gas, generally the available amount of this gas will preclude it. The error introduced by using the diluent gas is insignificant for gas mixtures of up to 1,000 to 2,000 ppm of each organic component. Record the temperature and atmospheric pressures as follows:

$$Q_2 = Q_1 \left(\frac{P_2 T_1}{P_1 T_2}\right)^{1/2} \qquad \text{Eq. 18-1}$$

Where: Q_2 = Flow rate at new absolute temperature (T_2) and new absolute pressure (P_2).

Q_1 = Flow rate at calibration absolute temperature (T_1) and absolute pressure (P_1).

Connect the rotameters to the calibration and diluent gas supplies using 6-mm Teflon tubing. Connect the outlet side of the rotameters through a connector to a leak-free Tedlar bag as shown in Figure 18.5. (See Section 7.1 for leak-check procedures.) Adjust the gas flows to provide the desired dilution, and fill the bag with sufficient gas for calibration. Be careful not to fill to the point where it applies additional pressure on the gas. Record the flow rates of both rotameters, the ambient temperature, and atmospheric pressure. Calculate the concentration of diluted gas as follows:

$$C_a = \frac{10^6 (\bar{X}_a q_a)}{q_a + q_d} \qquad \text{Eq. 18-2}$$

Where: C_a = Concentration of component "a" in ppm.

$\bar{X}_a$ = Mole fraction of component "a" in the calibration gas to be diluted.

q_a = Flow rate of the calibration gas containing mg component "a" at measured temperature and pressure.

q_d = Diluent gas flow at measured temperature and pressure.

Use single-stage dilutions to prepare calibration mixtures up to about 1:20 dilution factor. For greater dilutions, use a double dilution system. Assemble the apparatus, as shown in Figure 18-6, using calibrated flowmeters of suitable range. Adjust the control valves so that about 90 percent of the diluted gas from the first stage is exhausted, and 10 percent goes to the second stage flowmeter. Fill the Tedlar bag with the dilute gas from the second stage. Record the temperature, ambient pressure, and water manometer pressure readings. Correct the flow reading in the first stage as indicated by the water manometer reading. Calculate the concentration of the component in the final gas mixture as follows:

$$C_a = 106\, X \frac{qa1}{qa1 + qd1} \frac{qa2}{qa2 + qd2} \qquad \text{Eq. 18-3}$$

Where: Ca = Concentration of component "a" in ppm.

$\bar{X}a$ = Mole fraction of component "a" in original gas.

qa1 = Flow rate of component "a" in stage 1.

qa2 = Flow rate of component "a" in stage 2.

qd1 = Flow rate of diluent gas in stage 1.

qd2 = Flow rate of diluent gas in stage 2.

Further details of the calibration methods for rotameters and the dilution system can be found in Citation 21 in the Bibliography.

6.2.2 Preparation of Standards from Volatile Materials. Record all data shown on Figure 18-3.

6.2.2.1 Bag Technique. Evacuate a 10-liter Tedlar bag that has passed a leak-check (see Section 7.1), and meter in 5.0 liters of nitrogen through a O.5 liter per revolution dry test meter. While the bag is filling, use a O.5-ml syringe to inject a known quantity of the material of interest through the wall of the bag or through a septum-capped tee at the bag inlet. Withdraw the syringe needle, and immediately cover the resulting hole with a piece of masking tape. In a like manner, prepare dilutions having other concentrations. Prepare a minimum of three concentrations. Place each bag on a smooth surface, and alternately depress opposite sides of the bag 50 times to mix the gases. Record the average meter temperature, gas volume, liquid volume, barometric pressure, and meter pressure.

Set the electrometer attenuator to the X1 position. Flush the sampling loop with zero helium or nitrogen, and activate the sample valve. Record the injection time, sample loop temperature, column temperature, carrier gas flow rate, chart speed, and attenuator setting. Record peaks and detector responses that occur in the absence of any sample. Maintain conditions. Flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the calibration mixtures, and open the sample valve. Record the injection time. Select the peak that corresponds to the compound of interest. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. Divide this quantity by the chart speed, and record the resulting value as the retention time.

6.2.2.2 Preparation of Standards from Less Volatile Liquid Materials. Use the equipment shown in Figure 18-8. Calibrate the dry gas meter with a wet test meter or a spirometer. Use a water manometer for the pressure gauge and glass, Teflon, brass, or stainless steel for all connections. Connect a valve to the inlet of the 50-liter Tedlar bag.

To prepare the standards, assemble the equipment as shown in Figure 18-8, and leak-check the system. Completely evacuate the bag. Fill the bag with hydrocarbon-free air, and evacuate the bag again. Close the inlet valve.

Turn on the hot plate, and allow the water to reach boiling. Connect the bag to the impinger outlet. Record the initial meter reading, open the bag inlet valve, and open the cylinder. Adjust the rate so that the bag will be completely filled in approximately 15 minutes. Record meter pressure, temperature, and local barometric pressure.

Fill the syringe to the desired liquid volume with the material to be evaluated. Place the syringe needle into the impinger inlet using the septum provided, and inject the liquid into the flowing air stream. Use a needle of sufficient length to permit injection of the liquid below the air inlet branch of the tee. Remove the syringe.

Complete filling of the bag; note and record the meter pressure and temperature at regular intervals, preferably 1 minute.

When the bag is filled, stop the pump, and close the bag inlet valve. Record the final meter reading.

Disconnect the bag from the impinger outlet, and set it aside for at least 1 hour to equilibrate. Analyze the sample within the proven life period of its preparation.

6.2.2.3 Concentration Calculations. Average the meter temperature (Tm) and pressure (Pm) readings over the bag filling process.

Measure the solvent liquid density at room temperature by accurately weighing a known volume of the material on an analytical balance to the nearest 1.O milligram. Take care during the weighing to minimize evaporation of the material. A ground-glass stoppered 25-ml volumetric flask or a glass-stoppered specific gravity bottle is suitable for weighing. Calculate the result in terms of g/ml. As an alternative, literature values of the density of the liquid at 20EC may be used.

Calculate the concentration of material in the sample in mg/liter at standard conditions as follows:

$$C_{std\ sol} = \frac{760\ (Lv)\ (\ )\ (273 + Tm)}{273\ (Mf - Mi)\ (Pbar + Pm)}\ \frac{1000\ mg}{g} \qquad \text{Eq. 18-4}$$

Where: Cstd sol = Standard solvent concentration, mg/std liter.

Lv = Liquid volume injected, l. ??

= Liquid density at room temperature, g/ml.

Tm = Meter temperature, EC.

Mf,Mi = Final and initial meter reading, liters.

Pbar = Local barometric pressure (absolute), mm Hg.

Pm = Meter pressure (gauge), mm Hg.

6.3 Preparation of Calibration Curves. Obtain gas standards as described in Section 6.2 such that three concentrations per attenuator range are available. Establish proper GC conditioning, then flush the sampling loop for 30 seconds at a rate of 100 ml/min. Allow the sample loop pressure to equilibrate with atmospheric pressure, and activate the injection valve. Record the standard concentration, attenuator setting, injection time, chart speed, retention time, peak area, sample loop temperature, column temperature, and carrier gas flow rate. Repeat the standard injection until two consecutive injections give area counts within 5 percent of their average. The average multiplied by the attenuator setting is then the calibration area value for that concentration. Repeat this procedure for each standard. Plot concentrations along the abscissa and the calibration area values along the ordinate. Perform a regression analysis, and draw the least squares line.

6.4 Optional Use of Prepared Cylinders for Dilution Calibration Checks, and Response Factor Determinations. A set of three standards of the major component in the emissions is required. This set of standards can be taken into the field and thereby replace the need to prepare standards as described in Section 6.2.2.

The high concentration standard can be run through the dilution system to assess the accuracy of the system. First, prepare a calibration curve using the three standards following the procedure described in Section 6.3. Then, prepare a dilute sample using the high concentration standard so that the dilute sample will fall within the lower limits of the calibration curve.

Next, analyze the dilute sample, and calculate the measured concentration from the calibration curve as described in Section 6.3. The dilute concentration calculated from the analysis shall be within 10 percent of the concentration expected from the dilution system; otherwise determine the source of error in the dilution system, and correct it.

The calibration curve from the cylinder standards for a single organic can also be related to the GC response curves of all the compounds in the source by response factors developed in the laboratory. In the field, the single calibration curve from the cylinder standards and the calculated response factors measured in the laboratory can then be used to replace the need to prepare and analyze calibration standards for each organic compound (see Section 6.5 on daily quality control procedure).

Recheck the relative peak area of one of the calibration standards daily to guard against degradation. If the relative peak areas on successive days differ by more than 5 percent, remake all of the standards before proceeding to the final sample analyses.

6.5 Evaluation of Calibration and Analysis Procedure. Immediately after the preparation of the calibration curve and prior to the final sample analyses, perform the analysis audit described in Part 61, Appendix C, Procedure 2: "Procedure for Field Auditing GC Analysis" (47 FR 39179, September 7, 1982). The information required to document the analysis of the audit samples has been included on the example data sheets shown in Figures 18-3 and 18-7. The audit analyses shall agree with the audit concentrations within 10 percent. When available, the tester may obtain audit cylinders by contacting: Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Quality Assurance Division (MD-77), Research Triangle Park, North Carolina 27711. Audit cylinders obtained from a commercial gas manufacturer may be used provided: (a) the gas manufacturer certifies the audit cylinder as described in Section 5.2.3.1 of Method 23 and (b) the gas manufacturer obtains an independent analysis of the audit cylinders to verify this analysis. Independent analysis is defined as an analysis performed by an individual other than the individual who performs the gas manufacturer's analysis, while using calibration standards and analysis equipment different from those used for the gas manufacturer's analysis. Verification is complete and acceptable when the independent analysis concentration is within 5 percent of the gas manufacturer's concentration.

7. FINAL SAMPLING AND ANALYSIS PROCEDURE

Considering safety (flame hazards) and the source conditions, select an appropriate sampling and analysis procedure (Section 7.1, 7.2, or 7.4). In situations where a hydrogen flame is a hazard and no intrinsically safe GC is suitable, use the flexible bag collection technique or an adsorption technique. If the source temperature is below 100EC, and the organic concentrations are suitable for the detector to be used, use the direct interface method. If the source gases require dilution, use a dilution interface and either the bag sample or adsorption tubes. The choice between these two techniques will depend on the physical layout of the site, the source temperature, and the storage stability of the compounds if collected in the bag. Sample polar compounds by direct interfacing or dilution interfacing to prevent sample loss by adsorption on the bag.

7.1 Integrated Bag Sampling and Analysis.

7.1.1 Evacuated Container Sampling Procedure. In this procedure, the bags are filled by evacuating the rigid air-tight container holding the bags. Therefore, check both the bags and the container for leaks before and after use as follows: Connect a water manometer using a tee connector between the bag or rigid container and a pressure source. Pressurize the bag or container to 5 to 10 cm H2O (2 to 4 in. H2O), and allow it to stand overnight. A deflated bag indicates a leak.
7.1.1.1 Apparatus.

7.1.1.1.1 Probe. Stainless steel, Pyrex glass, or Teflon tubing probe, according to the duct temperature, with 6.4-mm OD Teflon tubing of sufficient length to connect to the sample bag. Use stainless steel or Teflon unions to connect probe and sample line.

7.1.1.1.2 Quick Connects. Male (2) and female (2) of stainless steel construction.

7.1.1.1.3 Needle Valve. To control gas flow.

7.1.1.1.4 Pump. Leakless Teflon-coated diaphragm-type pump or equivalent. To deliver at least 1 liter/min.

7.1.1.1.5 Charcoal Adsorption Tube. Tube filled with activated charcoal, with glass wool plugs at each end, to adsorb organic vapors.

7.1.1.1.6 Flowmeter. O to 500-ml flow range; with manufacturer's calibration curve.

7.1.1.2 Sampling Procedure. To obtain a sample, assemble the sample train as shown in Figure 18-9. Leak check both the bag and the container. Connect the vacuum line from the needle valve to the Teflon sample line from the probe. Place the end of the probe at the centroid of the stack, and start the pump with the needle valve adjusted to yield a flow of O.5 liter/minute. After allowing sufficent time to purge the line several times, connect the vacuum line to the bag, and evacuate until the rotameter indicates no flow. Then position the sample and vacuum lines for sampling, and begin the actual sampling, keeping the rate proportional to the stack velocity. As a precaution, direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Record the source temperature, barometric pressure, ambient temperature, sampling flow rate, and initial and final sampling time on the data sheet shown in Figure 18-10. Protect the Tedlar bag and its container from sunlight. When possible, perform the analysis within 2 hours of sample collection.

7.1.2 Direct Pump Sampling Procedure. Follow 7.1.1, except place the pump and needle valve between the probe and the bag. Use a pump and needle valve constructed of stainless steel or some other material not affected by the stack gas. Leak-check the system, and then purge with stack gas before connecting to the previously evacuated bag.

7.1.3 Explosion Risk Area Bag Sampling Procedure. Follow 7.1.1 except replace the pump with another evacuated can (see Figure 18-9a). Use this method whenever there is a possibility of an explosion due to pumps, heated probes, or other flame producing equipment.

7.1.4 Other Modified Bag Sampling Procedures. In the event that condensation is observed in the bag while collecting the sample and a direct interface system cannot be used, heat the bag during collection, and maintain it at a suitably elevated temperature during all subsequent operations. (NOTE: Take care to leak-check the system prior to the dilutions so as not to create a potentially explosive atmosphere.) As an alternative, collect the sample gas, and simultaneously dilute it in the Tedlar bag.
In the first procedure, heat the box containing the sample bag to the source temperature, provided the components of the bag and the surrounding box can withstand this temperature. Then transport the bag as rapidly as possible to the analytical area while maintaining the heating, or cover the box with an insulating blanket. In the analytical area, keep the box heated to source temperature until analysis. Be sure that the method of heating the box and the control for the heating circuit are compatible with the safety restrictions required in each area.

To use the second procedure, prefill the Tedlar bag with a known quantity of inert gas. Meter the inert gas into the bag according to the procedure for the preparation of gas concentration standards of volatile liquid materials (Section 6.2.2.2), but eliminate the midget impinger section. Take the partly filled bag to the source, and meter the source gas into the bag through heated sampling lines and a heated flowmeter, or Teflon positive displacement pump. Verify the dilution factors periodically through dilution and analysis of gases of known concentration.

7.1.5 Analysis of Bag Samples. Connect the needle valve, pump, charcoal tube, and flowmeter to draw gas samples through the gas sampling valve. Flush the sample loop with gas from one of the three Tedlar bags containing a calibration mixture, and analyze the sample. Obtain at least two chromatograms for the sample. The results are acceptable when the peak areas from two consecutive injections agree to within 5 percent of their average. If they do not agree, run additional samples until consistent area data are obtained. If this agreement is not obtained, correct the instrument techique problems before proceeding. If the results are acceptable, analyze the other two calibration gas mixtures in the same manner. Prepare the calibration curve by using the least squares method.

Analyze the two field audit samples as described in Section 6.5 by connecting each Tedlar bag containing an audit gas mixture to the sampling valve. Calculate the results; record and report the data to the audit supervisor. If the results are acceptable, proceed with the analysis of the source samples.

Analyze the source gas samples by connecting each bag to the sampling valve with a piece of Teflon tubing identified with that bag. Follow the restrictions on replicate samples specified for the calibration gases. Record the data. Analyze the other two bag samples of source gas in the same manner. After all three bag samples have been analyzed, repeat the analysis of the calibration gas mixtures. Use the average of the two calibration curves to determine the respective sample concentrations. If the two calibration curves differ by more than 5 percent from their mean value, then report the final results by both calibration curves.

7.1.6 Determination of Bag Water Vapor Content. Measure the ambient temperature and barometric pressure near the bag. From a water saturation vapor pressure table, determine and record the water vapor content of the bag as a decimal figure. (Assume the relative humidity to be 100 percent unless a lesser value is known.)

Use the field analytical data sheet is shown in Figure 18-11. The sheet has been designed to tabulate information from the bag collection, direct interface, and dilution interface systems; as a result, not all of the requested information will apply to any single method. Note the data that do not apply with the notation "N.A." Summarize the analysis.

7.2 Direct Interface Sampling and Analysis Procedure. The direct interface procedure can be used provided that the moisture content of the gas does not interfere with the analysis procedure, the physical requirements of the equipment can be met at the site, and the source gas concentration is low enough that detector saturation is not a problem. Adhere to all safety requirements with this method.

7.2.1 Apparatus.

7.2.1.1 Probe. Constructed of stainless steel, Pyrex glass, or Teflon tubing as required by duct temperature, 6.4-mm OD. enlarged at duct end to contain glass wool plug. If necessary, heat the probe with heating tape or a special heating unit capable of maintaining duct temperature.

7.2.1.2 Sample Lines. 6.4-mm OD Teflon lines, heat-traced to prevent condensation of material.

7.2.1.3 Quick Connects. To connect sample line to gas sampling valve on GC instrument and to pump unit used to withdraw source gas. Use a quick connect or equivalent on the cylinder or bag containing calibration gas to allow connection of the calibration gas to the gas sampling valve.

7.2.1.4 Thermocouple Readout Device. Potentiometer or digital thermometer, to measure source temperature and probe temperature.

7.2.1.5 Heated Gas Sampling Valve. Of two-position, six-port design, to allow sample loop to be purged with source gas or to direct source gas into the GC instrument.

7.2.1.6 Needle Valve. To control gas sampling rate from the source.

7.2.1.7 Pump. Leakless Teflon-coated diaphragm-type pump or equivalent, capable of at least 1 liter/minute sampling rate.

7.2.1.8 Flowmeter. Of suitable range to measure sampling rate.

7.2.1.9 Charcoal Adsorber. To adsorb organic vapor collected from the source to prevent exposure of personnel to source gas.

7.2.1.10 Gas Cylinders. Carrier gas (helium or nitrogen), and oxygen and hyrogen for a flame ionization detector (FID) if one is used.

7.2.1.11 Gas Chromatograph. Capable of being moved into the field, with detector, heated gas sampling valve, column required to complete separation of desired components, and option for temperature programming.

7.2.1.12 Recorder/Integrator. To record results.

7.2.2 Procedure. To obtain a sample, assemble the sampling system as shown in Figure 18-12. Make sure all connections are tight. Turn on the probe and sample line heaters. As the temperature of the probe and heated line approaches the source temperature as indicated on the thermocouple readout device, control the heating to maintain a temperature of O to 3EC above the source temperature. While the probe and heated line are being heated, disconnect the sample line from the gas sampling valve, and attach the line from the calibration gas mixture. Flush the sample loop with calibration gas and analyze a portion of that gas. Record the results. After the calibration gas sample has been flushed into the GC instrument, turn the gas sampling valve to flush position, then reconnect the probe sample line to the valve. Move the probe to the sampling position, and draw source gas into the probe, heated line, and sample loop. After thorough flushing, analyze the sample using the same conditions as for the calibration gas mixture. Repeat the analysis on an additional sample. Measure the peak areas for the two samples, and if they do not agree to within 5 percent of their mean value, analyze additional samples until two consecutive analyses meet this criteria. Record the data. After consistent results are obtained, remove the probe from the source and analyze a second calibration gas mixture. Record this calibration data and the other required data on the data sheet shown in Figure 18-11, deleting the dilution gas information.

(NOTE: Take care to draw all samples, calibration mixtures, and audits through the sample loop at the same pressure.)

In addition, analyze the field audit samples by connecting the audit sample cylinders to the gas sampling valve. Use the same instrument conditions as were used for the source samples. Record the data, and report the results of these analyses to the audit supervisor.

7.3 Dilution Interface Sampling and Analysis Procedure. Source samples that contain a high concentration of organic materials may require dilution prior to analysis to prevent saturating the GC detector. The apparatus required for this direct interface procedure is basically the same as that described in the Section 7.2, except a dilution system is added between the heated sample line and the gas sampling valve. The apparatus is arranged so that either a 10:1 or 100:1 dilution of the source gas can be directed to the chromatograph. A pump of larger capacity is also required, and this pump must be heated and placed in the system between the sample line and the dilution apparatus.

7.3.1 Apparatus. The equipment required in addition to that specified for the direct interface system is as follows:

7.3.1.1 Sample Pump. Leakless Teflon-coated diaphragm-type that can withstand being heated to 120EC and deliver 1.5 liters/minute.

7.3.1.2 Dilution Pumps. Two Model A-150 Komhyr Teflon positive displacement type delivering 150 cc/minute, or equivalent. As an option, calibrated flowmeters can be used in conjunction with Teflon-coated diaphragm pumps.

7.3.1.3 Valves. Two Teflon three-way valves, suitable for connnecting to 6.4-mm OD Teflon tubing.

7.3.1.4 Flowmeters. Two, for measurement of diluent gas, expected delivery flow rate to be 1,350 cc/min.

7.3.1.5 Diluent Gas with Cylinders and Regulators. Gas can be nitrogen or clean dry air, depending on the nature of the source gases.

7.3.1.6 Heated Box. Suitable for being heated to 120EC, to contain the three pumps, three-way valves, and associated connections. The box should be equipped with quick connect fittings to facilitate connection of: (1) the heated sample line from the probe, (2) the gas sampling valve, (3) the calibration gas mixtures, and (4) diluent gas lines. A schematic diagram of the components and connections is shown in Figure 18-13.

(Note: Care must be taken to leak-check the system prior to the dilutions so as not to create a potentially explosive atmosphere.)

The heated box shown in Figure 18-13 is designed to receive a heated line from the probe. An optional design is to build a probe unit that attaches directly to the heated box. In this way, the heated box contains the controls for the probe heaters, or, if the box is placed against the duct being sampled, it may be possible to eliminate the probe heaters. In either case, a heated Teflon line is used to connect the heated box to the gas sampling valve on the chromatograph.

7.3.2 Procedure. Assemble the apparatus by connecting the heated box, shown in Figure 18-13, between the heated sample line from the probe and the gas sampling valve on the chromatograph. Vent the source gas from the gas sampling valve directly to the charcoal filter, eliminating the pump and rotameter. Heat the sample probe, sample line, and heated box. Insert the probe and source thermocouple at the centroid of the duct. Measure the source temperature, and adjust all heating units to a temperature O to 3EC above this temperature. If this temperature is above the safe operating temperature of the Teflon components, adjust the heating to maintain a temperature high enough to prevent condensation of water and organic compounds. Verify the operation of the dilution system by analyzing a high concentration gas of known composition through either the 10:1 or 100:1 dilution stages, as appropriate. (If necessary, vary the flow of the diluent gas to obtain other dilution ratios.) Determine the concentration of the diluted calibration gas using the dilution factor and the calibration curves prepared in the laboratory. Record the pertinent data on the data sheet shown in Figure 18-11. If the data on the diluted calibration gas are not within 10 percent of the expected values, determine whether the chromatograph or the dilution system is in error, and correct it. Verify the GC operation using a low concentration standard by diverting the gas into the sample loop, bypassing the dilution system.

If these analyses are not within acceptable limits, correct the dilution system to provide the desired dilution factors. Make this correction by diluting a high-concentration standard gas mixture to adjust the dilution ratio as required.

Once the dilution system and GC operations are satisfactory, proceed with the analysis of source gas, maintaining the same dilution settings as used for the standards. Repeat the analyses until two consecutive values do not vary by more than 5 percent from their mean value are obtained.

Repeat the analysis of the calibration gas mixtures to verify equipment operation. Analyze the two field audit samples using either the dilution system, or directly connect to the gas sampling valve as required. Record all data and report the results to the audit supervisor.

7.4 Adsorption Tube Procedure (Alternative Procedure). It is suggested that the tester refer to the National Institute for Occupational Safety and Health (NIOSH) method for the particular organics to be sampled. The principal interferent will be water vapor. If water vapor is present at concentrations above 3 percent, silica gel should be used in front of the charcoal. Where more than one compound is present in the emissions, then develop relative adsorptive capacity information.

7.4.1 Additional Apparatus. In addition to the equipment listed in the NIOSH method for the particular organic(s) to be sampled, the following items (or equivalent) are suggested.

7.4.1.1 Probe (Optional). Borosilicate glass or stainless steel, approximately 6-mm ID, with a heating system if water condensation is a problem, and a filter (either in-stack or out-stack heated to stack temperature) to remove particulate matter. In most instances, a plug of glass wool is a satisfactory filter.

7.4.1.2 Flexible Tubing. To connect probe to adsorption tubes. Use a material that exhibits minimal sample adsorption.

7.4.1.3 Leakless Sample Pump. Flow controlled, constant rate pump, with a set of limiting (sonic) orifices to provide pumping rates from approximately 10 to 100 cc/min.

7.4.1.4 Bubble-Tube Flowmeter. Volume accuracy within +1 percent, to calibrate pump.

7.4.1.5 Stopwatch. To time sampling and pump rate calibration.

7.4.1.6 Adsorption Tubes. Similar to ones specified by NIOSH, except the amounts of adsorbent per primary/backup sections are 800/200 mg for charcoal tubes and 1040/260 mg for silica gel tubes. As an alternative, the tubes may contain a porous polymer adsorbent such as Tenax GC or XAD-2.

7.4.1.7 Barometer. Accurate to 5 mm Hg, to measure atmospheric pressure during sampling and pump calibration.

7.4.1.8 Rotameter. O to 100 cc/min, to detect changes in flow rate during sampling.

7.4.2 Sampling and Analysis. It is suggested that the tester follow the sampling and analysis portion of the respective NIOSH method section entitled "Procedure." Calibrate the pump and limiting orifice flow rate through adsorption tubes with the bubble tube flowmeter before sampling. The sample system can be operated as a "recirculating loop" for this operation. Record the ambient temperature and barometric pressure. Then, during sampling, use the rotameter to verify that the pump and orifice sampling rate remains constant.

Use a sample probe, if required. Minimize the length of flexible tubing between the probe and adsorption tubes. Several adsorption tubes can be connected in series, if the extra adsorptive capacity is needed. Provide the gas sample to the sample system at a pressure sufficient for the limiting orifice to function as a sonic orifice. Record the total time and sample flow rate (or the number of pump strokes), the barometric pressure, and ambient temperature. Obtain a total sample volume commensurate with the expected concentration(s) of the volatile organic(s) present, and recommended sample loading factors (weight sample per weight adsorption media). Laboratory tests prior to actual sampling may be necessary to predetermine this volume. When more than one organic is present in the emissions, then develop relative adsorptive capacity information. If water vapor is present in the sample at concentrations above 2 to 3 percent, the adsorptive capacity may be severely reduced. Operate the gas chromatograph according to the manufacturer's instructions. After establishing optimum conditions, verify and document these conditions during all operations. Analyze the audit samples (see Section 7.4.4.3), then the emission samples. Repeat the analysis of each sample until the relative deviation of two consecutive injections does not exceed 5 percent.

7.4.3 Standards and Calibration. The standards can be prepared according to the respective NIOSH method. Use a minimum of three different standards; select the concentrations to bracket the expected average sample concentration. Perform the calibration before and after each day's sample analyses. Prepare the calibration curve by using the least squares method.

7.4.4 Quality Assurance.

7.4.4.1 Determination of Desorption Efficiency. During the testing program, determine the desorption efficiency in the expected sample concentration range for each batch of adsorption media to be used. Use an internal standard. A minimum desorption efficiency of 50 percent shall be obtained. Repeat the desorption determination until the relative deviation of two consecutive determinations does not exceed 5 percent. Use the average desorption efficiency of these two consecutive determinations for the correction specified in Section 7.4.4.5. If the desorption efficiency of the compound(s) of interest is questionable under actual sampling conditions, use of the Method of Standard Additions may be helpful to determine this value.

7.4.4.2 Determination of Sample Collection Efficiency. For the source samples, analyze the primary and backup portions of the adsorption tubes separately. If the backup portion exceeds 10 percent of the total amount (primary and back-up), repeat the sampling with a larger sampling portion.

7.4.4.3 Analysis Audit. Immediately before the sample analyses, analyze the two audits in accordance with Section 7.4.2. The analysis audit shall agree with the audit concentration within 10 percent.

7.4.4.4 **Pump Leak Checks and Volume Flow Rate Checks.** Perform both of these checks immediately after sampling with all sampling train components in place. Perform all leak-checks according to the manufacturer's instructions, and record the results. Use the bubble-tube flowmeter to measure the pump volume flow rate with the orifice used in the test sampling, and record the result. If it has changed by more than 5 but less than 20 percent, calculate an average flow rate for the test. If the flow rate has changed by more than 20 percent, recalibrate the pump and repeat the sampling.

7.4.4.5 **Calculations.** All calculations can be performed according to the respective NIOSH method. Correct all sample volumes to standard conditions. If a sample dilution system has been used, multiply the results by the appropriate dilution ratio. Correct all results by dividing by the desorption efficiency (decimal value). Report results as ppm by volume, dry basis.

7.5 **Reporting of Results.** At the completion of the field analysis portion of the study, ensure that the data sheets shown in Figure 18-11 have been completed. Summarize this data on the data sheets shown in Figure 18-15.

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I. Name of company ______________________________ Date __________

Address ______________________________

____

Contacts ______________________________ Phone __________

______________________________ __________

Process to be sampled ______________________________

____

____

Duct or vent to be sampled ______________________________

____

II. Process description ______________________________

____

____

____

____

Raw material ______________________________

____

____

Products ______________________________

____

____

Operating cycle

Check: Batch __________ Continuous __________ Cyclic __________

Timing of batch or cycle ______________________________

Best time to test ______________________________

Figure 18-1. Preliminary survey data sheet.

III. Sampling site

A. Description

Site description ______________________________

Duct shape and size ______________________________

Material ______________________________

Wall thickness ______________________________ inches

Upstream distance ________ inches ____________ diameter

Downstream distance ________ inches ____________ diameter

Size of port ______________________________

Size of access area ______________________________

Hazards ____________________ Ambient temp. ________EF

B. Properties of gas stream

Temperature ______ EC ______ EF, Date source____________

Velocity ____________________, Data source____________

Static pressure ______ inches H2O, Data source____________

Moisture content ____________%, Data source____________

Particulate content ____________, Data source____________

Gaseous components

N2 ______ %		Hydrocarbons	______ ppm
O2 ______ %		____________	______
CO ______ %		____________	______
CO2 ______ %		____________	______
SO2 ______ %		____________	______

Hydrocarbon components

____________	________ ppm
____________	________ ppm
____________	________ ppm
____________	________ ppm
____________	________ ppm
____________	________ ppm

C. Sampling considerations

Location to set up GC ______________________________

____

Special hazards to be considered ______________________________

____

Power available at duct ______________________________

Power available for GC ______________________________

Plant safety requirements ______________________________

____

Vehicle traffic rules ______________________________

____

Plant entry requirements ______________________________

____

Security agreements ______________________________

____

Potential problems ______________________________

____

D. Site diagrams. (Attach additional sheets if required).

Figure 18-1 (continued). Preliminary survey data sheet.

Components_to_be_analyzed	Expected_concentration
______________________	____________________
______________________	____________________
______________________	____________________
______________________	____________________
______________________	____________________
______________________	____________________

Suggested chromatographic column ______________________________________

____

Column flow rate _______ ml/min   Head pressure _______ mm Hg

Column temperature:

Isothermal ____________ EC

Programmed from _______ EC to _______ EC at _______ EC/min

Injection port/sample loop temperature _______ EC

Detector temperature _______ EC

Detector flow rates: Hydrogen _______ ml/min.

head pressure _______ mm Hg

Air/Oxygen _______ ml/min.

head pressure _______ mm Hg

Chart speed ___________ inches/minute

Compound data:

Compound	Retention_time	Attenuation
_______	____________	__________
_______	____________	__________
_______	____________	__________
_______	____________	__________
_______	____________	__________

Figure 18-2. Chromatographic conditions data sheet.

Calibration Curve Data - Volatile and
Liquid Samples Collected in a Tedlar Bag

	Blank	Mixture 1	Mixture 2	Mixture 3
Size of Tedlar bag (liters)				
Dilution gas (name)				
Vol. of dilution gas (liters)				
Component (name)				
Volume of component (ml)				
Average meter temp. (EC)				
Average meter pressure (nm)				
Atmospheric pressure (nm)				
Density of liquid component (g/ml)				
Sample loop volume (ml)				
Sample loop temp. (EC)				
Carrier gas flow rate (ml/min)				
Column temperature				
Initial (EC)				
Program rate (EC/min)				
Final (EC)				
Injection time (24 hr. basis)				
Distance to peak (cm)				
Chart speed (cm/min)				
Retention time (min)				
Calculated concentration (ppm)				
Attenuator setting				
Peak height (mm)				
Peak area (mm2)				
Area x attenuation				

Plot peak area x attenuation against concentration to obtain calibration curve.

Figure 18-3. Calibration curve data sheet - injection of volatile sample into Tedlar bag.

Rotameter number ____

Gas used ____

Method: Bubble meter ______ Spirometer ______ Wet test meter ______

Rotameter construction ____

Float type ____

Laboratory temperature (T obs.) _________ EC _________ EF

Laboratory pressure (P obs.) ______ in Hg _________ mm Hg

1. Flowmeter_reading	Time_(min)	Gas_volumea	Flow rate (lab_conditions)b

a
Vol. of gas may be measured in milliliters, liters or cubic feet.
b
Convert to standard conditions (20EC and 760 mm Hg).

$$Q_{STD} = Q_{obs} \left(\frac{760 \times T\ Abs.}{P\ obs. \times 293} \right)^{1/2}$$

Flowmeter_reading	Flow_rate_(STD_conditions)

Plot meter against flow rate (std) and draw smooth curve.

Figure 18-4. Rotameter calibration data sheet.

1. High concentration gas mixture

Component ____________________ Concentration _______________ ppm

Diluent gas __________________

2. Dilution and analysis data   Date ____________

Stage_1	_Mixture_1__	_Mixture_2__	_Mixture_3__
Component gas-rotameter reading			
Diluent gas-rotameter reading			
Ambient temp. (EC)			
Manometer reading, inches H_2O			
Flow rate component gas (ml/min)			
Flow rate diluent gas (ml/min)			

Stage_2			
Component gas-rotameter reading			
Diluent gas-rotameter reading			
Flow rate component gas (ml/min)			
Flow rate diluent gas (ml/min)			
Calculated concentration (ppm)			

Analysis			
Sample loop volume (ml)			
Sample loop temp. (EC)			
Carrier gas flow rate (ml/min)			
Column temperature			
Initial (EC)			
Program rate (EC/min)			
Final (EC)			
Injection time (24-hr basis)			
Distance to peak (inches)			
Chart speed (inch/min)			
Retention time (min)			
Attenuator factor			
Peak height (mm)			
Peak area (mm2)			
Area x attenuation factor (mm2)			

Plot peak area x attenuator factor against concentration to obtain calibration curve.

Figure 18-7. Calibration curve data sheet - dilution method.

3. Low concentration standard

Known concentration (ppm) __________

Retention time (min) __________

Injection time (24-hour basis) __________

Attenuation factor __________

Peak height (mm) __________

Peak area (mm2) __________

Peak area x attenuation (mm2) __________

Calculated concentration (ppm) __________

Deviation (%) __________

4. Audit samples

	Sample_1	Sample_2
Retention time (min)	______	______
Injection time (24-hour basis)	______	______
Attenuation factor	______	______
Peak height (mm)	______	______
Peak area (mm2)	______	______
Peak area x attenuation factor	______	______
Measured concentration	______	______
Data reported on (date)	______	______
Data reported on (initial)	______	______
Certified concentration (ppm)	______	______
Deviation (%)	______	______

Note: If a pump is used instead of a rotameter for component gas flow, substitute pump delivery rate for rotameter readings).

Figure 18-7 (continued). Calibration curve data sheet - dilution method.

Plant ______________________________ Date ______________

Site ____

	Sample_1	Sample_2	Sample_3
Source temperature (EC)	______	______	______
Barometric pressure (mm Hg)	______	______	______
Ambient temperature (EC)	______	______	______
Sample flow rate (appr.)	______	______	______
Bag number	______	______	______
Start time	______	______	______
Finish time	______	______	______

Figure 18-10. Field sample data sheet - Tedlar bag collection method.

Plant ______________________ Date ______________

Location ______________________________

1. General information

Source temperature (EC) __________

Probe temperature (EC) __________

Ambient temperature (EC) __________

Atmospheric pressure (mm) __________

Source pressure ("Hg) __________

Absolute source pressure (mm) __________

Sampling rate (liter/min) __________

Sample loop volume (ml) __________

Sample loop temperature (EC) __________

Columnar temperature:
Initial (EC) time (min) __________
Program rate (EC/min) __________
Final (EC)/time (min) __________

Carrier gas flow rate (ml/min) __________

Detector temperature (EC) __________

Injection time (24-hour basis) __________

Chart speed (mm/min) __________

Dilution gas flow rate (ml/min) __________

Dilution gas used (symbol) __________

Dilution ratio __________

Figure 18-11. Field analysis data sheets.

2. Field Analysis Data - Calibration Gas

Run No. __________ Time __________

Components	Area	Attenuation	A_x_A_Factor	Conc._(ppm)

Run No. __________ Time __________

Components	Area	Attenuation	A_x_A_Factor	Conc._(ppm)

Run No. __________ Time __________

Components	Area	Attenuation	A_x_A_Factor	Conc._(ppm)

Figure 18-11 (continued). Field analysis data sheets.

Gaseous Organic Sampling and Analysis Check List
(Respond with initials or number as appropriate)

1. Presurvey data _Date_
   - A. Grab sample collected ___ [ ] ______
   - B. Grab sample analyzed for composition ___ [ ] ______
     - Method GC ___ [ ]
     - GC/MS ___ [ ]
     - Other ______________ ___ [ ]
   - C. GC-FID analysis performed ___ [ ] ______
2. Laboratory calibration data
   - A. Calibration curves prepared ___ [ ] ______
     - Number of components ___ [ ]
     - Number of concentrations/ component (3 required) ___ [ ]
   - B. Audit samples (optional)
     - Analysis completed ___ [ ] ______
     - Verified for concentration ___ [ ] ______
     - OK obtained for field work ___ [ ] ______
3. Sampling procedures
   - A. Method
     - Bag sample ___ [ ]
     - Direct interface ___ [ ]
     - Dilution interface ___ [ ]
   - B. Number of samples collected ___ [ ] ______
4. Field Analysis
   - A. Total hydrocarbon analysis performed ___ [ ] ______
   - B. Calibration curve prepared ___ [ ] ______
     - Number of components ___ [ ]
     - Number of concentrations per component (3 required) ___ [ ]

Gaseous Organic Sampling and Analysis Data

Plant ______________________________ Date ____________

Location ____

	Source sample_1	Source sample_2	Source sample_3
1. General information			
Source temperature (EC)	______	______	______
Probe temperature (EC)	______	______	______
Ambient temperature (EC)	______	______	______
Atmospheric pressure (mm Hg)	______	______	______
Source pressure (mm Hg)	______	______	______
Sampling rate (ml/min)	______	______	______
Sample loop volume (ml)	______	______	______
Sample loop temperature (EC)	______	______	______
Sample collection time (24-hr basis)	______	______	______
Column temperature			
Initial (EC)	______	______	______
Program rate (EC/min)	______	______	______
Final (EC)	______	______	______
Carrier gas flow rate (ml/min)	______	______	______
Detector temperature (EC)	______	______	______
Chart speed (cm/min)	______	______	______
Dilution gas flow rate (ml/min)	______	______	______
Diluent gas used (symbol)	______	______	______
Dilution ratio	______	______	______

Performed by (signature):________________________

Date:____________________

Figure 18-14. Sampling and analysis sheet.

Appendix B

Construction of a Temporary Total Enclosure for Volatile Organic Compound Emission Assessment During Manufacture of Fiberglass Boats

CONSTRUCTION OF A TEMPORARY TOTAL ENCLOSURE FOR VOLATILE ORGANIC COMPOUND EMISSION ASSESSMENT DURING MANUFACTURE OF FIBERGLASS BOATS

Descriptions for the construction of a temporary total enclosure (TTE) to be used to facilitate emissions assessment during open molding of fiberglass boats are presented below. The US EPA has provided a set of criteria for the use of an enclosure as a capture device in the assessment of volatile organic compound (VOC) emissions. This set of criteria are described in Method 204 (Criteria for and Specifications of a Permanent or Temporary Total Enclosure), a proposed methodology not yet codified in the Code of Federal Regulations.

Method 204 details a set of requirements which, if met, allows the volatile organic compound (VOC) capture efficiency (CE) to be assumed to be 100%, thereby eliminating the somewhat tedious process of demonstrating CE during a test program. These requirements are summarized as bullets below.

- Any natural draft opening (NDO) shall be at least four equivalent opening diameters from each VOC emitting point.
- Any exhaust point from the enclosure shall be at least four equivalent duct or hood diameters from each NDO.
- The total area of all NDO's shall not exceed 5% of the surface area of the enclosure's four walls, floor, and ceiling.
- The average face velocity (FV) of air through all NDO's shall be at least 200 feet per minute.

Additionally, time savings can be gained during the proposed test program by incorporating sampling needs into the design of the TTE. Parameters that will require monitoring include make-up air flow rates and VOC concentrations as well as exhaust flow rates and VOC concentrations. Operation of the TTE should represent actual conditions encountered in a spray booth as much as possible minimizing the potential for artificial VOC generation or suppression.

The TTE described below meets the design criteria of Method 204, will contain a 25"X4'X4' tool, provide 30-60 air exchanges per hour, be easy to sample, and simple to assess. The materials of construction were chosen for their ready availability and consist of lumber, polyethylene sheeting, common fasteners, and common sizes of galvanized duct work. The fugitive exhaust fan selected is designed for spray booth ventilation.

Figures 1 and 2 illustrate two views of the TTE. Each long side measures 36'X10" and is made of 2X4's covered with polyethylene sheeting. Studs are on 4' centers. As illustrated, entry to the enclosure is through two (2) removable plywood panels located in one end of the enclosure. The rear panel (not shown) is a 16'X10' panel made in similar fashion to the sides. The poly sheeting is attached to the sides using 1X2 battens.

The sides are connected to the front and rear by bolting them to 4X4 corner posts as illustrated in Figure 3. The peaked roof is made of 2X4's and utilized a small cable tensioned with a turnbuckle, rather than joists, to provide lateral support. The make-up air duct is suspended from these rafters with galvanized straps. Roof sheeting is laid on after construction and sealed at the edges with duct tape, as are all holes made in the polyethylene sheeting due to accidential punture or passage of duct work.

Make-up air enters the enclosure through an overhead, centrally located 1'X2' duct containing six 1'X1.5' dampened vents. The equivalent diameter of vents of this size (2LW/(L+W)=1.2') will allow spraying to within 4.8' of the 10' high duct work. The dampers will allow air flow distribution through the enclosure to be balanced over a range of operating air flows. The total area of the NDO's is less than 0.5% of the TTE surface area. The single make-up air inlet will simplify NDO air flow direction and flow rate monitoring, background air assessments, and provide options for ducting in make-up air.

Air pick-ups are located at floor level along both sides of the length of the enclosure. Each duct consists of a 1' diameter galvanized steel duct containing six 1'X0.5' dampened vents. As illustrated in Figure 4, these exhaust ducts are joined into an 18" diameter duct leading to the test location after a straight run of 11 feet. This straight run in each of the exhaust ducts will allow placement of a velocity traverse sampling location downstream of a flow control damper. Coupled with the dampened vents at the air inlets air flow distribution within the enclosure as well as total system air flow can be controlled through a range of operation. The test location is located in the straight run of 18" duct at distances that meet the EPA Method 1 "maximum" distance requirements for selection of a sampling location containing well developed flow (as do the traverse location placements).

The exhaust fan selected is capable of moving 6980 cfm of free air and 5640 cfm at 0.25" wc static pressure. The dampers in the exhaust duct will be employed to reduce the flow rates through the system to the required levels.

Louvered Vents - Distance to Centers

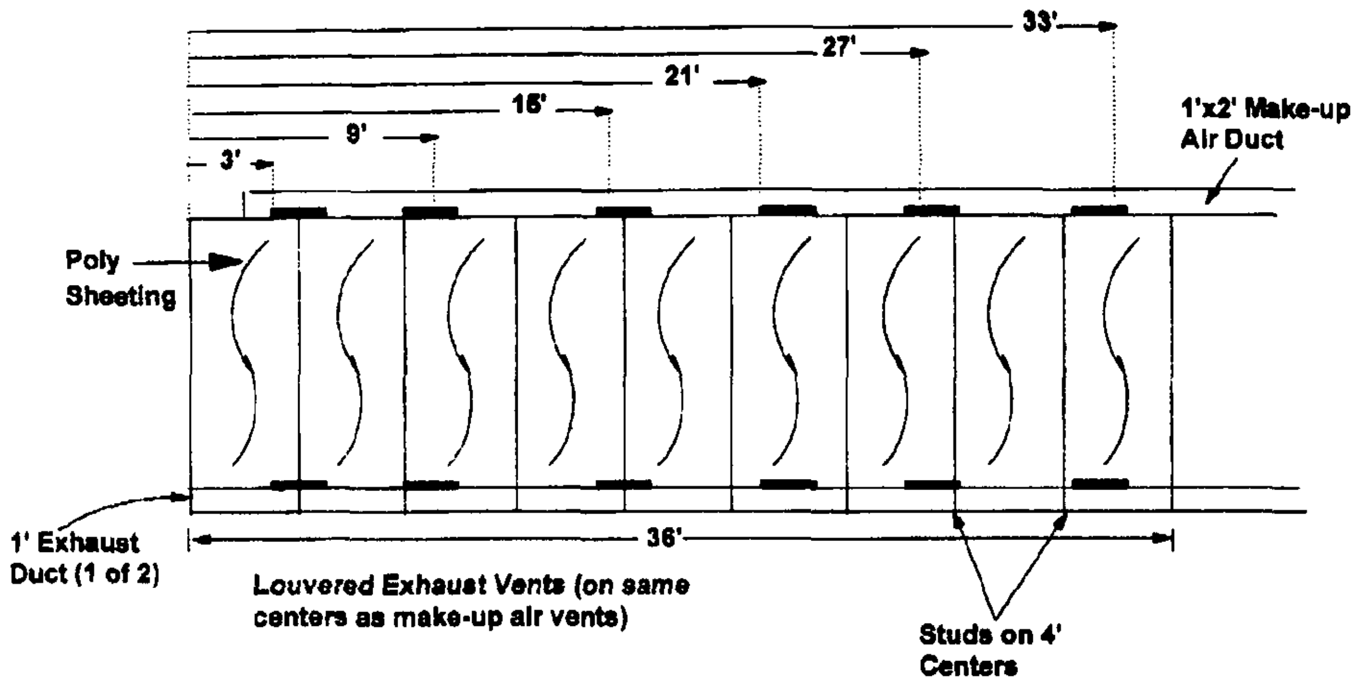
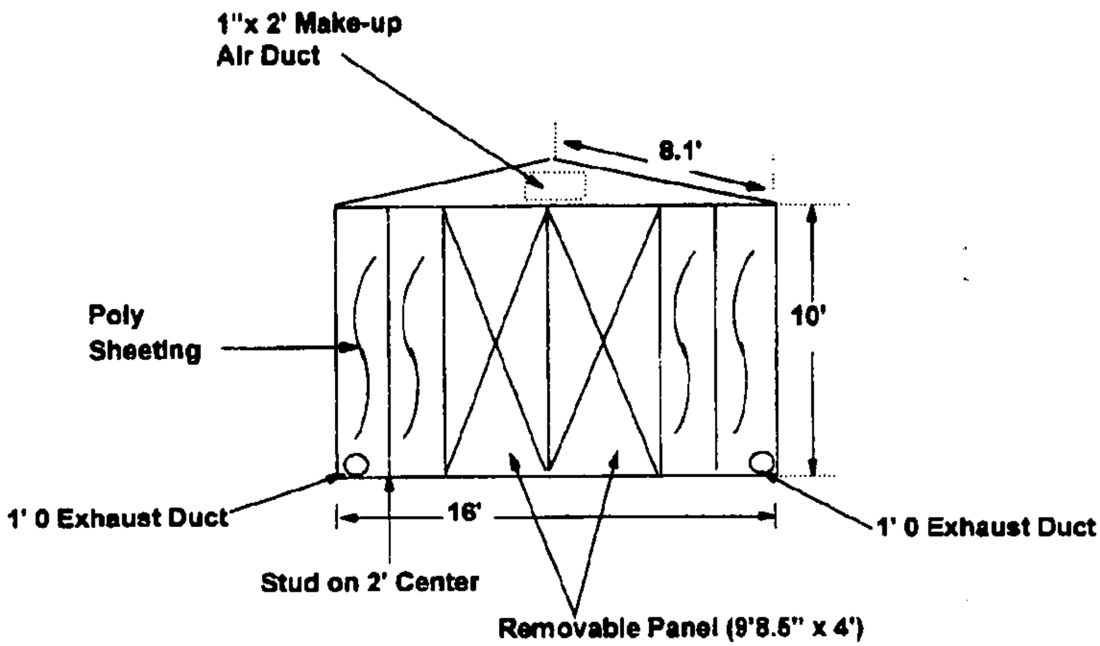


Figure 1

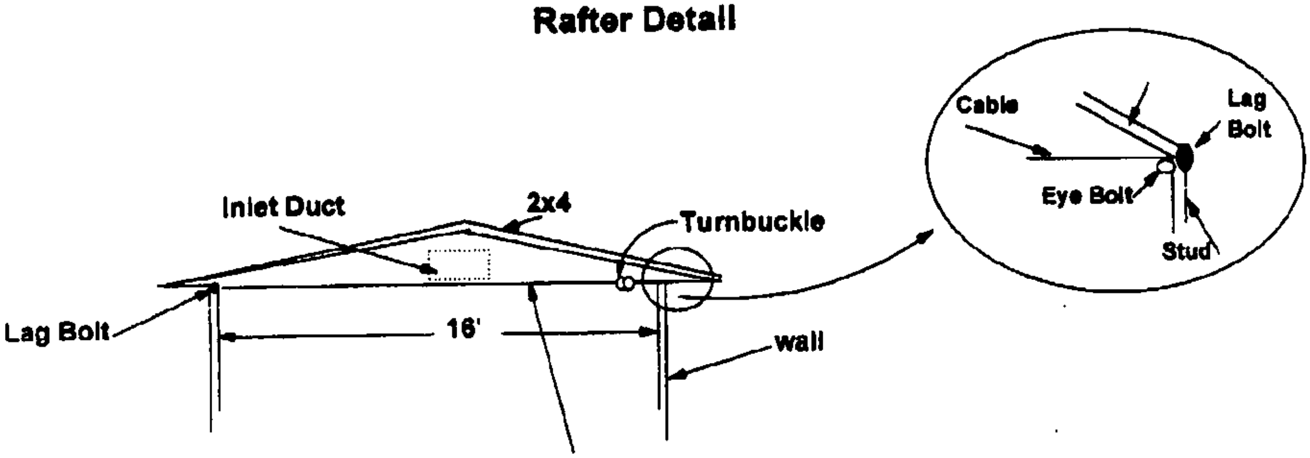
1 of 2 Sides, Shown Without Roof



Entry End

Figure 2

Rafter Detail



Corner Detail

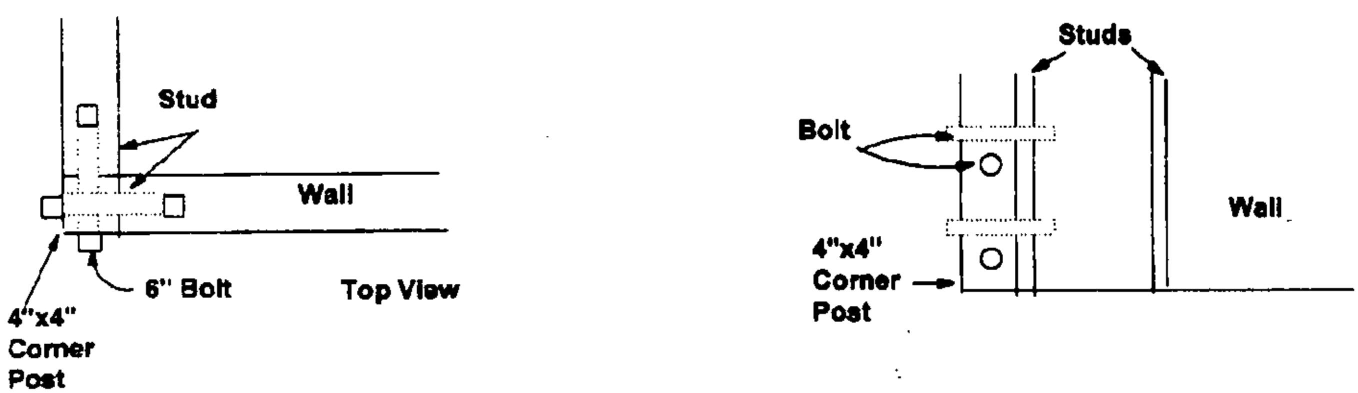


Figure 3

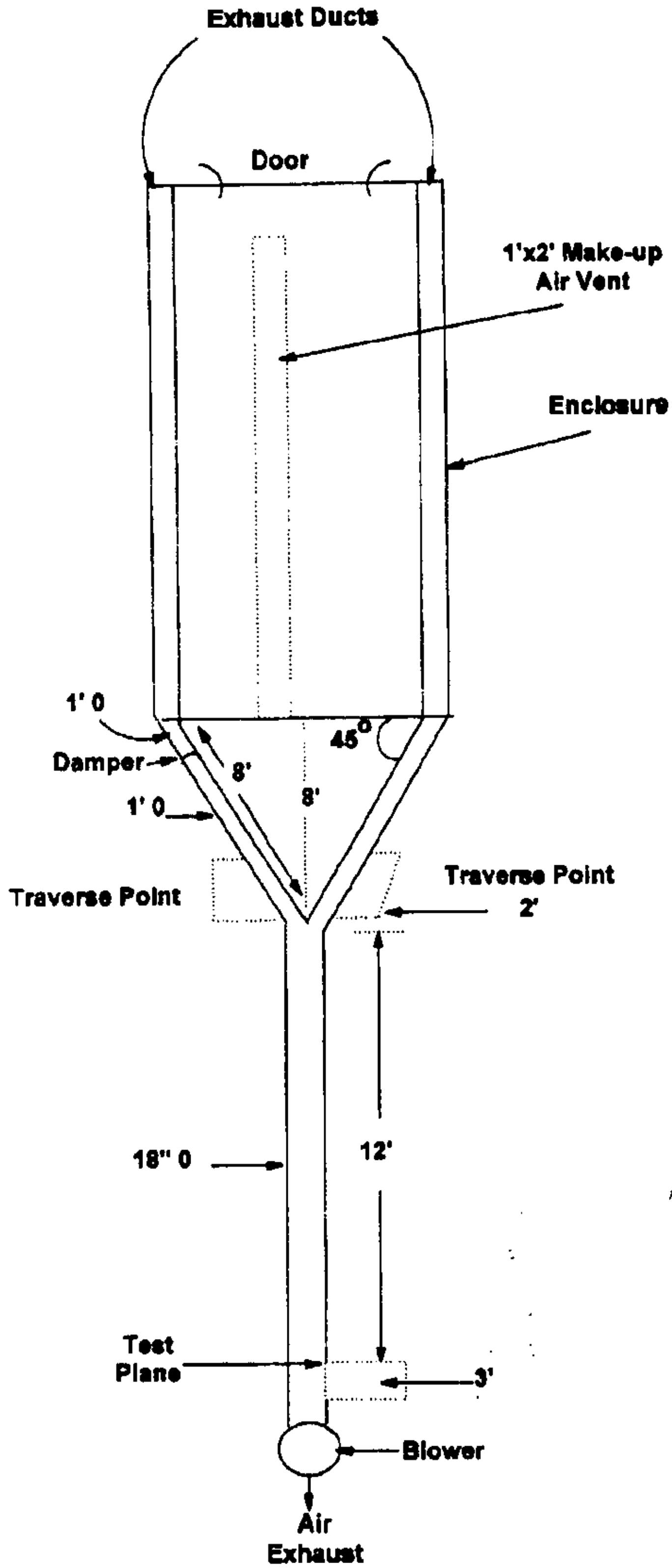

Exhaust Ducts
Door
1'x2' Make-up
Air Vent
Enclosure
1' 0
Damper
8'
8'
45°
1' 0
Traverse Point
Traverse Point
2'
18" 0
12'
Test
Plane
3'
Blower
Air
Exhaust

Figure 4

Appendix C

Calculations

Calculations

Appendix C.1	Sample Calculation
Appendix C.2	Calculation of Flow Rates
Appendix C.3	Method 25A Results
Appendix C.4	Method 18 Results
Appendix C.5	Emission Calculations
Appendix C.6	Analysis of Concentration Tail
Appendix C.7	Styrene Recovery Test Results
Appendix C. 8	Calculation of Error and Drift for Method 25A

Appendix C.1

Sample Calculation

Test No.:	9
Run No.	7
Date:	19-Apr-97

Input values in red.
Calculated values in blue.
Transferred values in green.

To determine the emission rate of styrene (and methyl methacrylate [MMA]), the following calculations are made.

Method 1	Location of test ports and traverse points
Method 2	Velocity and flow rate of stack gas
Methods 3 & 4	Fixed gas content and moisture content
Method 18	Organic compound concentrations
Method 25A	Total hydrocarbon concentrations

The calculations associated with these methods follow.

Method 1 *Location of test ports and travese points*

Test points were located in accordance with Method 1 criteria, striving to achieve 8 duct diameters after the last flow disturbance and at least 2 duct diameters before the next flow disturbance. The exhaust line (after the two exhaust plena are combined) is 18-in diameter, 126 inches long. Based on the figure in Method 1, the sample port was located 6 duct diameters downstream of the combining of the plena and 1.5 duct diameters upsteam of the next flow disturbance (in this case, the building exhaust duct).

A total of 16 measurement points were selected for this program to measure flow rate in the exhaust duct.

Methods 3 & 4 *Fixed gas content and moisture content*

Fixed gas content was taken to be typical atmospheric content, because the exhaust was primarily air with no reaction of the air in the enclosure. Moisture was assumed to be negligible, and was not needed to estimate emissions because concentration measurements were made at flowing conditions.

Nitrogen content is assumed to be the remainder of the dry gas.

Molecular weight of the dry stack gas is determined from the fixed gas contents by multiplying the gas content by its molecular weight and adding the contributiions of the three gases.

	Percent	MW	
CO_2	0.05	44	0.022
O_2	20.9	32	6.688
N_2	79.05	28	22.134
MW (flowing)			28.844 lb/lb mol

The assumption of insignificance of the moisture content can be tested by using the relative huidity to incorporate a moisture measurement into the flow rate calculation. For this example, the relative humidity is 50 percent at 53 F. From psychrometric charts, the moisture content is 0.019 mol moisture per mol dry air.

Relative Humidity	50 percent
at	53 F
Moisture content	0.019 lbmol H_2O/lbmol DA
Fraction moisture	0.0186 lbmol H_2O/lbmol gas

From the moisture fraction and the dry gas molecular weight, the wet stack gas molecular weight is calculated. This molecular weight could be used in calculating velocity (Method 2). However, the difference between values calculated with moisture considered and withour considering moisture is about one-third of a percent, insignificant.

MW (dry)	28.844 lb/lbmol
Moisture fraction	0.0186
MW (wet - stack gas)	28.64 lb/lbmol

Method 2 *Velocity and flow rate of stack gas*

The stack diameter and calculated cross sectional area is as follows:

Duct diameter	18 in
Duct area	1.77 ft^2
	254 in^2

Velocity head readings (in in H_2O) from the **Field Log** are logged so that square root values can be calculated and an average value taken. The temperature reading was logged for use in this calculation.

Velocity Head Readings			SQRT(delta P)	Stack Gas Temperature
1	0.17	in H_2O	0.41	
2	0.23	in H_2O	0.48	
3	0.24	in H_2O	0.49	
4	0.24	in H_2O	0.49	
5	0.22	in H_2O	0.47	
6	0.22	in H_2O	0.47	
7	0.22	in H_2O	0.47	
8	0.20	in H_2O	0.45	
1	0.18	in H_2O	0.42	

2	0.21	in H_2O	0.46	
3	0.22	in H_2O	0.47	
4	0.22	in H_2O	0.47	
5	0.25	in H_2O	0.50	
6	0.25	in H_2O	0.50	
7	0.24	in H_2O	0.49	
8	0.22	in H_2O	0.47	
	AVERAGE VALUES		0.469	66.0 F

Constant	85.49	**[Method 2 constant]**
Pitot constant	0.99	**[standard pitot constant]**
Temperaure (t_s)	66.0 F	
Barometric pressure (P_b)	29.76 in Hg	**[Field Log]**
Static pressure (P_s)	-2.40 in H_2O	**[Field Log]**
Molecular weight	28.64 lb/lbmol	**[Methods 3 & 4]**

With moisture consideration

Velocity	31.28 ft/sec
	1877 ft/min
Flow rate	3317 cfm
	3255 dcfm
	3250 dscfm

Without moisture consideration

		Difference
Velocity	31.17 ft/sec	-0.35%
	1870 ft/min	-0.35%
Flow rate	3305 cfm	-0.35%
	3305 dcfm	1.54%
	3300 dscfm	1.54%

The flow rate without moisture was used to calculate emissions. The flow rate calculated as above represents the flow rate measured before or after the run. Flow rate was monitored continuously during each run using a single point pressure head reading at the centroid of the duct. This pressure head was used to adjust the flow rate measured above to provide a continuous flow rate during the run. Flow rate 3305 cfm was varied by the ratio of the square root of the pressure head to the square root of the pressure head measured continuous (and recorded in the DAS) during the flow rate measurement.

DAS Pressure Head 0.23 in H_2O

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH_2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane
7:39:24	0.3	2.9	2.5	0.231	64.2	496.5		382.6	3312	0.0001
7:40:24	1.1	3.5	2.5	0.224	65.4	496.3		383.4	3264	0.0004
7:41:24	96.7	99.1	2.4	0.229	66.4	491.6		384.1	3297	0.0365
7:42:24	364.2	366.5	2.3	0.228	67.0	485.1		384.6	3289	0.1370
7:43:24	470.2	472.5	2.3	0.232	67.3	478.8		384.8	3318	0.1784
7:44:24	462.4	464.7	2.3	0.229	66.6	472.7		384.3	3297	0.1746
7:45:24	510.0	512.3	2.3	0.229	66.0	467.9		383.9	3297	0.1928
7:46:24	397.1	399.4	2.3	0.227	65.9	467.7		383.8	3285	0.1495
7:47:24	305.6	307.8	2.2	0.228	66.3	467.7		384.1	3293	0.1153
7:48:24	298.0	300.2	2.2	0.225	66.8	467.8		384.4	3267	0.1114

This table also presents other calculations used in determining results. These other calculations follow.

Method 25A *Total hydrocarbon concentrations*

Total hydrocarbon (THC) results from the THC analyzer provides concentrations in terms of propane equivalents. The outlet concentration is noted as "THC o" and the inlet concentration (measured in accordance with Method 204) is identified as "THC i"; the difference of these two values (THC Δ) is used to estimate emissions. It is the THC concentration in propane equivalents.

THC Δ = THC o - THC i

The equivalent concentration of styrene (or MMA) can be calculated from this propane equivalent using a response factor developed specifically for the instruments.

RF (styrene)	2.401
RF (MMA)	1.39

In the table shown above, the CEM data are used to calculate emissions for each minute of the test run. Flow rate is calculated as described above. Effective THC concentration is calculated as the difference of outlet and inlet. Molar volume is calculated from the temperature of the exhaust stream and the molar volume at 32 F (359 scf/lbmol). Then, the volume of gas that is propane is calculated from the THC concentation and the flow rate. Mass of propane is the product of the volume of propane and molecular weight of propane, divided by molar volume.

Volume (THC) = Flow rate * THC Δ

Mass (as propane) = Volume (THC) * MW (propane) / Molar volume (scf/lbmol)

The total emissions as propane is merely the sum of all 1-min readings for the entire test run.

These data are nearly identical to the value derived from converting concentration to styrene using the response factor and using the molecular weight of styrene.

Method 18 *Organic compound concentrations*

Method 18 was used to determine the concentrations of sepcific organic compounds of interest (I.e., styrene and MMA). Daily calibration of the gas chromatograph (GC) allowed generation of repsone curves from which concentrations of the two species could be calculated using the responses by the instrument to the samples. This procedure was siimply a point to point calculation of interpolated concentration. The concentrations were used to determine the ratio of styrene to MMA for use in apportioning emissions calculated from the Method 25A results (according to the approved protocol).

Test No:	NMMA-9-2				Area Counts		Response Factors		Calculated Conc		Equiv	Ratio
Run No.	Std (ppmv)	Compound	Time	THC	Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Sty:MMA
1035	59.2	Styrene			4908355		1.206E-05					
1036	59.2	Styrene			4736861		1.25E-05					
1037	204	Styrene			18883424		1.08E-05					
1038	204	Styrene			19033904		1.072E-05					
1039		NMMA-9-2-1	7:40		79164				4.3	0.0	10	#######
1040		NMMA-9-2-2	7:50	244	8462029				93.2	0.0	224	#######
1041		NMMA-9-2-3	7:59	811	27239728				292.4	0.0	702	#######
1042		NMMA-9-2-4	8:11	202	7715888				85.3	0.0	205	#######
1043		NMMA-9-2-5	8:23	129	4569920				51.9	0.0	125	#######
1044		NMMA-9-2-6	8:34	95	3308221				38.5	0.0	93	#######
1045		NMMA-9-2-7	8:45	745	24461856				263.0	0.0	631	#######
1046		NMMA-9-2-8	8:57	790	25658512				275.7	0.0	662	#######
1047		NMMA-9-2-9	9:09	259	9079418				99.8	0.0	240	#######
1048		NMMA-9-2-10	9:20	157	5377642				60.5	0.0	145	#######

In the example table, the four samples analyzed for styrene confirmed the calibration from the previous day. As shown in the table, the calculated equivalent concentration is slightly less than the concetration measured by THC. However, the emissions were calculated using the THC data; Method 18 concentrations were used only to speciate the emissions and to provide a check of the Method 25A approach.

When no MMA was detected (i.e., for all resin runs because MMA was present only in gelcoat), the default ratio of styrene to MMA was 10^9. As used in the next set of calculations, this value effectively renders all the hydrocarbon as styrene.

Emissions were also calculated using the average data for each time period between the GC analyses. This approach allowed calculation of speciated emissions for the different time periods, taking into account the different rates of emissions for the two compounds through the application of material.

Time for GC analyses was corrdinated with the CEM data (THC, temperature, flow rate, resin use). For each interval between GC analyses, the average delta-THC was computed, along with average temperature, and average molar volume. This average concentration and average molar volume was used with the average flow rate for the interval to determine the total mols of THC measured during the interval. (See column labeled "Total mols THC.")

The mols of styrene were determined from the total mols THC using the ratio of styrene to MMA from the GC results and the response factor for styrene to THC (2.401). Mass of styrene was then calculated using the molcular weight of styrene. Similarly, the amount of MMA released in an interval was calculated. The total emissions of each compound were then reported as emissions. Total emissions were the sum of these two values.

Time	Duration (min)	Av THC Δ (ppmv)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
7:40	1	0.7	64.8	383.0	6.12E-06	#######	0.000	0.000	0.000	0.0%
7:50	10	339.6	66.7	384.4	0.029402	#######	1.274	0.000	1.274	4.2%
7:59	9	602.1	67.3	384.8	0.046866	#######	2.030	0.000	2.030	6.6%
8:11	12	387.7	67.3	384.8	0.040244	#######	1.743	0.000	1.743	5.7%
8:23	12	155.9	67.7	385.1	0.01617	#######	0.700	0.000	0.700	2.3%
8:34	11	109.5	67.7	385.1	0.010408	#######	0.451	0.000	0.451	1.5%
8:45	11	209.2	69.1	386.1	0.019833	#######	0.859	0.000	0.859	2.8%
8:57	12	725.3	70.4	387.1	0.07483	#######	3.241	0.000	3.241	10.6%
9:09	12	460.0	70.0	386.8	0.047495	#######	2.057	0.000	2.057	6.7%
9:20	11	175.4	70.2	386.9	0.016593	#######	0.719	0.000	0.719	2.3%

These data were also used to calculate the emissions for the point measurements by GC; the purpose of the point measurement calculated emissions was to compare with the calculcated emissions based on Method 25A results. Temperature and molar volume from the CEM data calculations were again used for these estimates. Concentrations from the GC analyses were used with the flow rates from the CEM data to calculate emissions for each interval representing the GC data. The total from these calculations were compared with the Method 25A results.

Time	Duration (min)	Av THC Δ (ppmv)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Point THC Δ (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
7:40	1	0.7	64.8	383.0	6.12E-06	0	4	0	0.0000	0.000	0.000	0.000
7:50	10	339.6	66.7	384.4	0.029402	244	93	0	0.0210	0.909	0.000	0.923
7:59	9	602.1	67.3	384.8	0.046866	811	292	0	0.0627	2.716	0.000	2.759
8:11	12	387.7	67.3	384.8	0.040244	202	85	0	0.0208	0.902	0.000	0.916
8:23	12	155.9	67.7	385.1	0.01617	129	52	0	0.0133	0.576	0.000	0.585
8:34	11	109.5	67.7	385.1	0.010408	95	39	0	0.0090	0.389	0.000	0.395
8:45	11	209.2	69.1	386.1	0.019833	745	263	0	0.0702	3.039	0.000	3.087
8:57	12	725.3	70.4	387.1	0.07483	790	276	0	0.0810	3.507	0.000	3.562
9:09	12	460.0	70.0	386.8	0.047495	259	100	0	0.0266	1.150	0.000	1.169
9:20	11	175.4	70.2	386.9	0.016593	157	60	0	0.0148	0.639	0.000	0.649

The results of these two sets of calculations were summarized in each spreadsheet for each run. This example (NMMA-9-2) was a 42 percent resin spray up lamination run for 28-ft hull mold. The amount of resin used was transferred from the CEM data, listing in the summary the initial resin mass and final resin mass. Similarly, the start and end times for the run are listed.

The styrene and MMA contents in the resin (or gelcoat) are input from material safety data sheets; in this case, the styrene is 42.2 percent; resins contained no MMA. Values averaged over the entire run period were transferred from the CEM data to this summary (temperature, flow rate, THC concentration, molar volume).

Total emissions in propane equivalents were calculated in the CEM data log; this value was transferred directly to this page as propane emissions (shown below and in the data table for "Average Data." Emissions of individual compounds calculated using CEM data and the GC results were also presented in the table as "Average Data" with point source data presented for comparison.

The results in the summary table were presented as emissions (total lb) and as a percentage of available styrene or MMA. Available constituent was calculated from resin use and the content of the constituent in the resin. The percentage was simply determined using calculated emissions and calculated available material.

Test No.	NMMA-9-2		28 Hull 42R	
File:	041997.PRN			
Calibration:	0419A.CAL			
Date:	4/19/97			
Persons:	Doerle			
			496.5	lb start
Amount of Resin Used:	315.7 lb		180.9	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	67.6			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3328		3306	cfm
Average THC concentration (ppmv)	217.4			
Molar volume (scf/lb mol)	385.0		7:39	Time start
Duration of test (min)	376	6:16:00	13:55	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb)	31.29			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	133.22	0.00	133.22		133.22	0.00	133.22
Emissions	30.64	0.00	30.64	31.29	31.35	0.00	31.84
Fraction	23.0%	#DIV/0!	23.0%	23.5%	23.5%	#DIV/0!	23.9%
Difference between approaches--->				2.07%			3.77%

The approaches for calculating emissions were compared in the table. The average data as propane compared favorably with the speciated calculations. Also, the results of estimates using GC results compared favorably.

Appendix C.2

Calculation of Flow Rates

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	7	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.14	in H_2O	0.37
V2	0.16	in H_2O	0.40
V3	0.16	in H_2O	0.40
V4	0.16	in H_2O	0.40
V5	0.16	in H_2O	0.40
V6	0.16	in H_2O	0.40
V7	0.15	in H_2O	0.39
V8	0.15	in H_2O	0.39
H1	0.12	in H_2O	0.35
H2	0.14	in H_2O	0.37
H3	0.14	in H_2O	0.37
H4	0.15	in H_2O	0.39
H5	0.15	in H_2O	0.39
H6	0.16	in H_2O	0.40
H7	0.16	in H_2O	0.40
H8	0.12	in H_2O	0.35
	AVERAGE SQRT(Delta P)		0.39

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	66.3
Barometric pressure (P_b)	[in Hg]	30.0
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	25.5
Flow rate	cfm	2708
DAS Pressure Head	[in H_2O]	0.3

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	3	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.14	in H_2O	0.37
V2	0.16	in H_2O	0.40
V3	0.16	in H_2O	0.40
V4	0.16	in H_2O	0.40
V5	0.16	in H_2O	0.40
V6	0.16	in H_2O	0.40
V7	0.15	in H_2O	0.39
V8	0.15	in H_2O	0.39
H1	0.12	in H_2O	0.35
H2	0.14	in H_2O	0.37
H3	0.14	in H_2O	0.37
H4	0.15	in H_2O	0.39
H5	0.15	in H_2O	0.39
H6	0.16	in H_2O	0.40
H7	0.16	in H_2O	0.40
H8	0.12	in H_2O	0.35
	AVERAGE SQRT(Delta P)		0.39

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	66.3
Barometric pressure (P_b)	[in Hg]	30.0
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	25.5
Flow rate	cfm	2708
DAS Pressure Head	[in H_2O]	0.3

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	8	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.17	in H_2O	0.41
V2	0.18	in H_2O	0.42
V3	0.18	in H_2O	0.42
V4	0.18	in H_2O	0.42
V5	0.18	in H_2O	0.42
V6	0.19	in H_2O	0.44
V7	0.18	in H_2O	0.42
V8	0.16	in H_2O	0.40
H1	0.14	in H_2O	0.37
H2	0.16	in H_2O	0.40
H3	0.17	in H_2O	0.41
H4	0.18	in H_2O	0.42
H5	0.18	in H_2O	0.42
H6	0.18	in H_2O	0.42
H7	0.17	in H_2O	0.41
H8	0.16	in H_2O	0.40
	AVERAGE SQRT(Delta P)		0.42

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	66
Barometric pressure (P_b)	[in Hg]	30.0
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	27.5
Flow rate	cfm	2916
DAS Pressure Head	[in H_2O]	0.15

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	1	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.17	in H_2O	0.41
V2	0.18	in H_2O	0.42
V3	0.19	in H_2O	0.44
V4	0.19	in H_2O	0.44
V5	0.19	in H_2O	0.44
V6	0.18	in H_2O	0.42
V7	0.18	in H_2O	0.42
V8	0.16	in H_2O	0.40
H1	0.15	in H_2O	0.39
H2	0.16	in H_2O	0.40
H3	0.18	in H_2O	0.42
H4	0.18	in H_2O	0.42
H5	0.19	in H_2O	0.44
H6	0.18	in H_2O	0.42
H7	0.17	in H_2O	0.41
H8	0.16	in H_2O	0.40
	AVERAGE SQRT(Delta P)		0.42

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	68
Barometric pressure (P_b)	[in Hg)	30.0
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	27.8
Flow rate	cfm	2948
DAS Pressure Head	[in H_2O]	0.15

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	7	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.18	in H_2O	0.42
V2	0.21	in H_2O	0.46
V3	0.21	in H_2O	0.46
V4	0.21	in H_2O	0.46
V5	0.20	in H_2O	0.45
V6	0.19	in H_2O	0.44
V7	0.19	in H_2O	0.44
V8	0.16	in H_2O	0.40
H1	0.18	in H_2O	0.42
H2	0.19	in H_2O	0.44
H3	0.20	in H_2O	0.45
H4	0.20	in H_2O	0.45
H5	0.20	in H_2O	0.45
H6	0.22	in H_2O	0.47
H7	0.21	in H_2O	0.46
H8	0.20	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.44

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	67
Barometric pressure (P_b)	[in Hg]	30.0
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	29.4
Flow rate	cfm	3118
DAS Pressure Head	[in H_2O]	0.17
Time		11:06

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	6	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.240	in H_2O	0.49
V3	0.240	in H_2O	0.49
V4	0.240	in H_2O	0.49
V5	0.240	in H_2O	0.49
V6	0.240	in H_2O	0.49
V7	0.240	in H_2O	0.49
V8	0.210	in H_2O	0.46
H1	0.200	in H_2O	0.45
H2	0.220	in H_2O	0.47
H3	0.240	in H_2O	0.49
H4	0.240	in H_2O	0.49
H5	0.240	in H_2O	0.49
H6	0.240	in H_2O	0.49
H7	0.240	in H_2O	0.49
H8	0.230	in H_2O	0.48
	AVERAGE SQRT(Delta P)		0.48

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	68
Barometric pressure (P_b)	[in Hg]	30.1
Static pressure (P_s)	[in H_2O]	-3.1
Molecular weight		28.84
Velocity	ft/sec	31.8
Flow rate	cfm	3377
DAS Pressure Head	[in H_2O]	0.22
Relative Humidity	[percent]	43 at 67 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	3	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.220	in H_2O	0.47
V3	0.220	in H_2O	0.47
V4	0.210	in H_2O	0.46
V5	0.200	in H_2O	0.45
V6	0.200	in H_2O	0.45
V7	0.190	in H_2O	0.44
V8	0.170	in H_2O	0.41
H1	0.190	in H_2O	0.44
H2	0.200	in H_2O	0.45
H3	0.210	in H_2O	0.46
H4	0.210	in H_2O	0.46
H5	0.230	in H_2O	0.48
H6	0.230	in H_2O	0.48
H7	0.230	in H_2O	0.48
H8	0.210	in H_2O	0.46
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	65
Barometric pressure (P_b)	[in Hg]	30.1
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	30.1
Flow rate	cfm	3189
DAS Pressure Head	[in H_2O]	0.20
Relative Humidity	[percent]	50 at 67 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	4	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.19	in H_2O	0.44
V2	0.21	in H_2O	0.46
V3	0.21	in H_2O	0.46
V4	0.22	in H_2O	0.47
V5	0.21	in H_2O	0.46
V6	0.20	in H_2O	0.45
V7	0.18	in H_2O	0.42
V8	0.17	in H_2O	0.41
H1	0.18	in H_2O	0.42
H2	0.19	in H_2O	0.44
H3	0.19	in H_2O	0.44
H4	0.20	in H_2O	0.45
H5	0.22	in H_2O	0.47
H6	0.22	in H_2O	0.47
H7	0.21	in H_2O	0.46
H8	0.20	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.45

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	68		
Barometric pressure (P_b)	[in Hg]	30.1		
Static pressure (P_s)	[in H_2O]	-3.2		
Molecular weight		28.84		
Velocity	ft/sec	29.6		
Flow rate	cfm	3140		
DAS Pressure Head	[in H_2O]	0.19		
Relative Humidity	[percent]	46	at	67 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	1	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.160	in H_2O	0.40
V2	0.230	in H_2O	0.48
V3	0.240	in H_2O	0.49
V4	0.240	in H_2O	0.49
V5	0.210	in H_2O	0.46
V6	0.210	in H_2O	0.46
V7	0.210	in H_2O	0.46
V8	0.170	in H_2O	0.41
H1	0.170	in H_2O	0.41
H2	0.190	in H_2O	0.44
H3	0.210	in H_2O	0.46
H4	0.210	in H_2O	0.46
H5	0.240	in H_2O	0.49
H6	0.240	in H_2O	0.49
H7	0.240	in H_2O	0.49
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	67
Barometric pressure (P_b)	[in Hg]	30.3
Static pressure (P_s)	[in H_2O]	-3.1
Molecular weight		28.84
Velocity	ft/sec	30.2
Flow rate	cfm	3206
DAS Pressure Head	[in H_2O]	0.22
Relative Humidity	[percent]	53 at 61 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	11	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.180	in H_2O	0.42
V2	0.210	in H_2O	0.46
V3	0.220	in H_2O	0.47
V4	0.220	in H_2O	0.47
V5	0.210	in H_2O	0.46
V6	0.200	in H_2O	0.45
V7	0.190	in H_2O	0.44
V8	0.170	in H_2O	0.41
H1	0.180	in H_2O	0.42
H2	0.200	in H_2O	0.45
H3	0.200	in H_2O	0.45
H4	0.200	in H_2O	0.45
H5	0.220	in H_2O	0.47
H6	0.230	in H_2O	0.48
H7	0.220	in H_2O	0.47
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.45

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	73
Barometric pressure (P_b)	[in Hg]	30.3
Static pressure (P_s)	[in H_2O]	-3.2
Molecular weight		28.84
Velocity	ft/sec	29.9
Flow rate	cfm	3171
DAS Pressure Head	[in H_2O]	0.20
Relative Humidity	[percent]	41 at 71 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	11	Duct diameter	18 in
Run No.	1R	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.18	in H_2O	0.42
V2	0.21	in H_2O	0.46
V3	0.22	in H_2O	0.47
V4	0.22	in H_2O	0.47
V5	0.21	in H_2O	0.46
V6	0.20	in H_2O	0.45
V7	0.19	in H_2O	0.44
V8	0.17	in H_2O	0.41
H1	0.18	in H_2O	0.42
H2	0.20	in H_2O	0.45
H3	0.20	in H_2O	0.45
H4	0.20	in H_2O	0.45
H5	0.22	in H_2O	0.47
H6	0.23	in H_2O	0.48
H7	0.22	in H_2O	0.47
H8	0.20	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.45

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	73		
Barometric pressure (P_b)	[in Hg)	30.3		
Static pressure (P_s)	[in H_2O]	-3.2		
Molecular weight		28.84		
Velocity	ft/sec	29.9		
Flow rate	cfm	3171		
DAS Pressure Head	[in H_2O]	0.20		
Relative Humidity	[percent]	41	at	71 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	6	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.210	in H_2O	0.46
V2	0.230	in H_2O	0.48
V3	0.230	in H_2O	0.48
V4	0.240	in H_2O	0.49
V5	0.230	in H_2O	0.48
V6	0.230	in H_2O	0.48
V7	0.220	in H_2O	0.47
V8	0.190	in H_2O	0.44
H1	0.200	in H_2O	0.45
H2	0.210	in H_2O	0.46
H3	0.220	in H_2O	0.47
H4	0.220	in H_2O	0.47
H5	0.250	in H_2O	0.50
H6	0.250	in H_2O	0.50
H7	0.250	in H_2O	0.50
H8	0.210	in H_2O	0.46
	AVERAGE SQRT(Delta P)		0.47

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	71
Barometric pressure (P_b)	[in Hg]	30.4
Static pressure (P_s)	[in H_2O]	-2.7
Molecular weight		28.84
Velocity	ft/sec	31.3
Flow rate	cfm	3319
DAS Pressure Head	[in H_2O]	0.22
Relative Humidity	[percent]	47 at 43 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	14	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.240	in H_2O	0.49
V3	0.240	in H_2O	0.49
V4	0.250	in H_2O	0.50
V5	0.240	in H_2O	0.49
V6	0.240	in H_2O	0.49
V7	0.230	in H_2O	0.48
V8	0.180	in H_2O	0.42
H1	0.200	in H_2O	0.45
H2	0.210	in H_2O	0.46
H3	0.220	in H_2O	0.47
H4	0.230	in H_2O	0.48
H5	0.260	in H_2O	0.51
H6	0.260	in H_2O	0.51
H7	0.250	in H_2O	0.50
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.48

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	66
Barometric pressure (P_b)	[in Hg]	30.4
Static pressure (P_s)	[in H_2O]	-2.8
Molecular weight		28.84
Velocity	ft/sec	31.4
Flow rate	cfm	3329
DAS Pressure Head	[in H_2O]	0.21
Relative Humidity	[percent]	32 at 57 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	13	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.180	in H_2O	0.42
V2	0.220	in H_2O	0.47
V3	0.220	in H_2O	0.47
V4	0.230	in H_2O	0.48
V5	0.220	in H_2O	0.47
V6	0.210	in H_2O	0.46
V7	0.210	in H_2O	0.46
V8	0.160	in H_2O	0.40
H1	0.190	in H_2O	0.44
H2	0.200	in H_2O	0.45
H3	0.220	in H_2O	0.47
H4	0.220	in H_2O	0.47
H5	0.240	in H_2O	0.49
H6	0.240	in H_2O	0.49
H7	0.240	in H_2O	0.49
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	67		
Barometric pressure (P_b)	[in Hg]	30.3		
Static pressure (P_s)	[in H_2O]	-2.6		
Molecular weight		28.84		
Velocity	ft/sec	30.3		
Flow rate	cfm	3217		
DAS Pressure Head	[in H_2O]	0.17		
Relative Humidity	[percent]	29	at	58 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	11	Duct diameter	18 in
Run No.	3	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.220	in H_2O	0.47
V3	0.240	in H_2O	0.49
V4	0.240	in H_2O	0.49
V5	0.240	in H_2O	0.49
V6	0.240	in H_2O	0.49
V7	0.220	in H_2O	0.47
V8	0.200	in H_2O	0.45
H1	0.190	in H_2O	0.44
H2	0.210	in H_2O	0.46
H3	0.210	in H_2O	0.46
H4	0.220	in H_2O	0.47
H5	0.250	in H_2O	0.50
H6	0.250	in H_2O	0.50
H7	0.240	in H_2O	0.49
H8	0.220	in H_2O	0.47
	AVERAGE SQRT(Delta P)		0.47

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	71
Barometric pressure (P_b)	[in Hg]	30.1
Static pressure (P_s)	[in H_2O]	-2.7
Molecular weight		28.84
Velocity	ft/sec	31.4
Flow rate	cfm	3332
DAS Pressure Head	[in H_2O]	0.17
Relative Humidity	[percent]	34 at 43 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	5	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.170	in H_2O	0.41
V2	0.210	in H_2O	0.46
V3	0.220	in H_2O	0.47
V4	0.220	in H_2O	0.47
V5	0.220	in H_2O	0.47
V6	0.220	in H_2O	0.47
V7	0.210	in H_2O	0.46
V8	0.190	in H_2O	0.44
H1	0.180	in H_2O	0.42
H2	0.190	in H_2O	0.44
H3	0.210	in H_2O	0.46
H4	0.210	in H_2O	0.46
H5	0.240	in H_2O	0.49
H6	0.240	in H_2O	0.49
H7	0.240	in H_2O	0.49
H8	0.210	in H_2O	0.46
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	71		
Barometric pressure (P_b)	[in Hg)	30.0		
Static pressure (P_s)	[in H_2O]	-2.6		
Molecular weight		28.84		
Velocity	ft/sec	30.5		
Flow rate	cfm	3236		
DAS Pressure Head	[in H_2O]	0.16		
Relative Humidity	[percent]	30	at	53 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	2	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.160	in H_2O	0.40
V2	0.200	in H_2O	0.45
V3	0.220	in H_2O	0.47
V4	0.220	in H_2O	0.47
V5	0.210	in H_2O	0.46
V6	0.200	in H_2O	0.45
V7	0.200	in H_2O	0.45
V8	0.160	in H_2O	0.40
H1	0.160	in H_2O	0.40
H2	0.190	in H_2O	0.44
H3	0.190	in H_2O	0.44
H4	0.200	in H_2O	0.45
H5	0.220	in H_2O	0.47
H6	0.230	in H_2O	0.48
H7	0.230	in H_2O	0.48
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.45

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	72		
Barometric pressure (P_b)	[in Hg)	29.9		
Static pressure (P_s)	[in H_2O]	-2.6		
Molecular weight		28.84		
Velocity	ft/sec	29.7		
Flow rate	cfm	3151		
DAS Pressure Head	[in H_2O]	0.15		
Relative Humidity	[percent]	27	at	60 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	5	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.160	in H_2O	0.40
V2	0.190	in H_2O	0.44
V3	0.200	in H_2O	0.45
V4	0.200	in H_2O	0.45
V5	0.200	in H_2O	0.45
V6	0.200	in H_2O	0.45
V7	0.190	in H_2O	0.44
V8	0.160	in H_2O	0.40
H1	0.160	in H_2O	0.40
H2	0.180	in H_2O	0.42
H3	0.190	in H_2O	0.44
H4	0.190	in H_2O	0.44
H5	0.210	in H_2O	0.46
H6	0.220	in H_2O	0.47
H7	0.220	in H_2O	0.47
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.44

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	67		
Barometric pressure (P_b)	[in Hg]	30.04		
Static pressure (P_s)	[in H_2O]	-2.3		
Molecular weight		28.84		
Velocity	ft/sec	29.0		
Flow rate	cfm	3071		
DAS Pressure Head	[in H_2O]	0.19		
Relative Humidity	[percent]	39	at	47 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	2	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.160	in H_2O	0.40
V2	0.190	in H_2O	0.44
V3	0.200	in H_2O	0.45
V4	0.200	in H_2O	0.45
V5	0.190	in H_2O	0.44
V6	0.190	in H_2O	0.44
V7	0.180	in H_2O	0.42
V8	0.170	in H_2O	0.41
H1	0.160	in H_2O	0.40
H2	0.180	in H_2O	0.42
H3	0.180	in H_2O	0.42
H4	0.190	in H_2O	0.44
H5	0.220	in H_2O	0.47
H6	0.220	in H_2O	0.47
H7	0.220	in H_2O	0.47
H8	0.180	in H_2O	0.42

AVERAGE SQRT(Delta P) 0.43

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	68		
Barometric pressure (P_b)	[in Hg]	30.1		
Static pressure (P_s)	[in H_2O]	-2.3		
Molecular weight		28.84		
Velocity	ft/sec	28.8		
Flow rate	cfm	3053		
DAS Pressure Head	[in H_2O]	0.18		
Relative Humidity	[percent]	43	at	49 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	16	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.190	in H_2O	0.44
V2	0.230	in H_2O	0.48
V3	0.230	in H_2O	0.48
V4	0.240	in H_2O	0.49
V5	0.230	in H_2O	0.48
V6	0.210	in H_2O	0.46
V7	0.210	in H_2O	0.46
V8	0.180	in H_2O	0.42
H1	0.200	in H_2O	0.45
H2	0.210	in H_2O	0.46
H3	0.220	in H_2O	0.47
H4	0.230	in H_2O	0.48
H5	0.250	in H_2O	0.50
H6	0.260	in H_2O	0.51
H7	0.250	in H_2O	0.50
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.47

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	67		
Barometric pressure (P_b)	[in Hg]	30.06		
Static pressure (P_s)	[in H_2O]	-2.45		
Molecular weight		28.84		
Velocity	ft/sec	31.1		
Flow rate	cfm	3297		
DAS Pressure Head	[in H_2O]	0.24		
Relative Humidity	[percent]	45	at	46 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	15	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.180	in H_2O	0.42
V2	0.200	in H_2O	0.45
V3	0.220	in H_2O	0.47
V4	0.220	in H_2O	0.47
V5	0.200	in H_2O	0.45
V6	0.200	in H_2O	0.45
V7	0.200	in H_2O	0.45
V8	0.170	in H_2O	0.41
H1	0.180	in H_2O	0.42
H2	0.190	in H_2O	0.44
H3	0.210	in H_2O	0.46
H4	0.210	in H_2O	0.46
H5	0.220	in H_2O	0.47
H6	0.230	in H_2O	0.48
H7	0.230	in H_2O	0.48
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.45

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	67
Barometric pressure (P_b)	[in Hg]	29.99
Static pressure (P_s)	[in H_2O]	-2.21
Molecular weight		28.84
Velocity	ft/sec	29.9
Flow rate	cfm	3168
DAS Pressure Head	[in H_2O]	0.23
Relative Humidity	[percent]	51 at 54 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	16	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.180	in H_2O	0.42
V2	0.200	in H_2O	0.45
V3	0.230	in H_2O	0.48
V4	0.220	in H_2O	0.47
V5	0.220	in H_2O	0.47
V6	0.210	in H_2O	0.46
V7	0.200	in H_2O	0.45
V8	0.180	in H_2O	0.42
H1	0.190	in H_2O	0.44
H2	0.200	in H_2O	0.45
H3	0.210	in H_2O	0.46
H4	0.220	in H_2O	0.47
H5	0.240	in H_2O	0.49
H6	0.250	in H_2O	0.50
H7	0.240	in H_2O	0.49
H8	0.210	in H_2O	0.46
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49	
Pitot constant		0.99	
Temperaure (t_s)	[F]	70	
Barometric pressure (P_b)	[in Hg]	30.01	
Static pressure (P_s)	[in H_2O]	-2.3	
Molecular weight		28.84	
Velocity	ft/sec	30.6	
Flow rate	cfm	3243	
DAS Pressure Head	[in H_2O]	0.26	
Relative Humidity	[percent]	51	at 60 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	15	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.230	in H_2O	0.48
V3	0.240	in H_2O	0.49
V4	0.240	in H_2O	0.49
V5	0.230	in H_2O	0.48
V6	0.220	in H_2O	0.47
V7	0.210	in H_2O	0.46
V8	0.180	in H_2O	0.42
H1	0.190	in H_2O	0.44
H2	0.220	in H_2O	0.47
H3	0.220	in H_2O	0.47
H4	0.230	in H_2O	0.48
H5	0.260	in H_2O	0.51
H6	0.260	in H_2O	0.51
H7	0.250	in H_2O	0.50
H8	0.210	in H_2O	0.46

AVERAGE SQRT(Delta P) 0.47

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	72
Barometric pressure (P_b)	[in Hg]	30.01
Static pressure (P_s)	[in H_2O]	-2.5
Molecular weight		28.84
Velocity	ft/sec	31.5
Flow rate	cfm	3339
DAS Pressure Head	[in H_2O]	0.27
Relative Humidity	[percent]	44 at 62 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	12	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.220	in H_2O	0.47
V3	0.220	in H_2O	0.47
V4	0.240	in H_2O	0.49
V5	0.220	in H_2O	0.47
V6	0.220	in H_2O	0.47
V7	0.200	in H_2O	0.45
V8	0.170	in H_2O	0.41
H1	0.180	in H_2O	0.42
H2	0.210	in H_2O	0.46
H3	0.210	in H_2O	0.46
H4	0.220	in H_2O	0.47
H5	0.250	in H_2O	0.50
H6	0.240	in H_2O	0.49
H7	0.250	in H_2O	0.50
H8	0.210	in H_2O	0.46
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49		
Pitot constant		0.99		
Temperaure (t_s)	[F]	65		
Barometric pressure (P_b)	[in Hg]	30.19		
Static pressure (P_s)	[in H_2O]	-2.4		
Molecular weight		28.84		
Velocity	ft/sec	30.6		
Flow rate	cfm	3246		
DAS Pressure Head	[in H_2O]	0.22		
Relative Humidity	[percent]	42	at	49 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	9	Duct diameter	18 in
Run No.	1	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.200	in H_2O	0.45
V2	0.230	in H_2O	0.48
V3	0.230	in H_2O	0.48
V4	0.240	in H_2O	0.49
V5	0.200	in H_2O	0.45
V6	0.210	in H_2O	0.46
V7	0.200	in H_2O	0.45
V8	0.180	in H_2O	0.42
H1	0.180	in H_2O	0.42
H2	0.200	in H_2O	0.45
H3	0.220	in H_2O	0.47
H4	0.220	in H_2O	0.47
H5	0.240	in H_2O	0.49
H6	0.240	in H_2O	0.49
H7	0.250	in H_2O	0.50
H8	0.210	in H_2O	0.46
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	69
Barometric pressure (P_b)	[in Hg]	29.88
Static pressure (P_s)	[in H_2O]	-2.3
Molecular weight		28.84
Velocity	ft/sec	30.8
Flow rate	cfm	3271
DAS Pressure Head	[in H_2O]	0.19
Relative Humidity	[percent]	0.43 at 55 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	12	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.190	in H_2O	0.44
V2	0.220	in H_2O	0.47
V3	0.220	in H_2O	0.47
V4	0.230	in H_2O	0.48
V5	0.220	in H_2O	0.47
V6	0.210	in H_2O	0.46
V7	0.210	in H_2O	0.46
V8	0.190	in H_2O	0.44
H1	0.170	in H_2O	0.41
H2	0.200	in H_2O	0.45
H3	0.210	in H_2O	0.46
H4	0.220	in H_2O	0.47
H5	0.240	in H_2O	0.49
H6	0.250	in H_2O	0.50
H7	0.240	in H_2O	0.49
H8	0.200	in H_2O	0.45
	AVERAGE SQRT(Delta P)		0.46

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	68
Barometric pressure (P_b)	[in Hg]	29.87
Static pressure (P_s)	[in H_2O]	-2.3
Molecular weight		28.84
Velocity	ft/sec	30.7
Flow rate	cfm	3254
DAS Pressure Head	[in H_2O]	0.19
Relative Humidity	[percent]	44 at 54 F

Velocity Traverse - Flow Rate Calculation
NMMA Baseline Styrene Emission Test

Test No.	9	Duct diameter	18 in
Run No.	2	Duct area	1.77 ft^2

Pressure Head Readings

V1	0.170	in H_2O	0.41
V2	0.230	in H_2O	0.48
V3	0.240	in H_2O	0.49
V4	0.240	in H_2O	0.49
V5	0.220	in H_2O	0.47
V6	0.220	in H_2O	0.47
V7	0.220	in H_2O	0.47
V8	0.200	in H_2O	0.45
H1	0.180	in H_2O	0.42
H2	0.210	in H_2O	0.46
H3	0.220	in H_2O	0.47
H4	0.220	in H_2O	0.47
H5	0.250	in H_2O	0.50
H6	0.250	in H_2O	0.50
H7	0.240	in H_2O	0.49
H8	0.220	in H_2O	0.47
	AVERAGE SQRT(Delta P)		0.47

Constant		85.49
Pitot constant		0.99
Temperaure (t_s)	[F]	66
Barometric pressure (P_b)	[in Hg]	29.76
Static pressure (P_s)	[in H_2O]	-2.4
Molecular weight		28.84
Velocity	ft/sec	31.2
Flow rate	cfm	3306
DAS Pressure Head	[in H_2O]	0.23
Relative Humidity	[percent]	50 at 53 F

Appendix C.3

Method 25A Results

Time	THC O (ppmv)	THC I (ppmv)	Flow (inH2O)
14:50:47	0.0	-0.3	0.186
14:51:47	0.0	-0.3	0.196
14:52:47	0.0	-0.3	0.200
14:53:47	10.8	-0.3	0.202
14:54:47	44.5	-0.3	0.203
14:55:47	76.9	-0.3	0.201
14:56:47	102.6	-0.3	0.201
14:57:47	130.3	-0.3	0.203
14:58:47	153.5	-0.3	0.204
14:59:47	183.0	-0.3	0.200
15:00:47	201.1	-0.3	0.203
15:01:47	200.4	-0.3	0.201
15:02:47	211.8	-0.3	0.203
15:03:47	236.1	-0.3	0.203
15:04:47	248.5	-0.3	0.203
15:05:47	297.9	-0.3	0.200
15:06:47	305.1	1.1	0.202
15:07:47	314.5	2.1	0.200
15:08:47	304.3	1.9	0.203
15:09:47	268.8	1.9	0.201
15:10:47	291.2	1.9	0.202
15:11:47	302.3	1.9	0.203
15:12:47	317.6	1.8	0.202
15:13:47	257.1	1.8	0.201
15:14:47	258.2	1.8	0.201
15:15:47	268.7	1.8	0.203
15:16:47	254.0	1.8	0.200
15:17:47	262.5	1.7	0.205
15:18:47	272.1	1.7	0.202
15:19:47	257.9	1.7	0.201
15:20:47	205.1	1.8	0.201
15:21:47	192.4	1.7	0.203
15:22:47	180.5	1.7	0.201
15:23:47	127.3	1.7	0.205
15:24:47	107.7	1.7	0.204
15:25:47	88.0	1.7	0.204
15:26:47	78.4	1.7	0.199
15:27:47	63.5	1.7	0.204
15:28:47	54.3	1.7	0.200
15:29:47	46.1	1.6	0.200
15:30:47	39.5	1.6	0.200
15:31:47	33.2	1.6	0.199
15:32:47	27.0	1.6	0.201
15:33:47	19.6	1.6	0.201
15:34:47	16.0	1.6	0.201
15:35:47	13.5	1.6	0.200
15:36:47	11.0	1.6	0.202

Time	THC O (ppmv)	THC I (ppmv)	Flow (inH2O)
15:37:47	9.5	1.6	0.203
15:38:47	8.0	1.6	0.197
15:39:47	7.1	1.6	0.199
15:40:47	6.4	1.6	0.201
15:41:47	5.7	1.5	0.202
15:42:47	5.0	1.5	0.199
15:43:47	5.0	1.5	0.201
15:44:47	4.7	1.5	0.200
15:45:47	4.0	1.5	0.200
15:46:47	3.9	1.5	0.199
15:47:47	3.9	1.5	0.197
15:48:47	3.8	1.5	0.200
15:49:47	3.0	1.5	0.199
15:50:47	2.9	1.5	0.200
15:51:47	1.9	1.5	0.200
15:52:47	1.9	1.5	0.198
15:53:47	1.9	1.6	0.197
15:54:47	1.7	1.5	0.199
15:55:47	1.3	1.5	0.197

Time PST	Elapsed Time	THC o (ppmv)	THC i (ppmv)	Flow (inH2O)	Temp (F)	Resin (lb)		Molar Volume	Mass as Propane	Cum Percent	Declining Mass
11:11:11	0:00:00	4.4	1.7	0.150	61.1	668.2	Start Test Run	380.3	0.0015	0.04%	3.6604
11:12:11	0:01:00	8.7	1.7	0.144	63.2	666.8		381.8	0.0030	0.12%	3.6589
11:13:11	0:02:00	21.2	1.7	0.150	65.3	665.6		383.4	0.0073	0.33%	3.6559
11:14:11	0:03:00	11.5	1.7	0.150	67.0			384.6	0.0040	0.43%	3.6485
11:15:11	0:04:00	8.3	2.1	0.144	68.2			385.5	0.0029	0.51%	3.6445
11:16:11	0:05:00	7.5	2.5	0.144	68.8			385.9	0.0026	0.58%	3.6417
11:17:11	0:06:00	42.4	2.8	0.145	68.9			386.0	0.0146	0.98%	3.6391
11:18:11	0:07:00	64.4	2.9	0.146	69.2			386.2	0.0221	1.59%	3.6245
11:20:22	0:09:11	71.9	2.7	0.147	69.5			386.4	0.0247	2.26%	3.6024
11:20:23	0:09:12	71.9	2.7	0.147	69.5			386.4	0.0247	2.94%	3.5777
11:21:11	0:10:00	65.8	2.9	0.147	69.9			386.7	0.0226	3.55%	3.5529
11:22:11	0:11:00	63.5	3.0	0.146	69.9	664.6		386.7	0.0218	4.15%	3.5303
11:23:11	0:12:00	87.4	3.0	0.146	70.0	663.4		386.8	0.0300	4.97%	3.5086
11:24:11	0:13:00	121.4	2.8	0.148	69.9	662.1		386.7	0.0417	6.11%	3.4786
11:25:11	0:14:00	147.3	2.6	0.145	69.6	661.8		386.5	0.0506	7.49%	3.4369
11:26:11	0:15:00	153.0	2.5	0.145	69.3	661.0		386.2	0.0526	8.93%	3.3863
11:27:11	0:16:00	166.3	2.4	0.148	69.2	660.0		386.2	0.0572	10.49%	3.3337
11:28:11	0:17:00	184.9	2.3	0.147	69.2	659.4		386.2	0.0636	12.22%	3.2765
11:29:11	0:18:00	200.0	2.2	0.144	68.9	658.0		386.0	0.0688	14.10%	3.2129
11:30:11	0:19:00	212.1	2.1	0.145	68.8	657.4		385.9	0.0730	16.10%	3.1442
11:31:11	0:20:00	226.2	2.0	0.145	68.7	655.8		385.8	0.0778	18.22%	3.0712
11:32:11	0:21:00	237.0	1.8	0.145	69.0	655.4	Brush	386.1	0.0815	20.45%	2.9934
11:33:11	0:22:00	241.3	1.8	0.143	69.7	654.2		386.5	0.0829	22.71%	2.9119
11:34:11	0:23:00	264.6	2.0	0.144	70.1	653.6		386.8	0.0908	25.19%	2.8290
11:35:11	0:24:00	275.5	2.1	0.143	70.3	652.4		387.0	0.0945	27.78%	2.7382
11:36:11	0:25:00	236.4	2.1	0.145	70.2	652.2	Brush	386.9	0.0811	29.99%	2.6437
11:37:11	0:26:00	219.7	2.2	0.145	70.4	651.6		387.0	0.0754	32.05%	2.5626
11:38:11	0:27:00	205.3	2.3	0.145	70.4	651.4		387.1	0.0704	33.97%	2.4872
11:39:11	0:28:00	219.5	2.4	0.143	70.7	650.4		387.3	0.0752	36.03%	2.4169
11:40:11	0:29:00	228.1	2.4	0.144	70.3	649.6		387.0	0.0782	38.17%	2.3416
11:41:11	0:30:00	220.5	2.2	0.145	70.2	647.4		386.9	0.0757	40.23%	2.2634
11:42:11	0:31:00	250.6	2.0	0.145	70.1	647.2		386.9	0.0860	42.58%	2.1877
11:43:11	0:32:00	248.0	1.9	0.144	70.5	647.0	Gelcoat ceased	387.1	0.0850	44.91%	2.1017
11:44:11	0:33:00	237.7	1.8	0.145	70.6	647.0		387.2	0.0815	47.13%	2.0167
11:45:11	0:34:00	217.0	1.8	0.143	70.5	647.0		387.2	0.0744	49.16%	1.9352
11:46:11	0:35:00	196.6	1.9	0.141	70.8	647.0		387.3	0.0674	51.00%	1.8608
11:47:11	0:36:00	190.9	2.2	0.145	71.1	647.0		387.6	0.0654	52.79%	1.7934
11:48:11	0:37:00	176.3	2.3	0.146	70.4	647.0		387.1	0.0605	54.44%	1.7280
11:49:11	0:38:00	163.9	2.4	0.145	70.3	647.0		387.0	0.0562	55.98%	1.6676
11:50:11	0:39:00	149.0	2.5	0.144	70.3	647.0		387.0	0.0511	57.37%	1.6114
11:51:11	0:40:00	138.3	2.7	0.144	70.3	647.0		387.0	0.0474	58.67%	1.5603
11:52:11	0:41:00	137.3	2.7	0.144	70.8	647.0		387.3	0.0471	59.96%	1.5128
11:53:11	0:42:00	131.3	2.7	0.147	70.8	647.0		387.4	0.0450	61.19%	1.4658
11:54:11	0:43:00	121.1	2.7	0.144	71.1	647.0		387.6	0.0415	62.32%	1.4208
11:55:11	0:44:00	121.5	2.7	0.146	71.1	647.0		387.6	0.0416	63.46%	1.3793
11:56:11	0:45:00	111.8	2.8	0.147	70.9	647.0		387.4	0.0383	64.50%	1.3377
11:57:11	0:46:00	105.8	3.0	0.147	70.3	647.0		387.0	0.0363	65.49%	1.2994
11:58:11	0:47:00	107.7	3.1	0.147	70.4	647.0		387.1	0.0369	66.50%	1.2631
11:59:11	0:48:00	99.7	3.0	0.144	70.0	647.0		386.8	0.0342	67.44%	1.2262
12:00:11	0:49:00	96.2	3.0	0.146	69.9	647.0		386.7	0.0330	68.34%	1.1919
12:01:11	0:50:00	98.7	2.8	0.145	70.0	647.0		386.8	0.0339	69.26%	1.1589
12:02:11	0:51:00	95.0	2.7	0.146	70.7	647.0		387.3	0.0326	70.15%	1.1250
12:03:11	0:52:00	89.9	2.6	0.147	70.9	647.0		387.4	0.0308	71.00%	1.0925
12:04:11	0:53:00	87.2	2.5	0.149	70.8	647.0		387.3	0.0299	71.81%	1.0617
12:05:11	0:54:00	84.8	2.3	0.148	70.5	647.0		387.1	0.0291	72.61%	1.0318
12:06:11	0:55:00	81.1	2.2	0.146	70.2	647.0		386.9	0.0278	73.37%	1.0027
12:07:18	0:56:07	83.1	2.1	0.147	69.9	647.0		386.7	0.0285	74.15%	0.9749
12:08:24	0:57:13	82.7	2.0	0.148	70.7	647.0		387.3	0.0283	74.92%	0.9463

Time PST	Elapsed Time	THC o (ppmv)	THC i (ppmv)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Mass as Propane	Cum Percent	Declining Mass
12:09:11	0:58:00	82.2	2.0	0.148	71.2	647.0	387.6	0.0281	75.69%	0.9180
12:10:11	0:59:00	75.5	1.9	0.147	71.1	647.0	387.5	0.0259	76.40%	0.8899
12:11:11	1:00:00	73.4	1.8	0.149	70.7	647.0	387.3	0.0252	77.08%	0.8640
12:12:11	1:01:00	74.3	1.7	0.146	70.3	647.0	387.0	0.0255	77.78%	0.8388
12:13:11	1:02:00	73.1	1.7	0.146	70.3	647.0	387.0	0.0251	78.46%	0.8134
12:14:11	1:03:00	72.0	1.7	0.147	70.7	647.0	387.3	0.0247	79.14%	0.7883
12:15:11	1:04:00	69.0	1.6	0.145	70.9	647.0	387.4	0.0236	79.78%	0.7636
12:16:11	1:05:00	67.5	1.6	0.150	70.7	647.0	387.3	0.0231	80.42%	0.7400
12:17:11	1:06:00	67.4	1.6	0.146	71.2	647.0	387.6	0.0231	81.05%	0.7169
12:18:11	1:07:00	65.7	1.5	0.148	71.3	647.0	387.7	0.0225	81.66%	0.6938
12:19:11	1:08:00	62.4	1.5	0.150	71.4	647.0	387.8	0.0214	82.24%	0.6713
12:20:11	1:09:00	60.7	1.5	0.148	71.4	647.0	387.8	0.0208	82.81%	0.6499
12:21:11	1:10:00	60.3	1.5	0.146	71.6	647.0	387.9	0.0206	83.38%	0.6291
12:22:11	1:11:00	57.7	1.6	0.151	71.3	647.0	387.7	0.0197	83.92%	0.6085
12:23:11	1:12:00	58.5	1.6	0.149	71.4	647.0	387.8	0.0200	84.46%	0.5888
12:24:11	1:13:00	56.6	1.5	0.150	71.6	647.0	388.0	0.0194	84.99%	0.5687
12:25:11	1:14:00	53.5	1.5	0.151	71.9	647.0	388.1	0.0183	85.49%	0.5494
12:26:11	1:15:00	51.7	1.5	0.149	72.2	647.0	388.4	0.0177	85.97%	0.5311
12:27:11	1:16:00	49.6	1.4	0.148	72.1	647.0	388.3	0.0170	86.44%	0.5134
12:28:11	1:17:00	51.0	1.4	0.152	71.5	647.0	387.9	0.0174	86.91%	0.4965
12:29:11	1:18:00	52.4	1.4	0.151	71.1	647.0	387.5	0.0180	87.40%	0.4790
12:30:11	1:19:00	52.8	1.3	0.153	71.2	647.0	387.6	0.0181	87.90%	0.4611
12:31:11	1:20:00	46.7	1.3	0.147	70.9	647.0	387.4	0.0160	88.33%	0.4430
12:32:11	1:21:00	46.3	1.2	0.148	71.2	647.0	387.6	0.0159	88.77%	0.4270
12:33:11	1:22:00	44.9	1.2	0.151	71.4	647.0	387.8	0.0154	89.19%	0.4111
12:34:11	1:23:00	43.0	1.2	0.149	71.7	647.0	388.0	0.0147	89.59%	0.3958
12:35:11	1:24:00	42.5	1.2	0.150	71.7	647.0	388.0	0.0145	89.99%	0.3811
12:36:11	1:25:00	40.6	1.2	0.150	71.5	647.0	387.9	0.0139	90.37%	0.3665
12:37:11	1:26:00	39.9	1.2	0.150	71.5	647.0	387.9	0.0136	90.74%	0.3526
12:38:11	1:27:00	38.5	1.2	0.150	71.9	647.0	388.2	0.0132	91.10%	0.3390
12:39:11	1:28:00	36.0	1.2	0.151	72.0	647.0	388.2	0.0123	91.44%	0.3258
12:40:11	1:29:00	36.0	1.2	0.152	71.9	647.0	388.1	0.0123	91.77%	0.3135
12:41:11	1:30:00	34.3	1.2	0.151	72.1	647.0	388.3	0.0117	92.09%	0.3012
12:42:11	1:31:00	33.9	1.2	0.151	72.1	647.0	388.3	0.0116	92.41%	0.2894
12:43:11	1:32:00	31.0	1.1	0.151	71.8	647.0	388.1	0.0106	92.70%	0.2779
12:44:11	1:33:00	30.2	1.1	0.152	71.6	647.0	388.0	0.0103	92.98%	0.2672
12:45:11	1:34:00	30.1	1.0	0.150	71.9	647.0	388.2	0.0103	93.26%	0.2569
12:46:11	1:35:00	31.8	1.0	0.150	72.1	647.0	388.3	0.0109	93.56%	0.2466
12:47:11	1:36:00	29.7	1.1	0.151	72.2	647.0	388.4	0.0102	93.84%	0.2357
12:48:11	1:37:00	27.0	1.1	0.155	72.0	647.0	388.2	0.0092	94.09%	0.2256
12:49:11	1:38:00	26.2	1.1	0.148	72.0	647.0	388.3	0.0090	94.33%	0.2163
12:50:11	1:39:00	24.5	1.1	0.152	72.0	647.0	388.3	0.0084	94.56%	0.2074
12:51:11	1:40:00	23.3	1.1	0.150	71.9	647.0	388.2	0.0080	94.78%	0.1990
12:52:11	1:41:00	24.4	1.1	0.150	72.1	647.0	388.3	0.0084	95.01%	0.1910
12:53:11	1:42:00	25.4	1.1	0.149	72.8	647.0	388.8	0.0087	95.25%	0.1827
12:54:11	1:43:00	24.3	1.1	0.150	73.0	647.0	389.0	0.0083	95.47%	0.1740
12:55:11	1:44:00	23.1	1.1	0.149	73.2	647.0	389.1	0.0079	95.69%	0.1657
12:56:11	1:45:00	22.2	1.3	0.152	73.1	647.0	389.0	0.0076	95.90%	0.1578
12:57:11	1:46:00	22.3	1.3	0.151	72.8	647.0	388.8	0.0076	96.10%	0.1502
12:58:11	1:47:00	22.8	1.2	0.151	73.3	647.0	389.2	0.0078	96.32%	0.1426
12:59:11	1:48:00	22.2	1.2	0.150	73.5	647.0	389.4	0.0076	96.52%	0.1349
13:00:11	1:49:00	22.8	1.2	0.153	73.3	647.0	389.2	0.0078	96.73%	0.1273
13:01:11	1:50:00	22.0	1.3	0.149	73.4	647.0	389.3	0.0075	96.94%	0.1195
13:02:11	1:51:00	21.3	1.4	0.151	73.5	647.0	389.4	0.0073	97.14%	0.1120
13:03:11	1:52:00	19.8	1.5	0.151	73.3	647.0	389.2	0.0067	97.32%	0.1048
13:04:11	1:53:00	18.5	1.6	0.152	73.4	647.0	389.2	0.0063	97.49%	0.0980
13:05:11	1:54:00	17.3	1.7	0.147	73.2	647.0	389.1	0.0059	97.65%	0.0917
13:06:11	1:55:00	16.2	1.7	0.149	73.0	647.0	389.0	0.0055	97.81%	0.0858

Time PST	Elapsed Time	THC o (ppmv)	THC i (ppmv)	Flow (inH2O)	Temp (F)	Resin (lb)		Molar Volume	Mass as Propane	Cum Percent	Declining Mass
13:07:11	1:56:00	15.3	1.6	0.149	72.8	647.0		388.8	0.0052	97.95%	0.0803
13:08:11	1:57:00	16.2	1.6	0.149	73.1	647.0		389.0	0.0055	98.10%	0.0751
13:09:11	1:58:00	15.8	1.5	0.151	73.4	647.0		389.3	0.0054	98.25%	0.0696
13:10:11	1:59:00	14.7	1.5	0.151	73.6	647.0		389.4	0.0050	98.38%	0.0642
13:11:11	2:00:00	14.4	1.6	0.151	73.7	647.0		389.5	0.0049	98.52%	0.0591
13:12:11	2:01:00	12.9	1.7	0.150	74.0	647.0		389.7	0.0044	98.64%	0.0542
13:13:11	2:02:00	12.9	1.8	0.150	74.4	647.0		390.0	0.0044	98.76%	0.0499
13:14:11	2:03:00	11.8	1.8	0.152	74.3	647.0		389.9	0.0040	98.87%	0.0455
13:15:11	2:04:00	12.1	1.7	0.152	74.1	647.0		389.8	0.0041	98.98%	0.0415
13:16:14	2:05:03	11.0	1.7	0.149	73.4	647.0		389.2	0.0038	99.08%	0.0373
13:17:11	2:06:00	10.3	1.7	0.151	72.8	647.0		388.9	0.0035	99.18%	0.0336
13:18:11	2:07:00	11.6	1.6	0.150	73.3	647.0		389.2	0.0040	99.29%	0.0301
13:19:11	2:08:00	10.5	1.6	0.151	73.6	647.0		389.4	0.0036	99.38%	0.0261
13:20:11	2:09:00	9.9	1.6	0.151	73.5	647.0		389.3	0.0034	99.48%	0.0225
13:21:11	2:10:00	10.1	1.6	0.150	73.1	647.0		389.1	0.0035	99.57%	0.0192
13:22:11	2:11:00	8.5	1.5	0.150	73.1	647.0		389.0	0.0029	99.65%	0.0157
13:23:11	2:12:00	8.2	1.5	0.153	73.2	647.0		389.1	0.0028	99.73%	0.0128
13:24:11	2:13:00	7.9	1.5	0.150	73.2	647.0		389.1	0.0027	99.80%	0.0100
13:25:11	2:14:00	7.7	1.4	0.153	72.9	647.0		388.9	0.0026	99.87%	0.0073
13:26:11	2:15:00	6.9	1.3	0.151	73.3	647.0		389.2	0.0023	99.94%	0.0047
13:27:11	2:16:00	6.8	1.3	0.153	73.6	647.0	End Run	389.4	0.0023	100.00%	0.0023

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Mass (as Propane)	Cum Percent	Declining Mass
10:31:32	13.1	15.63	2.50	0.20	64.61	348.2 Start Test	382.8	0.0044	0.0%	14.1680
10:32:32	122.7	125.05	2.31	0.20	67.39	345.4	384.9	0.0405	0.3%	14.1636
10:33:32	249.7	251.98	2.24	0.19	69.02	343	386.1	0.0821	0.9%	14.1232
10:34:32	300.0	302.05	2.10	0.20	70.30	340.2	387.0	0.0984	1.6%	14.0410
10:35:32	349.5	351.45	1.94	0.19	70.68	338	387.3	0.1145	2.4%	13.9427
10:36:32	339.9	341.68	1.80	0.19	71.27	335	387.7	0.1113	3.2%	13.8281
10:37:32	375.2	377.04	1.79	0.19	71.54	333.6	387.9	0.1228	4.1%	13.7169
10:38:32	435.2	436.99	1.75	0.19	71.55	331	387.9	0.1424	5.1%	13.5941
10:39:32	581.8	583.47	1.70	0.19	71.75	328.2	388.1	0.1903	6.4%	13.4517
10:40:32	657.3	658.94	1.68	0.18	72.23	325.8	388.4	0.2148	7.9%	13.2614
10:41:32	726.9	728.56	1.70	0.18	72.69	323.6	388.7	0.2373	9.6%	13.0466
10:42:32	675.8	677.54	1.70	0.18	73.13	321.8	389.1	0.2205	11.1%	12.8093
10:43:32	767.0	768.73	1.72	0.18	73.35	319	389.2	0.2501	12.9%	12.5889
10:44:32	761.0	762.75	1.75	0.18	73.63	317	389.4	0.2480	14.7%	12.3387
10:45:32	649.1	650.95	1.83	0.18	73.57	315	389.4	0.2116	16.2%	12.0907
10:46:32	682.0	683.92	1.92	0.18	73.47	313.2 **	389.3	0.2223	17.7%	11.8792
10:47:32	683.6	685.51	1.93	0.18	73.54	311.4	389.4	0.2228	19.3%	11.6568
10:48:32	593.7	595.55	1.86	0.18	73.60	309.8	389.4	0.1935	20.7%	11.4340
10:49:32	671.2	672.96	1.79	0.18	73.68	308.2	389.5	0.2187	22.2%	11.2405
10:50:32	682.1	683.77	1.70	0.18	73.70	306.4 End Side 1	389.5	0.2223	23.8%	11.0218
10:51:32	557.1	558.69	1.63	0.18	73.55	305.8	389.4	0.1816	25.1%	10.7995
10:52:32	472.9	474.54	1.60	0.18	73.66	305.3 Start Side 2	389.4	0.1541	26.1%	10.6179
10:53:32	609.7	611.25	1.55	0.18	73.58	303.8	389.4	0.1987	27.5%	10.4638
10:54:32	662.2	663.70	1.53	0.18	73.59	301.2	389.4	0.2158	29.1%	10.2651
10:55:32	709.5	710.97	1.48	0.18	73.59	298.6 **	389.4	0.2312	30.7%	10.0492
10:56:32	760.5	761.96	1.45	0.18	73.64	296	389.4	0.2479	32.5%	9.8180
10:57:32	711.2	712.59	1.43	0.18	73.53	295.2	389.4	0.2318	34.1%	9.5701
10:58:32	738.4	739.85	1.44	0.17	73.38	293.4	389.2	0.2408	35.8%	9.3383
10:59:32	739.9	741.35	1.46	0.17	73.52	292.2 **	389.3	0.2412	37.5%	9.0975
11:00:32	801.3	802.79	1.45	0.17	73.60	291	389.4	0.2612	39.3%	8.8564
11:01:32	854.3	855.76	1.44	0.17	73.56	288	389.4	0.2785	41.3%	8.5952
11:02:32	990.4	991.80	1.41	0.17	73.31	285.6	389.2	0.3230	43.6%	8.3167
11:03:32	951.9	953.32	1.37	0.17	73.58	283	389.4	0.3103	45.8%	7.9937
11:04:32	1026.0	1027.35	1.36	0.17	73.68	281	389.5	0.3344	48.1%	7.6835
11:05:32	987.3	988.72	1.37	0.17	73.79	279.2 End gelcoat	389.5	0.3217	50.4%	7.3491
11:06:32	853.2	854.48	1.31	0.17	73.39	278.6	389.3	0.2782	52.4%	7.0274
11:07:32	745.5	746.74	1.28	0.17	73.54		389.4	0.2430	54.1%	6.7492
11:08:32	650.2	651.46	1.30	0.17	73.67		389.5	0.2119	55.6%	6.5062
11:09:32	599.4	600.74	1.37	0.17	73.79		389.5	0.1953	57.0%	6.2943
11:10:32	564.8	566.11	1.34	0.17	73.91		389.6	0.1840	58.3%	6.0991
11:11:32	521.7	522.99	1.32	0.17	73.84		389.6	0.1700	59.4%	5.9151
11:12:32	554.9	556.18	1.31	0.17	74.03		389.7	0.1807	60.7%	5.7451
11:13:32	504.8	506.13	1.32	0.17	74.02		389.7	0.1644	61.9%	5.5644
11:14:32	496.8	498.09	1.26	0.18	74.12		389.8	0.1618	63.0%	5.4000
11:15:32	489.6	490.86	1.22	0.17	74.45		390.0	0.1593	64.2%	5.2383
11:16:32	468.3	469.56	1.22	0.17	74.76		390.3	0.1523	65.2%	5.0789
11:17:32	458.0	459.22	1.21	0.17	75.09		390.5	0.1489	66.3%	4.9266
11:18:32	481.8	482.99	1.21	0.17	75.41		390.7	0.1565	67.4%	4.7778
11:19:32	504.4	505.67	1.24	0.17	75.56		390.8	0.1638	68.5%	4.6213
11:20:32	476.1	477.40	1.25	0.17	75.83		391.0	0.1545	69.6%	4.4575
11:21:32	466.5	467.79	1.32	0.17	76.09		391.2	0.1513	70.7%	4.3029
11:22:32	445.0	446.32	1.31	0.16	76.27		391.4	0.1443	71.7%	4.1516
11:23:32	441.9	443.28	1.33	0.17	76.42		391.5	0.1433	72.7%	4.0073
11:24:32	433.7	435.05	1.38	0.16	76.57		391.6	0.1406	73.7%	3.8640
11:25:32	425.0	426.50	1.47	0.16	76.68		391.7	0.1377	74.7%	3.7234
11:26:32	419.3	420.75	1.48	0.17	76.80		391.7	0.1358	75.7%	3.5857
11:27:32	376.4	377.86	1.48	0.16	76.87		391.8	0.1219	76.5%	3.4498
11:28:32	371.9	373.30	1.43	0.16	76.99		391.9	0.1204	77.4%	3.3279

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Mass (as Propane)	Cum Percent	Declining Mass
11:29:32	380.6	382.07	1.43	0.16	77.04		391.9	0.1233	78.2%	3.2075
11:30:32	352.1	353.51	1.42	0.16	77.24		392.1	0.1140	79.0%	3.0842
11:31:32	333.2	334.62	1.45	0.16	77.31		392.1	0.1078	79.8%	2.9702
11:32:32	349.2	350.71	1.48	0.16	77.38		392.2	0.1130	80.6%	2.8624
11:33:32	352.4	353.85	1.47	0.16	77.48		392.2	0.1140	81.4%	2.7494
11:34:32	330.8	332.35	1.52	0.16	77.63		392.3	0.1070	82.2%	2.6353
11:35:32	315.3	316.84	1.51	0.17	77.60		392.3	0.1020	82.9%	2.5283
11:36:32	314.5	316.04	1.53	0.16	77.71		392.4	0.1017	83.6%	2.4263
11:37:32	309.8	311.33	1.53	0.16	77.82		392.5	0.1002	84.3%	2.3246
11:38:32	277.9	279.50	1.56	0.16	77.99		392.6	0.0898	84.9%	2.2244
11:39:32	299.3	300.83	1.55	0.16	78.03		392.6	0.0967	85.6%	2.1346
11:40:32	265.9	267.49	1.62	0.16	78.10		392.7	0.0859	86.2%	2.0378
11:41:32	262.7	264.33	1.62	0.16	78.18		392.8	0.0849	86.8%	1.9519
11:42:32	248.1	249.78	1.67	0.16	78.30		392.8	0.0802	87.4%	1.8670
11:43:32	259.0	260.65	1.65	0.16	78.37		392.9	0.0837	88.0%	1.7868
11:44:32	223.1	224.77	1.65	0.16	78.36		392.9	0.0721	88.5%	1.7032
11:45:32	231.9	233.52	1.65	0.16	78.42		392.9	0.0749	89.0%	1.6311
11:46:32	235.9	237.51	1.64	0.16	78.47		393.0	0.0762	89.6%	1.5562
11:47:32	217.6	219.28	1.65	0.16	78.57		393.0	0.0703	90.0%	1.4800
11:48:32	200.2	201.82	1.61	0.16	78.63		393.1	0.0646	90.5%	1.4097
11:49:32	207.5	209.08	1.62	0.16	78.76		393.2	0.0670	91.0%	1.3451
11:50:32	193.0	194.64	1.62	0.16	78.73		393.2	0.0623	91.4%	1.2781
11:51:32	183.7	185.39	1.64	0.16	78.71		393.1	0.0593	91.8%	1.2158
11:52:32	187.9	189.55	1.67	0.16	78.67		393.1	0.0607	92.3%	1.1565
11:53:32	153.4	155.02	1.63	0.16	78.56		393.0	0.0495	92.6%	1.0958
11:54:32	161.7	163.27	1.61	0.16	78.41		392.9	0.0522	93.0%	1.0463
11:55:32	149.5	151.07	1.57	0.16	78.25		392.8	0.0483	93.3%	0.9941
11:56:32	120.4	121.95	1.59	0.17	77.86		392.5	0.0389	93.6%	0.9458
11:57:32	98.3	99.90	1.57	0.17	77.15		392.0	0.0318	93.8%	0.9069
11:58:32	83.3	84.83	1.58	0.17	76.65		391.6	0.0270	94.0%	0.8750
11:59:32	113.8	115.40	1.55	0.16	76.52		391.5	0.0369	94.3%	0.8480
12:00:32	107.9	109.54	1.60	0.16	76.56		391.6	0.0350	94.5%	0.8111
12:01:32	87.6	89.16	1.61	0.16	76.17		391.3	0.0284	94.7%	0.7762
12:02:32	86.4	88.00	1.58	0.17	75.83		391.0	0.0281	94.9%	0.7478
12:03:32	84.6	86.22	1.59	0.17	75.65		390.9	0.0275	95.1%	0.7197
12:04:32	95.5	97.05	1.56	0.17	75.43		390.7	0.0310	95.3%	0.6922
12:05:32	78.2	79.79	1.58	0.17	75.18		390.6	0.0254	95.5%	0.6612
12:06:32	82.9	84.53	1.59	0.17	74.98		390.4	0.0270	95.7%	0.6358
12:07:32	76.7	78.34	1.59	0.17	74.76		390.3	0.0250	95.9%	0.6088
12:08:32	83.1	84.64	1.57	0.16	74.62		390.2	0.0270	96.1%	0.5839
12:09:32	62.9	64.45	1.60	0.17	74.34		389.9	0.0205	96.2%	0.5568
12:10:32	58.1	59.64	1.57	0.17	74.13		389.8	0.0189	96.3%	0.5364
12:11:32	76.7	78.29	1.54	0.16	73.82		389.6	0.0250	96.5%	0.5175
12:12:32	69.1	70.67	1.54	0.16	73.71		389.5	0.0225	96.7%	0.4925
12:13:32	56.7	58.28	1.56	0.16	73.64		389.4	0.0185	96.8%	0.4699
12:14:32	57.2	58.80	1.59	0.17	73.50		389.3	0.0186	96.9%	0.4515
12:15:32	57.1	58.64	1.56	0.17	73.35		389.2	0.0186	97.1%	0.4328
12:16:32	52.7	54.27	1.54	0.16	73.12		389.1	0.0172	97.2%	0.4142
12:17:32	51.4	52.89	1.51	0.17	72.98		389.0	0.0168	97.3%	0.3970
12:18:32	50.7	52.21	1.52	0.16	72.97		388.9	0.0165	97.4%	0.3802
12:19:32	46.8	48.29	1.50	0.17	72.91		388.9	0.0153	97.5%	0.3637
12:20:32	46.1	47.59	1.48	0.16	72.77		388.8	0.0151	97.6%	0.3484
12:21:32	43.4	44.95	1.53	0.16	72.63		388.7	0.0142	97.7%	0.3334
12:22:32	45.6	47.13	1.53	0.16	72.62		388.7	0.0149	97.9%	0.3192
12:23:32	41.7	43.23	1.53	0.16	72.62		388.7	0.0136	97.9%	0.3043
12:24:32	40.5	41.98	1.52	0.16	72.58		388.7	0.0132	98.0%	0.2907
12:25:32	38.5	40.03	1.51	0.16	72.56		388.6	0.0126	98.1%	0.2775
12:26:32	36.3	37.75	1.49	0.16	72.53		388.6	0.0118	98.2%	0.2649

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Molar Volume	Mass (as Propane)	Cum Percent	Declining Mass
12:27:32	32.4	33.92	1.50	0.16	72.23			388.4	0.0106	98.3%	0.2530
12:28:32	32.4	33.91	1.50	0.16	72.13			388.3	0.0106	98.4%	0.2425
12:29:32	32.7	34.18	1.48	0.16	72.18			388.4	0.0107	98.4%	0.2319
12:30:32	30.9	32.41	1.46	0.16	72.13			388.3	0.0101	98.5%	0.2212
12:31:32	29.1	30.57	1.45	0.16	72.14			388.3	0.0095	98.6%	0.2111
12:32:32	27.8	29.26	1.43	0.16	72.04			388.3	0.0091	98.6%	0.2015
12:33:32	26.9	28.37	1.43	0.16	72.00			388.2	0.0088	98.7%	0.1924
12:34:32	24.5	25.86	1.41	0.16	71.94			388.2	0.0080	98.8%	0.1836
12:35:32	25.5	26.96	1.43	0.16	72.02			388.2	0.0083	98.8%	0.1756
12:36:32	27.9	29.34	1.46	0.16	71.56			387.9	0.0091	98.9%	0.1673
12:37:32	31.5	32.94	1.43	0.16	71.74			388.0	0.0103	99.0%	0.1582
12:38:32	29.4	30.77	1.41	0.16	71.88			388.1	0.0096	99.0%	0.1479
12:39:32	29.0	30.47	1.42	0.16	71.73			388.0	0.0095	99.1%	0.1383
12:40:32	27.4	28.87	1.44	0.16	71.64			388.0	0.0090	99.2%	0.1288
12:41:32	23.0	24.68	1.63	0.16	71.46			387.8	0.0075	99.2%	0.1198
12:42:32	20.6	22.64	2.02	0.16	71.32			387.7	0.0067	99.3%	0.1122
12:43:32	19.0	21.17	2.20	0.16	71.02			387.5	0.0062	99.3%	0.1055
12:44:32	17.7	19.91	2.26	0.16	70.87			387.4	0.0058	99.3%	0.0993
12:45:32	17.0	19.20	2.24	0.16	70.68			387.3	0.0056	99.4%	0.0935
12:46:32	16.1	18.27	2.19	0.16	70.69			387.3	0.0053	99.4%	0.0879
12:47:32	15.4	17.54	2.16	0.16	70.61			387.2	0.0050	99.5%	0.0827
12:48:32	15.1	17.21	2.16	0.16	70.47			387.1	0.0049	99.5%	0.0776
12:49:32	14.3	16.46	2.17	0.16	70.47			387.1	0.0047	99.5%	0.0727
12:50:32	13.3	15.57	2.22	0.16	70.50			387.1	0.0044	99.6%	0.0680
12:51:32	13.7	15.95	2.28	0.16	70.44			387.1	0.0045	99.6%	0.0636
12:52:32	12.2	14.56	2.35	0.16	70.17			386.9	0.0040	99.6%	0.0592
12:53:32	11.4	13.86	2.44	0.16	70.13			386.9	0.0037	99.6%	0.0551
12:54:32	10.7	13.26	2.56	0.16	70.12			386.9	0.0035	99.7%	0.0514
12:55:32	11.0	13.53	2.57	0.16	70.07			386.8	0.0036	99.7%	0.0479
12:56:32	9.8	12.36	2.54	0.16	69.80			386.6	0.0032	99.7%	0.0443
12:57:32	9.4	11.94	2.51	0.16	69.32			386.3	0.0031	99.7%	0.0411
12:58:32	8.8	11.36	2.52	0.16	69.11			386.1	0.0029	99.8%	0.0380
12:59:32	7.9	10.37	2.45	0.16	69.10			386.1	0.0026	99.8%	0.0351
13:00:32	7.8	10.16	2.38	0.16	69.18			386.2	0.0026	99.8%	0.0325
13:01:32	7.3	9.60	2.26	0.16	69.21			386.2	0.0024	99.8%	0.0299
13:02:32	7.1	9.27	2.20	0.16	69.14			386.2	0.0023	99.8%	0.0275
13:03:32	7.1	9.27	2.13	0.16	69.04			386.1	0.0023	99.8%	0.0252
13:04:32	6.8	8.91	2.10	0.16	68.98			386.0	0.0022	99.9%	0.0228
13:05:32	6.1	8.18	2.11	0.16	69.02			386.1	0.0020	99.9%	0.0206
13:06:32	6.0	8.14	2.12	0.16	69.08			386.1	0.0020	99.9%	0.0186
13:07:32	5.7	7.80	2.08	0.16	68.95			386.0	0.0019	99.9%	0.0166
13:08:32	6.0	7.95	1.99	0.16	68.74			385.9	0.0020	99.9%	0.0147
13:09:32	5.3	7.17	1.87	0.16	68.75			385.9	0.0017	99.9%	0.0128
13:10:32	5.3	7.12	1.83	0.16	68.56			385.7	0.0017	99.9%	0.0110
13:11:32	6.6	8.33	1.76	0.17	68.35			385.6	0.0022	99.9%	0.0093
13:12:32	5.9	7.64	1.74	0.16	68.44			385.6	0.0019	100.0%	0.0071
13:13:32	5.2	7.01	1.80	0.16	68.48			385.7	0.0017	100.0%	0.0052
13:14:32	4.8	6.65	1.87	0.17	68.52			385.7	0.0016	100.0%	0.0035
13:15:32	4.0	5.92	1.88	0.17	67.59			385.0	0.0013	100.0%	0.0019
13:16:32	1.7	4.86	3.15	0.17	65.52		End Test	383.5	0.0006	100.0%	0.0006
2:45:00	262.28	263.96	1.69	0.17	73.42				14.1680		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Molar Volume	Mass	Cum Mass	Cum Percent	Declining Mass
14:55:44	0.6	1.7	1.1	0.17	72.7	183.2	Start Run	388.8	0.00018	0.00018	0.0%	5.8308
14:56:44	5.2	6.4	1.1	0.16	73.5			389.3	0.001703	0.001883	0.0%	5.8307
14:57:44	64.2	65.3	1.1	0.16	74.3	179.2		389.9	0.020884	0.022767	0.4%	5.8290
14:58:44	112.6	113.8	1.2	0.16	74.7	173.2		390.2	0.036631	0.059398	1.0%	5.8081
14:59:44	149.6	150.8	1.1	0.17	74.7	167.4		390.2	0.048662	0.108061	1.9%	5.7714
15:00:44	156.9	158.1	1.2	0.16	74.5	166.0		390.1	0.051044	0.159104	2.7%	5.7228
15:01:44	158.1	159.2	1.1	0.16	74.8	164.2		390.3	0.051405	0.210509	3.6%	5.6717
15:02:44	152.9	154.1	1.2	0.17	74.9	162.4		390.4	0.049705	0.260214	4.5%	5.6203
15:03:44	171.5	172.7	1.1	0.16	75.3	161.0		390.6	0.055723	0.315937	5.5%	5.5706
15:05:19	167.6	168.8	1.1	0.16	75.4	160.6		390.7	0.054448	0.370385	6.4%	5.5149
15:05:49	155.3	156.4	1.1	0.16	75.5	160.0	Roll out	390.8	0.050415	0.4208	7.3%	5.4605
15:06:44	141.2	142.3	1.2	0.16	75.6			390.9	0.045836	0.466636	8.1%	5.4100
15:07:44	132.2	133.3	1.1	0.16	75.7			390.9	0.04291	0.509546	8.8%	5.3642
15:08:44	126.9	128.0	1.1	0.16	75.9			391.1	0.041177	0.550723	9.5%	5.3213
15:09:44	122.9	124.0	1.1	0.16	75.9			391.1	0.039888	0.590611	10.2%	5.2801
15:10:44	121.1	122.2	1.1	0.17	76.0		Resin Appl	391.2	0.039275	0.629886	10.9%	5.2402
15:11:44	155.6	156.6	1.1	0.17	76.3	158.4		391.4	0.050438	0.680324	11.7%	5.2010
15:12:44	176.6	177.7	1.1	0.16	76.4	153.8		391.4	0.057249	0.737573	12.7%	5.1505
15:13:44	214.3	215.3	1.0	0.16	76.4	150.2		391.5	0.069461	0.807034	13.9%	5.0933
15:14:44	261.7	262.8	1.1	0.16	76.5	144.8		391.6	0.084811	0.891845	15.4%	5.0238
15:15:44	260.3	261.3	1.1	0.16	76.6	140.2	Roll out - skin coat done	391.6	0.084332	0.976177	16.8%	4.9390
15:16:44	242.2	243.2	1.1	0.17	76.5			391.5	0.07849	1.054667	18.2%	4.8547
15:17:44	204.7	205.7	1.1	0.17	76.6			391.6	0.066315	1.120982	19.3%	4.7762
15:18:44	204.1	205.2	1.1	0.16	76.5			391.5	0.066142	1.187124	20.5%	4.7099
15:19:44	193.0	194.1	1.1	0.17	76.5			391.6	0.06256	1.249684	21.6%	4.6437
15:20:44	176.3	177.3	1.0	0.16	76.6			391.6	0.057118	1.306802	22.6%	4.5812
15:21:44	162.4	163.4	1.0	0.17	76.5			391.6	0.05263	1.359433	23.5%	4.5240
15:22:44	156.6	157.7	1.1	0.16	76.7			391.7	0.050734	1.410167	24.3%	4.4714
15:23:44	146.6	147.7	1.1	0.17	76.4			391.5	0.047509	1.457676	25.2%	4.4207
15:24:44	135.0	136.2	1.2	0.17	76.4			391.4	0.043759	1.501434	25.9%	4.3732
15:25:44	136.5	137.7	1.2	0.17	76.6			391.6	0.044221	1.545656	26.7%	4.3294
15:26:44	128.6	129.8	1.2	0.17	76.6			391.6	0.041656	1.587312	27.4%	4.2852
15:27:44	126.4	127.6	1.2	0.17	76.7			391.7	0.040948	1.628261	28.1%	4.2435
15:28:44	117.0	118.3	1.2	0.17	76.8			391.8	0.037908	1.666168	28.8%	4.2026
15:29:44	118.9	120.1	1.3	0.17	76.9		Resin Appl - 2nd layers	391.8	0.038497	1.704665	29.4%	4.1647
15:30:44	180.8	182.0	1.2	0.17	77.2	134.4		392.0	0.058522	1.763187	30.4%	4.1262
15:31:44	218.7	219.9	1.2	0.17	77.3	131.4		392.1	0.070781	1.833969	31.7%	4.0677
15:32:44	257.6	258.8	1.2	0.17	77.6	126.4		392.3	0.083333	1.917301	33.1%	3.9969
15:33:44	279.5	280.6	1.1	0.17	77.9	122.0		392.5	0.090359	2.007661	34.7%	3.9135
15:34:44	291.2	292.3	1.1	0.17	78.0	116.2		392.6	0.094126	2.101786	36.3%	3.8232
15:35:44	277.9	279.0	1.1	0.17	77.9	112.2		392.6	0.089846	2.191632	37.8%	3.7291
15:36:44	278.6	279.7	1.1	0.17	77.9	111.8		392.6	0.09006	2.281692	39.4%	3.6392
15:37:44	271.8	272.9	1.1	0.16	77.9	109.0		392.5	0.087879	2.369572	40.9%	3.5492
15:38:44	302.3	303.4	1.1	0.16	78.0	104.4		392.6	0.097696	2.467268	42.6%	3.4613
15:39:44	297.2	298.4	1.1	0.16	78.1	103.0		392.7	0.096052	2.56332	44.2%	3.3636
15:40:44	305.7	306.8	1.1	0.16	78.2	99.6		392.8	0.098756	2.662076	45.9%	3.2675
15:41:44	283.8	285.0	1.2	0.17	78.3	98.8		392.8	0.091671	2.753747	47.5%	3.1688
15:42:44	265.9	267.0	1.2	0.17	78.5	98.4		393.0	0.085852	2.839599	49.0%	3.0771
15:43:44	263.6	264.8	1.2	0.17	78.6	97.0		393.0	0.085113	2.924712	50.5%	2.9912
15:44:44	257.5	258.7	1.2	0.17	78.6		Drum and glass repair - d	393.0	0.083148	3.00786	51.9%	2.9061
15:45:44	251.7	252.9	1.2	0.17	78.6			393.1	0.081267	3.089128	53.3%	2.8230
15:46:44	235.3	236.6	1.3	0.17	78.8			393.2	0.075944	3.165071	54.6%	2.7417
15:47:44	260.7	262.1	1.3	0.17	78.6			393.1	0.08417	3.249241	56.1%	2.6658
15:48:44	303.8	305.1	1.3	0.17	78.7			393.1	0.09807	3.34731	57.8%	2.5816
15:49:44	305.7	307.0	1.3	0.17	78.5			393.0	0.098707	3.446018	59.5%	2.4835
15:50:44	302.4	303.6	1.3	0.17	78.3			392.9	0.097662	3.54368	61.2%	2.3848
15:51:44	306.3	307.5	1.3	0.17	78.4			392.9	0.098905	3.642585	62.9%	2.2872
15:52:44	277.6	278.9	1.3	0.16	78.3			392.9	0.08968	3.732265	64.4%	2.1883

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Molar Volume	Mass	Cum Mass	Cum Percent	Declining Mass
15:53:44	310.8	312.0	1.3	0.17	78.4			392.9	0.100367	3.832632	66.2%	2.0986
15:54:44	309.3	310.6	1.3	0.16	78.3			392.8	0.099918	3.93255	67.9%	1.9982
15:55:44	306.8	308.0	1.3	0.16	78.1			392.7	0.099123	4.031673	69.6%	1.8983
15:56:44	305.1	306.3	1.2	0.16	78.1			392.7	0.09859	4.130263	71.3%	1.7992
15:57:44	360.6	361.9	1.2	0.17	78.0	50.4		392.6	0.116555	4.246819	73.3%	1.7006
15:58:44	354.1	355.3	1.2	0.16	77.9	47.2	Resin Appl Completed	392.5	0.11447	4.361289	75.3%	1.5840
15:59:44	283.5	284.7	1.2	0.16	77.7			392.4	0.09168	4.452969	76.9%	1.4696
16:00:44	261.8	263.0	1.2	0.17	77.7			392.4	0.084662	4.537631	78.3%	1.3779
16:01:44	240.9	242.2	1.3	0.17	77.6			392.3	0.07792	4.615551	79.7%	1.2932
16:02:44	235.9	237.2	1.3	0.17	77.5			392.3	0.076318	4.691868	81.0%	1.2153
16:03:44	209.8	211.2	1.3	0.16	77.4			392.2	0.067891	4.759759	82.2%	1.1390
16:04:44	189.9	191.2	1.4	0.16	77.3			392.1	0.061445	4.821204	83.2%	1.0711
16:05:44	189.3	190.7	1.3	0.17	77.2			392.0	0.061289	4.882493	84.3%	1.0096
16:06:44	178.1	179.5	1.4	0.17	77.1			392.0	0.057658	4.940151	85.3%	0.9484
16:07:44	165.0	166.5	1.5	0.17	76.9			391.8	0.053444	4.993595	86.2%	0.8907
16:08:44	157.8	159.2	1.4	0.16	76.7			391.7	0.05111	5.044705	87.1%	0.8373
16:09:44	160.2	161.6	1.4	0.16	76.8			391.7	0.051897	5.096602	88.0%	0.7861
16:10:44	146.4	147.7	1.3	0.17	76.8			391.7	0.04742	5.144022	88.8%	0.7342
16:11:44	116.0	117.3	1.4	0.17	76.7			391.7	0.037575	5.181597	89.4%	0.6868
16:12:44	116.5	117.8	1.3	0.16	76.6			391.6	0.037759	5.219357	90.1%	0.6493
16:13:44	119.6	120.9	1.3	0.17	76.5			391.5	0.038768	5.258125	90.8%	0.6115
16:14:44	118.5	119.8	1.3	0.16	76.5			391.5	0.038424	5.296549	91.4%	0.5727
16:15:44	116.9	118.2	1.3	0.16	76.5			391.5	0.037883	5.334432	92.1%	0.5343
16:16:44	107.3	108.6	1.3	0.16	76.5			391.5	0.034786	5.369217	92.7%	0.4964
16:17:44	103.5	104.8	1.3	0.16	76.6			391.6	0.033547	5.402764	93.3%	0.4616
16:18:44	98.8	100.1	1.3	0.17	76.6			391.6	0.03203	5.434794	93.8%	0.4281
16:19:44	91.2	92.4	1.3	0.17	76.6			391.6	0.029548	5.464342	94.3%	0.3961
16:20:44	85.0	86.3	1.2	0.16	76.4			391.5	0.027561	5.491903	94.8%	0.3665
16:21:44	80.0	81.3	1.3	0.10	76.3			391.4	0.025951	5.517854	95.2%	0.3389
16:22:44	76.4	77.6	1.2	0.11	76.2			391.3	0.024764	5.542618	95.7%	0.3130
16:23:44	73.6	74.8	1.2	0.16	76.3			391.4	0.023853	5.566471	96.1%	0.2882
16:24:44	71.2	72.5	1.2	0.16	76.4			391.5	0.023085	5.589557	96.5%	0.2644
16:25:44	66.2	67.5	1.2	0.16	76.4			391.5	0.021475	5.611032	96.9%	0.2413
16:26:44	62.6	63.8	1.2	0.16	76.4			391.5	0.020295	5.631327	97.2%	0.2198
16:27:44	59.7	60.9	1.2	0.16	76.4			391.5	0.019349	5.650676	97.5%	0.1995
16:28:44	56.2	57.4	1.2	0.16	76.4			391.5	0.018231	5.668907	97.9%	0.1802
16:29:44	52.9	54.0	1.2	0.16	76.4			391.5	0.017139	5.686046	98.1%	0.1619
16:30:44	47.9	49.1	1.2	0.16	76.4			391.4	0.015534	5.70158	98.4%	0.1448
16:31:44	43.4	44.6	1.2	0.16	76.4			391.5	0.014064	5.715644	98.7%	0.1293
16:32:44	39.3	40.5	1.2	0.16	76.4			391.4	0.012741	5.728385	98.9%	0.1152
16:33:44	35.7	36.8	1.1	0.16	76.1			391.3	0.011574	5.739959	99.1%	0.1025
16:34:44	31.4	32.5	1.1	0.16	76.0			391.2	0.010179	5.750138	99.3%	0.0909
16:35:44	28.6	29.8	1.1	0.16	75.8			391.0	0.009293	5.759431	99.4%	0.0807
16:36:44	25.7	26.8	1.1	0.16	75.7			391.0	0.008337	5.767767	99.6%	0.0714
16:37:44	23.4	24.5	1.2	0.16	75.7			390.9	0.007588	5.775355	99.7%	0.0631
16:38:44	20.2	21.3	1.1	0.16	75.5			390.8	0.006553	5.781908	99.8%	0.0555
16:39:44	17.7	18.8	1.2	0.15	75.4			390.7	0.005744	5.787652	99.9%	0.0489
16:40:44	15.8	16.9	1.1	0.15	75.3			390.7	0.005137	5.792788	100.0%	0.0432
16:41:44	13.7	14.8	1.1	0.15	75.2			390.6	0.004455	5.797243	100.1%	0.0381
16:42:44	12.6	13.7	1.1	0.15	75.1			390.5	0.004081	5.801324	100.1%	0.0336
16:43:44	11.0	12.2	1.1	0.15	74.9			390.3	0.003589	5.804913	100.2%	0.0295
16:44:44	9.4	10.5	1.1	0.15	74.8			390.3	0.00307	5.807983	100.3%	0.0259
16:45:44	8.9	9.9	1.1	0.15	74.6			390.1	0.002882	5.810865	100.3%	0.0229
16:46:44	7.9	9.0	1.0	0.15	74.5			390.0	0.002582	5.813447	100.3%	0.0200
16:47:44	7.1	8.1	1.0	0.15	74.3			389.9	0.002321	5.815768	100.4%	0.0174
16:48:44	6.4	7.4	1.0	0.15	74.1			389.8	0.002083	5.817851	100.4%	0.0151
16:49:44	5.7	6.7	1.0	0.15	73.9			389.6	0.001857	5.819708	100.5%	0.0130
16:50:44	5.0	6.0	1.0	0.15	73.7			389.5	0.001617	5.821325	100.5%	0.011

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)
16:51:44	4.6	5.6	1.0	0.15	73.6	
16:52:44	4.1	5.1	1.0	0.15	73.4	
16:53:44	4.1	5.1	0.9	0.14	73.2	
16:54:44	4.1	5.0	1.0	0.15	73.1	
16:55:44	3.1	4.0	0.9	0.15	73.0	
16:56:44	3.1	4.0	1.0	0.14	72.8	
16:57:44	3.1	4.0	1.0	0.14	72.7	
16:58:44	3.1	4.0	1.0	0.14	72.6	End Run

Molar Volume	Mass	Cum Mass	Cum Percent	Declining Mass
389.4	0.001492	5.822817	100.5%	0.0095
389.3	0.001344	5.824161	100.5%	0.0080
389.1	0.001351	5.825511	100.6%	0.0067
389.1	0.001328	5.82684	100.6%	0.0053
389.0	0.001013	5.827853	100.6%	0.0040
388.8	0.000997	5.828849	100.6%	0.0030
388.8	0.000997	5.829846	100.6%	0.0020
388.7	0.001002	5.830848	100.6%	0.0010

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Flow (cfm)	Molar Volume	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
9:20:52	30.84	30.72	-0.12	0.133	61.6	363.6	Start Test	2561	380.6	0.0091	0.0090	0.0%	19.796
9:21:52	154.23	154.05	-0.18	0.132	61.8	355.4		2556	380.8	0.0456	0.0451	0.3%	19.787
9:22:52	216.80	216.58	-0.22	0.130	61.7	349.4		2534	380.7	0.0635	0.0629	0.6%	19.741
9:23:52	274.92	274.75	-0.17	0.130	61.6	345.2		2534	380.7	0.0805	0.0797	1.0%	19.678
9:24:57	254.64	254.45	-0.20	0.132	61.9	340.4		2553	380.8	0.0751	0.0744	1.4%	19.597
9:25:52	356.24	355.98	-0.26	0.131	62.4	335.4		2543	381.3	0.1045	0.1035	1.9%	19.522
9:26:52	295.97	295.77	-0.19	0.132	62.6	330.6		2553	381.3	0.0872	0.0863	2.4%	19.417
9:27:52	199.85	199.75	-0.10	0.139	62.3	330.6		2619	381.2	0.0604	0.0598	2.7%	19.330
9:28:52	182.38	182.29	-0.09	0.131	62.4	330.6		2540	381.2	0.0535	0.0529	2.9%	19.270
9:29:52	232.80	232.70	-0.10	0.130	62.6	329.2		2533	381.3	0.0680	0.0674	3.3%	19.216
9:30:52	331.95	331.85	-0.10	0.130	62.8	323.2		2531	381.5	0.0969	0.0960	3.8%	19.148
9:31:52	308.47	308.34	-0.13	0.133	62.5	316.4		2560	381.3	0.0911	0.0902	4.2%	19.051
9:32:52	303.72	303.55	-0.17	0.129	62.4	312.8		2528	381.3	0.0886	0.0877	4.7%	18.960
9:33:52	272.21	271.97	-0.24	0.132	62.5	312.8		2557	381.3	0.0803	0.0795	5.1%	18.872
9:34:52	374.83	374.52	-0.31	0.130	62.9	309.4		2533	381.6	0.1095	0.1084	5.6%	18.791
9:35:52	442.57	442.32	-0.25	0.129	63.2	302.8		2521	381.8	0.1286	0.1273	6.3%	18.682
9:36:52	393.75	393.57	-0.18	0.129	63.2	298.4		2527	381.8	0.1147	0.1135	6.9%	18.553
9:37:52	280.68	280.53	-0.14	0.129	63.3	298.4		2528	381.9	0.0818	0.0810	7.3%	18.439
9:38:52	297.68	297.57	-0.11	0.130	63.4	298.4		2534	382.0	0.0869	0.0860	7.7%	18.357
9:39:52	307.96	307.92	-0.05	0.131	63.4	295.6		2539	381.9	0.0901	0.0892	8.2%	18.270
9:40:52	421.93	421.88	-0.05	0.129	63.4	290.6		2520	381.9	0.1225	0.1213	8.8%	18.180
9:41:52	402.87	402.82	-0.04	0.126	63.4	284.0		2497	381.9	0.1159	0.1148	9.4%	18.057
9:42:52	452.12	452.05	-0.07	0.126	63.4	279.6		2496	381.9	0.1300	0.1287	10.0%	17.942
9:43:52	337.99	338.03	0.04	0.127	62.9	277.4		2509	381.6	0.0978	0.0968	10.5%	17.812
9:44:52	326.03	326.07	0.04	0.127	62.7	277.4		2506	381.5	0.0942	0.0933	11.0%	17.714
9:45:52	381.70	381.62	-0.07	0.127	62.9	272.8		2502	381.6	0.1101	0.1090	11.5%	17.620
9:46:52	275.49	275.42	-0.07	0.127	62.8	272.8		2501	381.5	0.0795	0.0787	12.0%	17.509
9:47:52	250.38	250.30	-0.09	0.126	62.7	272.8		2497	381.4	0.0721	0.0714	12.3%	17.430
9:48:52	243.09	242.98	-0.11	0.124	62.5	272.8		2478	381.3	0.0695	0.0688	12.7%	17.358
9:49:52	214.65	214.62	-0.03	0.125	62.6	272.8		2487	381.3	0.0616	0.0610	13.0%	17.288
9:50:52	232.33	232.33	0.00	0.126	62.6	272.8		2495	381.3	0.0669	0.0662	13.3%	17.227
9:51:52	182.67	182.60	-0.06	0.125	62.2	272.8		2489	381.0	0.0525	0.0520	13.6%	17.160
9:52:52	216.56	216.44	-0.11	0.124	62.3	272.8		2476	381.1	0.0619	0.0613	13.9%	17.107
9:53:52	179.07	178.93	-0.13	0.126	62.5	272.8		2494	381.3	0.0515	0.0510	14.2%	17.045
9:54:52	109.49	109.36	-0.13	0.130	60.8	272.8		2529	380.1	0.0321	0.0317	14.3%	16.994
9:55:52	107.15	107.11	-0.04	0.129	59.4	272.8		2527	379.0	0.0314	0.0311	14.5%	16.962
9:56:52	115.95	115.92	-0.03	0.126	60.0	272.8		2491	379.4	0.0335	0.0332	14.6%	16.930
9:57:52	104.70	104.63	-0.07	0.124	61.4	272.8		2472	380.5	0.0299	0.0296	14.8%	16.897
9:58:52	101.52	101.49	-0.03	0.125	62.4	273.0		2485	381.2	0.0291	0.0288	14.9%	16.867
9:59:52	123.40	123.35	-0.05	0.126	62.8	270.2		2495	381.5	0.0355	0.0352	15.1%	16.838
10:00:52	118.68	118.67	-0.01	0.125	62.7	264.6		2488	381.5	0.0341	0.0337	15.3%	16.802
10:01:52	195.45	195.48	0.03	0.124	62.8	257.8		2480	381.5	0.0559	0.0553	15.6%	16.768
10:02:52	302.20	302.19	-0.01	0.125	63.2	251.4		2484	381.8	0.0865	0.0857	16.0%	16.712
10:03:52	360.56	360.52	-0.04	0.124	63.3	244.6		2474	381.9	0.1028	0.1018	16.5%	16.626
10:04:52	458.16	458.08	-0.08	0.125	63.3	244.6		2483	381.8	0.1311	0.1298	17.2%	16.523
10:05:52	485.19	485.06	-0.13	0.124	63.1	244.6		2476	381.7	0.1385	0.1371	17.9%	16.392
10:06:52	387.68	387.55	-0.13	0.125	63.2	244.6		2483	381.8	0.1109	0.1098	18.5%	16.254
10:07:52	321.05	320.90	-0.15	0.123	63.3	244.6		2468	381.9	0.0913	0.0904	18.9%	16.143
10:08:52	347.99	347.87	-0.12	0.125	63.4	237.4		2482	381.9	0.0995	0.0985	19.4%	16.051
10:09:52	457.42	457.30	-0.11	0.124	63.6	232.6		2470	382.1	0.1301	0.1288	20.1%	15.952
10:10:52	491.98	491.84	-0.14	0.123	63.5	227.6		2463	382.0	0.1396	0.1382	20.8%	15.822
10:11:52	513.95	513.79	-0.17	0.123	63.5	227.6		2462	382.0	0.1458	0.1443	21.5%	15.682
10:12:52	404.24	404.11	-0.13	0.125	63.4	227.6		2487	382.0	0.1158	0.1147	22.1%	15.536
10:13:52	350.11	350.03	-0.08	0.124	63.4	227.6		2476	382.0	0.0999	0.0989	22.6%	15.421
10:14:52	297.15	297.04	-0.12	0.124	63.4	226.8		2474	381.9	0.0847	0.0839	23.0%	15.321
10:15:52	299.78	299.60	-0.18	0.123	63.3	226.8		2460	381.9	0.0850	0.0841	23.5%	15.236
10:16:52	268.10	267.89	-0.21	0.125	63.3	226.8		2484	381.9	0.0767	0.0760	23.9%	15.151
10:17:52	239.65	239.41	-0.23	0.127	63.3	225.2		2501	381.9	0.0691	0.0684	24.2%	15.074
10:18:52	245.89	245.66	-0.23	0.123	63.4	223.2		2470	381.9	0.0700	0.0693	24.6%	15.005
10:19:52	303.45	303.30	-0.16	0.125	63.3	221.6		2486	381.9	0.0869	0.0861	25.0%	14.935
10:20:52	354.69	354.62	-0.07	0.125	63.4	215.6		2486	382.0	0.1016	0.1006	25.5%	14.848
10:21:52	472.34	472.27	-0.07	0.121	63.7	214.8		2449	382.2	0.1332	0.1319	26.2%	14.747
10:22:52	387.68	387.60	-0.08	0.123	63.7	214.8		2469	382.2	0.1102	0.1091	26.7%	14.614
10:23:52	340.71	340.64	-0.07	0.120	63.7	214.8		2439	382.2	0.0957	0.0947	27.2%	14.503
10:24:52	298.00	297.93	-0.08	0.124	63.8	209.8		2479	382.2	0.0850	0.0842	27.6%	14.408
10:25:52	408.58	408.51	-0.07	0.123	63.7	205.2		2463	382.2	0.1158	0.1147	28.2%	14.323
10:26:52	477.50	477.43	-0.07	0.123	63.7	200.2		2464	382.2	0.1355	0.1341	28.9%	14.207

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Flow (cfm)	Molar Volume	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
10:27:52	440.67	440.55	-0.11	0.122	63.8	200.2		2455	382.3	0.1245	0.1233	29.5%	14.071
10:28:52	351.47	351.36	-0.12	0.123	63.9	200.0		2468	382.3	0.0998	0.0989	30.1%	13.947
10:29:52	322.76	322.61	-0.15	0.124	64.0	199.4		2470	382.4	0.0917	0.0908	30.5%	13.847
10:30:52	330.80	330.68	-0.13	0.123	64.2	193.4	Skin Coat Done	2463	382.5	0.0937	0.0928	31.0%	13.755
10:31:52	391.88	391.69	-0.19	0.121	64.3		170.2	2446	382.6	0.1102	0.1091	31.5%	13.662
10:32:52	317.88	317.81	-0.08	0.124	64.2			2470	382.5	0.0903	0.0894	32.0%	13.551
10:33:52	259.54	259.39	-0.15	0.125	63.7			2487	382.2	0.0743	0.0736	32.4%	13.461
10:34:52	223.15	223.07	-0.08	0.123	63.5			2467	382.0	0.0634	0.0628	32.7%	13.387
10:35:52	239.67	239.51	-0.16	0.120	63.0			2437	381.6	0.0674	0.0667	33.0%	13.323
10:36:52	262.56	262.47	-0.09	0.125	62.9			2480	381.6	0.0751	0.0744	33.4%	13.256
10:37:52	254.59	254.53	-0.06	0.123	63.4			2466	381.9	0.0723	0.0716	33.8%	13.181
10:38:52	233.79	233.77	-0.02	0.123	63.8			2468	382.2	0.0664	0.0658	34.1%	13.109
10:39:52	231.71	231.66	-0.04	0.125	64.1			2488	382.5	0.0663	0.0657	34.5%	13.042
10:40:52	216.69	216.64	-0.04	0.122	64.3			2460	382.6	0.0613	0.0607	34.8%	12.976
10:41:52	172.58	172.51	-0.07	0.121	64.3			2446	382.6	0.0485	0.0481	35.0%	12.915
10:42:52	149.65	149.61	-0.04	0.123	64.3			2468	382.6	0.0425	0.0421	35.2%	12.866
10:43:52	164.12	164.07	-0.04	0.122	64.5			2454	382.8	0.0463	0.0459	35.5%	12.824
10:44:52	180.25	180.19	-0.06	0.124	64.6			2470	382.8	0.0512	0.0507	35.7%	12.777
10:45:52	176.05	176.08	0.03	0.124	64.8			2476	383.0	0.0501	0.0496	36.0%	12.726
10:46:52	142.94	142.98	0.04	0.122	64.9			2455	383.0	0.0403	0.0399	36.2%	12.676
10:47:52	159.75	159.79	0.03	0.126	65.2			2491	383.3	0.0457	0.0452	36.4%	12.636
10:48:52	157.54	157.52	-0.02	0.122	65.4			2459	383.4	0.0445	0.0440	36.6%	12.590
10:49:52	137.17	137.10	-0.06	0.124	65.4			2472	383.4	0.0389	0.0385	36.8%	12.546
10:50:52	123.72	123.66	-0.06	0.122	65.5			2455	383.5	0.0349	0.0345	37.0%	12.507
10:51:52	127.23	127.20	-0.03	0.126	65.5			2497	383.5	0.0365	0.0361	37.2%	12.472
10:52:52	111.69	111.65	-0.05	0.125	65.3			2485	383.4	0.0319	0.0315	37.3%	12.435
10:53:52	107.96	107.90	-0.06	0.125	65.3			2483	383.3	0.0308	0.0305	37.5%	12.404
10:54:52	111.57	111.50	-0.07	0.126	65.3			2496	383.3	0.0320	0.0316	37.7%	12.373
10:55:52	118.36	118.31	-0.05	0.124	65.5			2473	383.5	0.0336	0.0333	37.8%	12.341
10:56:52	111.65	111.65	-0.01	0.126	65.7			2497	383.6	0.0320	0.0317	38.0%	12.307
10:57:52	112.23	112.24	0.01	0.126	65.8			2495	383.7	0.0321	0.0318	38.2%	12.275
10:58:52	102.58	102.60	0.02	0.136	65.8			2590	383.7	0.0305	0.0302	38.3%	12.243
10:59:52	107.36	107.39	0.02	0.133	65.8			2562	383.7	0.0315	0.0312	38.5%	12.213
11:00:52	95.50	95.51	0.01	0.124	65.8			2474	383.7	0.0271	0.0268	38.6%	12.181
11:01:52	92.87	92.87	0.01	0.128	65.7			2513	383.6	0.0268	0.0265	38.7%	12.154
11:02:52	95.43	95.42	-0.01	0.128	65.7			2510	383.6	0.0275	0.0272	38.9%	12.127
11:03:52	92.93	92.89	-0.04	0.128	65.6			2515	383.6	0.0268	0.0265	39.0%	12.100
11:04:52	91.09	91.02	-0.07	0.128	65.8			2509	383.7	0.0262	0.0260	39.1%	12.073
11:05:52	91.05	90.94	-0.11	0.129	65.9			2525	383.8	0.0263	0.0261	39.3%	12.047
11:06:52	89.61	89.52	-0.09	0.128	66.1			2512	383.9	0.0258	0.0255	39.4%	12.020
11:07:52	84.03	84.01	-0.02	0.128	66.1			2517	383.9	0.0242	0.0240	39.5%	11.995
11:08:52	84.73	84.71	-0.02	0.128	66.2			2516	384.0	0.0244	0.0242	39.7%	11.970
11:09:52	84.00	83.96	-0.04	0.129	66.3			2523	384.1	0.0243	0.0240	39.8%	11.946
11:10:52	86.21	86.17	-0.04	0.129	66.6			2527	384.3	0.0249	0.0247	39.9%	11.922
11:11:52	82.12	82.06	-0.05	0.130	66.5			2531	384.3	0.0238	0.0236	40.0%	11.897
11:12:52	103.37	103.33	-0.04	0.130	66.6			2531	384.3	0.0300	0.0297	40.2%	11.873
11:13:52	96.10	96.08	-0.02	0.132	66.8			2549	384.4	0.0280	0.0278	40.3%	11.843
11:14:52	82.74	82.66	-0.08	0.131	66.9			2541	384.5	0.0241	0.0238	40.4%	11.815
11:15:52	74.46	74.33	-0.13	0.129	66.9			2526	384.5	0.0215	0.0213	40.5%	11.791
11:16:52	70.97	70.87	-0.10	0.131	66.9			2547	384.5	0.0207	0.0205	40.7%	11.769
11:17:52	71.20	71.10	-0.10	0.132	67.3			2551	384.8	0.0208	0.0206	40.8%	11.749
11:18:52	71.18	71.09	-0.09	0.131	67.3			2544	384.8	0.0207	0.0205	40.9%	11.728
11:19:52	68.21	68.17	-0.04	0.130	67.4			2529	384.8	0.0197	0.0195	41.0%	11.707
11:20:52	64.90	64.85	-0.04	0.131	67.5			2543	384.9	0.0189	0.0187	41.1%	11.687
11:21:52	62.89	62.83	-0.06	0.131	67.5			2542	385.0	0.0183	0.0181	41.1%	11.669
11:22:52	60.25	60.17	-0.07	0.131	67.6			2547	385.0	0.0175	0.0174	41.2%	11.650
11:23:52	63.97	63.93	-0.04	0.131	67.6			2546	385.0	0.0186	0.0184	41.3%	11.633
11:24:52	64.13	64.08	-0.05	0.129	67.7			2525	385.1	0.0185	0.0183	41.4%	11.614
11:25:52	64.28	64.21	-0.07	0.132	67.9			2550	385.2	0.0187	0.0185	41.5%	11.596
11:26:52	60.48	60.41	-0.06	0.129	67.9			2520	385.3	0.0174	0.0172	41.6%	11.577
11:27:52	57.07	57.03	-0.04	0.128	67.9			2518	385.2	0.0164	0.0163	41.7%	11.560
11:28:52	57.19	57.14	-0.04	0.131	67.9			2548	385.2	0.0166	0.0165	41.8%	11.543
11:29:52	55.81	55.74	-0.07	0.131	67.9			2547	385.2	0.0162	0.0161	41.9%	11.527
11:30:52	47.58	47.47	-0.11	0.130	67.8			2537	385.1	0.0138	0.0137	41.9%	11.510
11:31:52	46.07	45.93	-0.13	0.132	67.8			2557	385.2	0.0135	0.0133	42.0%	11.496
11:32:52	46.18	46.08	-0.10	0.132	67.9			2553	385.2	0.0135	0.0133	42.1%	11.483
11:33:52	43.50	43.47	-0.03	0.128	67.9			2511	385.3	0.0125	0.0124	42.1%	11.470

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Flow (cfm)	Molar Volume	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
11:34:52	37.83	37.81	-0.02	0.131	68.0			2546	385.3	0.0110	0.0109	42.2%	11.457
11:35:52	33.01	33.02	0.01	0.131	67.9			2539	385.2	0.0096	0.0095	42.2%	11.446
11:36:52	33.22	33.22	-0.01	0.132	67.9			2555	385.2	0.0097	0.0096	42.3%	11.437
11:37:52	30.77	30.76	-0.01	0.130	68.1			2537	385.4	0.0089	0.0088	42.3%	11.427
11:38:52	29.04	29.01	-0.03	0.132	68.3			2551	385.5	0.0085	0.0084	42.4%	11.418
11:39:52	26.76	26.73	-0.03	0.131	68.3			2540	385.5	0.0078	0.0077	42.4%	11.409
11:40:52	25.39	25.37	-0.02	0.131	68.3			2541	385.6	0.0074	0.0073	42.4%	11.402
11:41:52	23.39	23.37	-0.02	0.131	68.4			2544	385.6	0.0068	0.0067	42.5%	11.394
11:42:52	21.54	21.53	-0.01	0.132	68.4			2555	385.6	0.0063	0.0062	42.5%	11.388
11:43:52	19.25	19.23	-0.02	0.132	68.4			2550	385.6	0.0056	0.0055	42.5%	11.381
11:44:52	17.49	17.48	-0.01	0.131	68.4			2540	385.6	0.0051	0.0050	42.6%	11.376
11:45:52	16.47	16.44	-0.03	0.134	68.6		****	2574	385.7	0.0048	0.0048	42.6%	11.371
11:48:52	14.37	14.36	-0.02	0.144	69.8		****	2664	386.7	0.0044	0.0043	42.6%	11.366
11:49:52	13.45	13.43	-0.02	0.134	68.9			2575	386.0	0.0040	0.0039	42.6%	11.361
11:50:52	12.30	12.27	-0.03	0.132	68.9			2549	386.0	0.0036	0.0035	42.6%	11.357
11:51:52	11.11	11.07	-0.03	0.131	68.9			2545	386.0	0.0032	0.0032	42.7%	11.354
11:52:12	10.95	10.89	-0.06	0.132	68.8		****	2550	385.9	0.0032	0.0032	42.7%	11.351
11:53:00	10.16	10.10	-0.05	0.13	69.26			2569	386.2	0.0030	0.0029	42.7%	11.347
11:54:37	9.36	9.31	-0.04	0.136	69.7	248.8	****	2588	386.6	0.0028	0.0027	42.7%	11.344
11:54:56	9.93	9.89	-0.04	0.134	69.1	246.4		2572	386.1	0.0029	0.0029	42.7%	11.342
11:55:56	8.13	8.09	-0.04	0.134	68.9	247.6		2575	386.0	0.0024	0.0024	42.7%	11.339
11:56:56	7.71	7.63	-0.08	0.133	68.8	239.2		2564	385.9	0.0023	0.0022	42.7%	11.336
11:57:56	7.28	7.20	-0.08	0.134	68.9	238.9		2573	385.9	0.0021	0.0021	42.8%	11.334
11:58:56	5.83	5.74	-0.09	0.136	68.5	222.4		2590	385.7	0.0017	0.0017	42.8%	11.332
11:59:56	5.18	5.04	-0.13	0.133	68.3	202.6		2559	385.5	0.0015	0.0015	42.8%	11.330
12:00:56	5.08	4.98	-0.10	0.136	68.3	200.2		2588	385.5	0.0015	0.0015	42.8%	11.329
12:01:56	5.00	4.91	-0.09	0.135	68.4	232.9		2586	385.6	0.0015	0.0015	42.8%	11.327
12:02:56	4.26	4.22	-0.04	0.135	68.4	245.3		2582	385.6	0.0013	0.0012	42.8%	11.326
12:03:56	4.28	4.26	-0.02	0.138	68.3	245.3		2613	385.5	0.0013	0.0013	42.8%	11.325
12:04:56	4.20	4.18	-0.02	0.137	68.5	213.8	****	2598	385.7	0.0012	0.0012	42.8%	11.323
12:05:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.322
12:06:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.321
12:07:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.320
12:08:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.319
12:09:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.318
12:10:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.317
12:11:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.316
12:12:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.8%	11.315
12:13:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.9%	11.313
12:14:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.9%	11.312
12:15:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.9%	11.311
12:16:00	3.63	3.60	-0.03	0.136	68.9	213.8		2596	386.0	0.0011	0.0011	42.9%	11.310
12:17:36	3.07	3.02	-0.05	0.136	69.2	401.9	****	2594	386.2	0.0009	0.0009	42.9%	11.309
12:18:56	2.97	2.95	-0.02	0.137	68.1	396.0		2599	385.4	0.0009	0.0009	42.9%	11.308
12:19:56	2.97	2.95	-0.02	0.139	68.4	396.0		2618	385.6	0.0009	0.0009	42.9%	11.307
12:20:56	2.98	2.96	-0.02	0.138	68.8	289.8	****	2612	385.9	0.0009	0.0009	42.9%	11.306
12:21:56	2.99	2.96	-0.03	0.136	68.8	197.4		2595	385.9	0.0009	0.0009	42.9%	11.306
12:22:56	2.94	2.96	0.01	0.134	68.9	197.0		2571	386.0	0.0009	0.0009	42.9%	11.305
12:23:56	2.94	2.95	0.02	0.134	69.0	197.3		2569	386.0	0.0009	0.0009	42.9%	11.304
12:24:56	2.93	2.96	0.03	0.137	69.1	197.3		2597	386.1	0.0009	0.0009	42.9%	11.303
12:25:56	2.93	2.96	0.03	0.134	69.3	197.4		2568	386.3	0.0009	0.0008	42.9%	11.302
12:26:56	3.07	3.10	0.03	0.134	69.4	197.5		2577	386.3	0.0009	0.0009	42.9%	11.301
12:27:56	3.39	3.41	0.02	0.135	69.6	197.4		2583	386.5	0.0010	0.0010	42.9%	11.300
12:28:56	2.96	2.96	0.01	0.134	69.7	197.4		2575	386.5	0.0009	0.0009	42.9%	11.299
12:29:56	2.96	2.96	0.00	0.133	69.6	197.4		2560	386.5	0.0009	0.0009	42.9%	11.299
12:30:56	91.19	91.19	0.00	0.134	69.9	193.4		2576	386.7	0.0267	0.0265	43.1%	11.298
12:31:56	130.58	130.58	0.00	0.132	69.9	187.0		2549	386.7	0.0379	0.0375	43.3%	11.271
12:32:56	214.10	214.09	-0.01	0.132	69.7	184.7		2555	386.6	0.0623	0.0617	43.6%	11.233
12:33:56	200.70	200.67	-0.03	0.133	69.6	184.0		2566	386.5	0.0586	0.0581	43.9%	11.171
12:34:56	236.13	236.08	-0.05	0.132	69.7	179.6		2556	386.5	0.0687	0.0680	44.2%	11.112
12:35:56	235.56	235.52	-0.05	0.132	69.4	178.7		2549	386.3	0.0684	0.0677	44.6%	11.043
12:36:56	201.13	201.07	-0.07	0.134	69.3	178.7		2573	386.3	0.0590	0.0584	44.9%	10.975
12:37:56	163.01	162.94	-0.06	0.133	69.2	178.1		2561	386.2	0.0476	0.0471	45.1%	10.916
12:38:56	272.85	272.84	-0.02	0.129	69.0	172.9		2527	386.1	0.0786	0.0778	45.5%	10.869
12:39:56	431.30	431.27	-0.03	0.129	68.9	168.5		2519	386.0	0.1239	0.1227	46.1%	10.790
12:40:56	404.53	404.49	-0.04	0.127	68.9	165.6		2503	386.0	0.1155	0.1143	46.7%	10.666
12:41:56	435.49	435.43	-0.06	0.129	69.0	162.2		2527	386.0	0.1254	0.1242	47.3%	10.551

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Flow (cfm)	Molar Volume	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
12:42:56	366.01	365.94	-0.07	0.129	69.2	161.6		2522	386.2	0.1052	0.1041	47.9%	10.425
12:43:56	410.28	410.22	-0.06	0.129	68.9	156.7		2525	386.0	0.1181	0.1169	48.5%	10.320
12:44:56	479.27	479.24	-0.03	0.128	68.7	151.6		2511	385.9	0.1372	0.1359	49.2%	10.202
12:45:56	466.50	466.45	-0.05	0.127	68.7	148.2		2501	385.9	0.1331	0.1318	49.8%	10.065
12:46:56	388.24	388.17	-0.08	0.126	68.6	143.5		2499	385.8	0.1106	0.1096	50.4%	9.932
12:47:56	440.76	440.65	-0.10	0.126	68.4	141.3		2499	385.6	0.1257	0.1245	51.0%	9.821
12:48:56	484.13	484.03	-0.10	0.126	68.3	139.2		2498	385.5	0.1380	0.1367	51.7%	9.695
12:49:56	463.01	462.95	-0.06	0.124	68.4	144.7		2476	385.6	0.1308	0.1295	52.4%	9.557
12:50:56	400.11	400.08	-0.03	0.126	68.6	145.1		2495	385.7	0.1139	0.1127	53.0%	9.426
12:51:56	320.94	320.90	-0.03	0.126	68.5	142.4		2491	385.7	0.0912	0.0903	53.4%	9.313
12:52:56	273.05	273.00	-0.04	0.128	68.5	142.3		2517	385.7	0.0784	0.0776	53.8%	9.221
12:53:56	250.96	250.91	-0.04	0.128	68.6	142.3		2514	385.7	0.0720	0.0713	54.2%	9.143
12:54:56	330.71	330.65	-0.06	0.128	68.7	138.8		2511	385.8	0.0947	0.0938	54.7%	9.071
12:55:56	352.94	352.91	-0.03	0.127	68.8	137.7		2505	385.9	0.1008	0.0998	55.2%	8.976
12:56:56	343.91	343.89	-0.02	0.126	68.8	137.3		2499	385.9	0.0980	0.0971	55.7%	8.876
12:57:56	431.15	431.14	-0.01	0.127	68.7	130.9		2505	385.8	0.1232	0.1220	56.3%	8.778
12:58:56	492.10	492.10	0.01	0.127	68.7	124.3		2500	385.8	0.1403	0.1390	57.0%	8.654
12:59:56	419.03	419.04	0.01	0.125	68.8	116.7		2487	385.9	0.1188	0.1176	57.6%	8.514
13:00:56	493.65	493.63	-0.02	0.124	68.9	112.4		2478	385.9	0.1395	0.1381	58.3%	8.395
13:01:56	524.13	524.09	-0.03	0.127	68.8	109.7		2503	385.9	0.1496	0.1481	59.1%	8.256
13:02:56	429.31	429.29	-0.02	0.127	68.7	108.2		2506	385.9	0.1227	0.1215	59.7%	8.106
13:03:56	458.86	458.85	-0.02	0.126	68.8	106.0		2491	385.9	0.1303	0.1290	60.3%	7.983
13:04:56	405.65	405.62	-0.03	0.125	68.9	106.1		2481	385.9	0.1147	0.1136	60.9%	7.853
13:05:56	375.30	375.28	-0.03	0.123	68.9	103.6		2462	386.0	0.1053	0.1043	61.4%	7.738
13:06:56	366.84	366.77	-0.07	0.123	68.9	101.7		2469	386.0	0.1033	0.1022	62.0%	7.633
13:07:56	306.84	306.79	-0.06	0.126	68.9	101.7		2498	386.0	0.0874	0.0865	62.4%	7.530
13:08:56	269.41	269.35	-0.06	0.124	68.8	101.7		2478	385.9	0.0761	0.0754	62.8%	7.442
13:09:56	233.12	233.04	-0.07	0.127	68.7	101.7		2502	385.8	0.0665	0.0659	63.1%	7.366
13:10:56	234.68	234.62	-0.06	0.125	68.6	101.7		2484	385.8	0.0665	0.0658	63.5%	7.300
13:11:56	225.67	225.66	-0.01	0.126	68.6	101.7		2494	385.8	0.0642	0.0636	63.8%	7.233
13:12:56	212.19	212.16	-0.03	0.126	68.7	101.7		2490	385.8	0.0603	0.0597	64.1%	7.169
13:13:56	203.07	203.03	-0.04	0.123	68.6	101.7		2461	385.8	0.0570	0.0564	64.4%	7.109
13:14:56	193.18	193.16	-0.02	0.128	68.6	101.7		2514	385.7	0.0554	0.0548	64.7%	7.052
13:15:56	173.54	174.00	0.46	0.125	68.5	101.7		2484	385.7	0.0492	0.0487	64.9%	6.996
13:16:56	169.79	171.01	1.21	0.129	68.4	101.7		2524	385.6	0.0489	0.0484	65.2%	6.947
13:17:56	163.81	165.03	1.22	0.124	68.3	101.7		2478	385.6	0.0463	0.0459	65.4%	6.898
13:18:56	160.42	161.65	1.23	0.125	68.4	101.7		2484	385.6	0.0455	0.0450	65.6%	6.852
13:19:56	157.16	158.35	1.19	0.124	68.4	101.7		2476	385.6	0.0444	0.0440	65.8%	6.807
13:20:56	153.03	154.21	1.18	0.126	68.6	101.7		2498	385.7	0.0436	0.0432	66.1%	6.762
13:21:56	147.44	148.61	1.17	0.127	68.6	101.7		2505	385.8	0.0421	0.0417	66.3%	6.719
13:23:27	142.15	143.32	1.16	0.128	68.6	101.7		2512	385.8	0.0407	0.0403	66.5%	6.677
13:23:56	129.83	131.03	1.20	0.126	68.4	101.7		2491	385.6	0.0369	0.0365	66.7%	6.636
13:24:56	133.68	134.84	1.16	0.126	68.4	103.5		2496	385.6	0.0381	0.0377	66.9%	6.599
13:25:56	121.73	122.85	1.11	0.125	68.4	101.5		2484	385.6	0.0345	0.0342	67.0%	6.561
13:26:56	119.76	120.84	1.07	0.128	68.3	101.5		2511	385.5	0.0343	0.0340	67.2%	6.526
13:27:56	119.62	120.62	1.00	0.126	68.3	101.5		2499	385.5	0.0341	0.0338	67.4%	6.492
13:28:56	124.80	125.96	1.16	0.129	68.4	101.7		2525	385.6	0.0360	0.0356	67.6%	6.458
13:29:56	158.10	159.26	1.16	0.138	68.3	160.8		2608	385.6	0.0471	0.0466	67.8%	6.422
13:30:56	113.29	114.45	1.16	0.128	67.7	101.2		2518	385.1	0.0326	0.0323	68.0%	6.375
13:31:56	92.31	93.47	1.16	0.126	67.7	101.1		2495	385.1	0.0263	0.0261	68.1%	6.342
13:32:56	100.61	101.77	1.16	0.125	67.9	100.9		2488	385.2	0.0286	0.0283	68.2%	6.316
13:33:56	99.52	100.68	1.16	0.126	67.9		188.8	2492	385.2	0.0283	0.0280	68.4%	6.287
13:34:56	94.21	95.37	1.16	0.126	68.0			2498	385.3	0.0269	0.0266	68.5%	6.259
13:35:56	88.95	90.11	1.16	0.124	67.8			2479	385.2	0.0252	0.0249	68.6%	6.232
13:36:56	82.56	83.72	1.16	0.125	67.6	531.3		2485	385.0	0.0235	0.0232	68.8%	6.207
13:37:56	139.60	140.76	1.16	0.138	66.9	529.7		2615	384.5	0.0418	0.0414	69.0%	6.183
13:38:56	77.35	78.51	1.16	0.126	66.5	532.4		2492	384.2	0.0221	0.0219	69.1%	6.142
13:39:56	71.86	73.02	1.16	0.122	67.2	532.3		2456	384.7	0.0202	0.0200	69.2%	6.120
13:40:56	77.61	78.77	1.16	0.124	67.7	532.2		2475	385.1	0.0219	0.0217	69.3%	6.099
13:41:56	76.96	78.12	1.16	0.122	68.1	532.2		2454	385.4	0.0216	0.0213	69.4%	6.078
13:42:56	71.24	72.40	1.16	0.126	68.3	532.1		2495	385.6	0.0203	0.0201	69.5%	6.056
13:43:56	73.16	74.32	1.16	0.120	68.5	531.4		2439	385.7	0.0204	0.0202	69.6%	6.036
13:44:56	156.42	157.58	1.16	0.123	68.5	525.8		2466	385.7	0.0440	0.0436	69.8%	6.015
13:45:56	230.34	231.50	1.16	0.121	68.3	522.8		2446	385.5	0.0643	0.0637	70.2%	5.971
13:46:56	197.64	198.80	1.16	0.123	68.2	518.4		2461	385.4	0.0555	0.0550	70.4%	5.907
13:47:56	305.64	306.80	1.16	0.122	68.0	513.7		2451	385.3	0.0855	0.0847	70.9%	5.851

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Flow (cfm)	Molar Volume	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
13:48:56	308.63	309.79	1.16	0.128	68.0	511.8	2518	385.3	0.0887	0.0879	71.3%	5.766
13:49:56	297.97	299.13	1.16	0.129	68.0	510.6	2528	385.3	0.0860	0.0852	71.8%	5.677
13:50:56	437.01	438.17	1.16	0.131	67.8	505.0	2544	385.2	0.1270	0.1258	72.4%	5.591
13:51:56	490.40	491.56	1.16	0.130	67.9	501.1	2538	385.3	0.1421	0.1408	73.1%	5.464
13:52:56	513.61	514.77	1.16	0.132	68.0	495.4	2557	385.3	0.1500	0.1485	73.9%	5.322
13:53:56	528.86	530.02	1.16	0.132	68.0	491.9	2553	385.3	0.1542	0.1527	74.7%	5.172
13:54:56	571.25	572.41	1.16	0.131	68.1	486.8	2544	385.4	0.1659	0.1643	75.5%	5.018
13:55:56	703.86	705.02	1.16	0.132	68.0	483.1	2551	385.3	0.2051	0.2031	76.5%	4.852
13:56:56	597.73	598.90	1.16	0.134	68.2	479.8	2570	385.4	0.1754	0.1737	77.4%	4.647
13:57:56	533.07	534.23	1.16	0.135	68.2	476.3	2581	385.5	0.1571	0.1555	78.2%	4.472
13:58:56	568.78	569.94	1.16	0.136	68.2	471.4	2592	385.4	0.1683	0.1666	79.1%	4.314
13:59:56	522.32	523.48	1.16	0.138	68.1	469.3	2609	385.4	0.1556	0.1540	79.8%	4.146
14:00:56	414.48	415.64	1.16	0.139	68.2	469.2	2617	385.5	0.1238	0.1226	80.5%	3.991
14:01:56	418.32	419.48	1.16	0.147	68.3	466.4	2698	385.5	0.1288	0.1275	81.1%	3.867
14:02:56	471.09	472.26	1.16	0.141	68.3	465.0	2637	385.5	0.1418	0.1404	81.8%	3.738
14:03:56	432.97	434.13	1.16	0.134	68.4	463.1	2575	385.6	0.1272	0.1260	82.5%	3.596
14:04:56	428.20	429.36	1.16	0.137	68.3	459.4	2605	385.6	0.1273	0.1260	83.1%	3.469
14:05:56	356.38	357.54	1.16	0.139	68.4	459.5	2621	385.6	0.1066	0.1055	83.7%	3.342
14:06:56	342.56	343.72	1.16	0.141	68.3	457.4	2636	385.5	0.1031	0.1021	84.2%	3.235
14:07:56	447.73	448.89	1.16	0.137	68.1	452.5	2605	385.4	0.1331	0.1318	84.9%	3.132
14:08:56	442.11	443.27	1.16	0.137	68.1	449.6	2604	385.4	0.1315	0.1302	85.5%	2.999
14:09:56	466.73	467.89	1.16	0.138	68.1	444.5	2606	385.4	0.1389	0.1375	86.2%	2.867
14:10:56	496.53	497.69	1.16	0.144	68.1	438.9	2663	385.4	0.1510	0.1495	87.0%	2.729
14:11:56	517.86	519.02	1.16	0.146	68.0	433.4	2689	385.3	0.1590	0.1575	87.8%	2.578
14:12:56	496.08	497.24	1.16	0.147	68.0	432.0	2696	385.3	0.1527	0.1512	88.6%	2.419
14:13:56	413.15	414.31	1.16	0.148	68.0	431.2	2707	385.3	0.1277	0.1264	89.2%	2.266
14:14:56	402.03	403.19	1.16	0.153	67.9	430.8	2750	385.3	0.1262	0.1250	89.8%	2.138
14:15:56	336.68	337.84	1.16	0.155	67.9	430.8	2767	385.2	0.1064	0.1054	90.4%	2.012
14:16:56	323.04	324.20	1.16	0.157	67.9	430.8	2784	385.3	0.1027	0.1017	90.9%	1.906
14:17:56	324.19	325.35	1.16	0.158	68.0	430.8	2790	385.3	0.1033	0.1023	91.4%	1.803
14:18:56	276.69	277.85	1.16	0.160	68.0	430.8	2813	385.3	0.0889	0.0880	91.9%	1.700
14:19:56	254.31	255.47	1.16	0.162	68.0	430.8	2832	385.3	0.0822	0.0814	92.3%	1.611
14:20:56	208.56	209.72	1.16	0.165	67.9	430.8	2854	385.2	0.0680	0.0673	92.6%	1.528
14:21:56	208.73	209.89	1.16	0.162	67.9	430.8	2826	385.2	0.0674	0.0667	93.0%	1.460
14:22:56	191.19	192.35	1.16	0.163	67.9	430.8	2837	385.2	0.0620	0.0614	93.3%	1.393
14:23:56	185.26	186.42	1.16	0.163	67.9	430.8	2837	385.2	0.0600	0.0594	93.6%	1.331
14:24:56	170.77	171.93	1.16	0.162	67.9	430.8	2827	385.2	0.0551	0.0546	93.9%	1.271
14:25:56	159.96	161.12	1.16	0.161	67.7	430.8	2824	385.1	0.0516	0.0511	94.1%	1.216
14:26:56	151.99	153.15	1.16	0.159	67.7	430.8	2802	385.1	0.0487	0.0482	94.4%	1.164
14:27:56	145.49	146.65	1.16	0.163	67.6	430.8	2833	385.1	0.0471	0.0466	94.6%	1.116
14:28:56	141.82	142.98	1.16	0.159	67.5	430.8	2799	385.0	0.0454	0.0449	94.8%	1.069
14:29:56	130.59	131.75	1.16	0.162	67.5	430.8	2830	385.0	0.0422	0.0418	95.0%	1.023
14:30:56	125.14	126.30	1.16	0.164	67.5	430.8	2847	384.9	0.0407	0.0403	95.3%	0.981
14:31:56	120.14	121.30	1.16	0.161	67.4	430.8	2820	384.9	0.0387	0.0384	95.4%	0.940
14:32:56	116.05	117.21	1.16	0.163	67.2	430.8	2837	384.7	0.0377	0.0373	95.6%	0.902
14:33:56	112.49	113.65	1.16	0.160	67.1	430.8	2814	384.6	0.0362	0.0359	95.8%	0.864
14:34:56	113.96	115.12	1.16	0.162	67.1	430.8	2825	384.7	0.0368	0.0365	96.0%	0.828
14:35:56	109.23	110.39	1.16	0.160	67.1	430.8	2812	384.7	0.0351	0.0348	96.2%	0.791
14:36:56	104.08	105.24	1.16	0.162	67.1	430.8	2830	384.6	0.0337	0.0334	96.4%	0.756
14:37:56	104.44	105.60	1.16	0.162	67.1	430.8	2828	384.7	0.0338	0.0335	96.5%	0.722
14:38:56	99.32	100.48	1.16	0.162	67.0	430.8	2827	384.6	0.0321	0.0318	96.7%	0.688
14:39:56	99.97	101.13	1.16	0.163	66.9	430.8	2839	384.5	0.0325	0.0322	96.8%	0.656
14:40:56	99.65	100.81	1.16	0.159	66.6	430.9	2805	384.3	0.0320	0.0317	97.0%	0.624
14:41:56	101.18	102.34	1.16	0.162	66.7	430.8	2832	384.4	0.0328	0.0325	97.2%	0.592
14:42:56	96.61	97.77	1.16	0.159	66.8	430.9	2799	384.4	0.0310	0.0307	97.3%	0.559
14:43:56	92.18	93.34	1.16	0.167	66.8	430.9	2870	384.4	0.0303	0.0300	97.5%	0.528
14:44:56	88.65	89.81	1.16	0.175	66.8	430.9	2937	384.4	0.0298	0.0295	97.6%	0.498
14:45:56	86.39	87.55	1.16	0.168	66.7	430.9	2885	384.4	0.0285	0.0282	97.8%	0.468
14:46:56	75.48	76.64	1.16	0.161	66.7	430.9	2824	384.4	0.0244	0.0242	97.9%	0.439
14:47:56	75.76	76.92	1.16	0.158	66.6	430.9	2790	384.3	0.0242	0.0240	98.0%	0.415
14:48:56	74.76	75.92	1.16	0.158	66.6	430.9	2798	384.3	0.0239	0.0237	98.1%	0.391
14:49:56	67.55	68.71	1.16	0.157	66.5	430.9	2787	384.2	0.0216	0.0213	98.3%	0.367
14:50:56	66.31	67.47	1.16	0.160	66.6	430.9	2813	384.3	0.0214	0.0211	98.4%	0.345
14:51:56	62.58	63.74	1.16	0.157	66.7	430.9	2783	384.4	0.0199	0.0197	98.5%	0.324
14:52:56	60.68	61.85	1.16	0.159	66.7	430.9	2804	384.4	0.0195	0.0193	98.6%	0.304
14:53:56	57.55	58.71	1.16	0.162	66.7	430.9	2833	384.4	0.0187	0.0185	98.7%	0.284
14:54:56	53.94	55.10	1.16	0.160	66.7	430.9	2808	384.3	0.0173	0.0172	98.7%	0.266

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Flow (cfm)	Molar Volume	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
14:55:56	50.59	51.75	1.16	0.158	66.7	430.9		2796	384.4	0.0162	0.0160	98.8%	0.248
14:56:56	47.40	48.56	1.16	0.159	66.8	430.9		2803	384.4	0.0152	0.0151	98.9%	0.232
14:57:56	44.09	45.25	1.16	0.162	66.8	430.9		2832	384.4	0.0143	0.0142	99.0%	0.217
14:58:56	41.44	42.60	1.16	0.158	66.8	430.9		2792	384.5	0.0132	0.0131	99.0%	0.203
14:59:56	38.47	39.63	1.16	0.159	66.8	430.9		2799	384.5	0.0123	0.0122	99.1%	0.189
15:00:56	35.65	36.82	1.16	0.163	66.9	430.9		2841	384.5	0.0116	0.0115	99.2%	0.177
15:01:56	33.66	34.82	1.16	0.162	66.9	430.9		2828	384.5	0.0109	0.0108	99.2%	0.166
15:02:56	31.45	32.61	1.16	0.159	66.9	430.9		2800	384.5	0.0101	0.0100	99.3%	0.155
15:03:56	29.62	30.78	1.16	0.159	66.8	430.9		2801	384.4	0.0095	0.0094	99.3%	0.145
15:04:56	27.60	28.76	1.16	0.160	66.8	430.9		2810	384.4	0.0089	0.0088	99.4%	0.135
15:05:56	26.61	27.77	1.16	0.157	66.8	430.9		2788	384.5	0.0085	0.0084	99.4%	0.126
15:06:56	25.18	26.34	1.16	0.161	66.9	430.9		2820	384.5	0.0081	0.0080	99.4%	0.118
15:07:56	22.97	24.13	1.16	0.157	66.9	430.9		2786	384.5	0.0073	0.0073	99.5%	0.110
15:08:56	21.94	23.10	1.16	0.162	66.9	430.9		2826	384.5	0.0071	0.0070	99.5%	0.102
15:09:56	20.97	22.13	1.16	0.158	66.8	430.9		2794	384.4	0.0067	0.0066	99.6%	0.095
15:10:56	19.05	20.21	1.16	0.157	66.7	430.9		2782	384.4	0.0061	0.0060	99.6%	0.088
15:11:56	18.45	19.61	1.16	0.161	66.7	430.9		2823	384.4	0.0060	0.0059	99.6%	0.082
15:12:56	16.95	18.11	1.16	0.162	66.5	430.9		2826	384.2	0.0055	0.0054	99.6%	0.076
15:13:56	16.60	17.76	1.16	0.160	66.4	430.9		2815	384.2	0.0054	0.0053	99.7%	0.071
15:14:56	15.27	16.43	1.16	0.158	66.5	430.9		2789	384.2	0.0049	0.0048	99.7%	0.066
15:15:56	12.75	14.23	1.49	0.161	66.5	430.9		2818	384.2	0.0041	0.0041	99.7%	0.061
15:16:56	12.12	13.57	1.45	0.160	66.5	430.9		2813	384.2	0.0039	0.0039	99.7%	0.057
15:17:56	11.82	13.23	1.41	0.160	66.5	430.9		2809	384.2	0.0038	0.0038	99.8%	0.053
15:18:56	11.73	13.18	1.45	0.157	66.5	430.9		2783	384.3	0.0037	0.0037	99.8%	0.049
15:19:56	10.79	12.21	1.42	0.158	66.5	430.9		2790	384.2	0.0034	0.0034	99.8%	0.045
15:20:56	10.44	11.83	1.39	0.162	66.4	430.9		2826	384.2	0.0034	0.0033	99.8%	0.042
15:21:56	9.84	11.15	1.31	0.159	66.4	430.9		2803	384.1	0.0032	0.0031	99.8%	0.038
15:22:56	9.80	11.15	1.35	0.157	66.3	430.9		2787	384.1	0.0031	0.0031	99.8%	0.035
15:23:56	8.96	10.27	1.31	0.160	66.3	430.9		2807	384.1	0.0029	0.0029	99.9%	0.032
15:24:56	8.87	10.12	1.26	0.158	66.3	430.9		2790	384.1	0.0028	0.0028	99.9%	0.029
15:25:56	8.91	10.12	1.21	0.158	66.3	430.9		2796	384.1	0.0029	0.0028	99.9%	0.026
15:26:56	8.47	9.61	1.15	0.156	66.3	430.9		2776	384.1	0.0027	0.0027	99.9%	0.023
15:27:56	8.21	9.41	1.20	0.159	66.3	430.9		2801	384.1	0.0026	0.0026	99.9%	0.021
15:28:56	8.02	9.23	1.21	0.159	66.3	430.9		2801	384.1	0.0026	0.0026	99.9%	0.018
15:29:56	8.07	9.24	1.16	0.157	66.3	430.9		2784	384.0	0.0026	0.0026	99.9%	0.016
15:30:56	7.10	8.25	1.15	0.161	66.3	430.9		2823	384.0	0.0023	0.0023	99.9%	0.013
15:31:56	6.91	8.10	1.19	0.160	66.2	430.9		2809	384.0	0.0022	0.0022	100.0%	0.011
15:32:56	6.97	8.09	1.12	0.157	66.2	430.9		2785	384.0	0.0022	0.0022	100.0%	0.008
15:33:56	6.98	8.08	1.10	0.160	66.2	430.9		2813	384.0	0.0023	0.0022	100.0%	0.006
15:34:56	6.59	7.70	1.10	0.157	66.2	430.9		2787	384.0	0.0021	0.0021	100.0%	0.004
15:35:56	5.86	6.94	1.08	0.159	66.2	430.9	End Test	2803	384.0	0.0019	0.0019	100.0%	0.002

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:09:07	1.5	1.9	0.4	0.16	61.1	243.1	Start Run	380.3	2801	0.0005	0.0%	4.4543
16:10:07	47.6	48.0	0.4	0.16	61.6	241.5		380.7	2837	0.0156	0.4%	4.4538
16:11:07	130.2	130.6	0.4	0.17	62.0	239.3		381.0	2923	0.0439	1.3%	4.4382
16:12:07	199.3	199.8	0.4	0.16	62.3	237.5		381.2	2778	0.0639	2.8%	4.3942
16:13:07	260.7	261.1	0.4	0.15	62.6	235.1		381.4	2758	0.0830	4.6%	4.3303
16:14:07	330.6	331.1	0.4	0.15	62.7	232.6		381.4	2759	0.1052	7.0%	4.2473
16:15:07	355.4	355.9	0.5	0.15	62.9	230.6		381.6	2721	0.1115	9.5%	4.1421
16:16:07	320.1	320.6	0.5	0.15	63.2	228.6		381.8	2721	0.1004	11.8%	4.0306
16:17:07	358.8	359.3	0.5	0.15	63.4	227.1		382.0	2697	0.1115	14.3%	3.9303
16:18:07	280.7	281.2	0.5	0.15	63.9	226.6		382.3	2717	0.0878	16.2%	3.8188
16:19:07	355.8	356.3	0.6	0.15	64.0	224.8		382.4	2721	0.1114	18.7%	3.7310
16:20:07	458.8	459.5	0.6	0.15	64.0	222.4		382.4	2705	0.1428	21.9%	3.6196
16:21:07	413.3	414.0	0.7	0.15	64.3	221.0		382.6	2679	0.1274	24.8%	3.4768
16:22:07	407.5	408.1	0.6	0.15	64.5	219.6		382.8	2678	0.1254	27.6%	3.3495
16:23:07	427.9	428.6	0.6	0.15	64.7	217.4		382.9	2695	0.1325	30.6%	3.2240
16:24:07	478.5	479.1	0.6	0.14	64.8	216.1	End Gelcoat	383.0	2656	0.1460	33.9%	3.0915
16:25:07	398.8	399.4	0.6	0.15	65.0	215.9		383.1	2689	0.1232	36.6%	2.9455
16:26:07	308.6	309.1	0.6	0.14	65.2	215.8		383.3	2661	0.0943	38.8%	2.8223
16:27:07	317.0	317.5	0.6	0.14	65.3	215.8		383.3	2668	0.0971	40.9%	2.7281
16:28:07	282.1	282.7	0.6	0.15	65.4	215.8		383.4	2678	0.0867	42.9%	2.6310
16:29:07	232.2	232.8	0.6	0.14	65.6	215.8		383.5	2661	0.0709	44.5%	2.5443
16:30:07	224.9	225.6	0.6	0.15	65.7	215.8		383.6	2678	0.0691	46.0%	2.4734
16:31:07	224.0	224.6	0.6	0.15	65.8	215.8		383.7	2684	0.0689	47.6%	2.4043
16:32:07	225.9	226.4	0.6	0.14	65.9	215.8		383.8	2663	0.0690	49.1%	2.3354
16:33:07	199.1	199.7	0.6	0.15	66.1	215.8		383.9	2680	0.0612	50.5%	2.2664
16:34:07	201.0	201.6	0.6	0.14	66.2	215.8		384.0	2662	0.0613	51.9%	2.2053
16:35:07	192.2	192.8	0.6	0.15	66.3	215.8		384.0	2693	0.0593	53.2%	2.1440
16:36:07	191.1	191.6	0.5	0.14	66.4	215.8		384.1	2662	0.0583	54.5%	2.0847
16:37:07	196.6	197.2	0.6	0.14	66.4	215.8		384.2	2651	0.0597	55.8%	2.0264
16:38:07	183.5	184.2	0.7	0.15	66.5	215.8		384.2	2696	0.0567	57.1%	1.9667
16:39:07	181.0	181.7	0.6	0.15	66.6	215.8		384.3	2687	0.0557	58.4%	1.9100
16:40:07	179.4	180.0	0.7	0.15	66.6	215.8		384.3	2693	0.0553	59.6%	1.8544
16:41:07	174.7	175.4	0.7	0.15	66.6	215.8		384.3	2695	0.0539	60.8%	1.7990
16:42:07	169.6	170.4	0.8	0.15	66.7	215.8		384.4	2684	0.0521	62.0%	1.7451
16:43:07	180.0	180.8	0.8	0.15	66.8	215.8		384.4	2713	0.0559	63.2%	1.6930
16:44:07	166.2	166.9	0.8	0.15	66.8	215.7		384.4	2682	0.0510	64.4%	1.6371
16:45:07	144.8	145.5	0.7	0.15	66.8	215.7		384.4	2679	0.0444	65.4%	1.5861
16:46:07	154.6	155.2	0.7	0.15	66.8	215.7		384.5	2719	0.0481	66.5%	1.5417
16:47:07	147.1	147.7	0.7	0.15	66.9	215.7		384.5	2709	0.0456	67.5%	1.4936
16:48:07	143.6	144.4	0.7	0.15	66.9	215.7		384.5	2720	0.0447	68.5%	1.4480
16:49:07	169.6	170.2	0.6	0.15	66.9	215.7		384.5	2688	0.0522	69.7%	1.4033
16:50:07	152.7	153.3	0.6	0.15	67.0	215.7		384.6	2727	0.0476	70.7%	1.3512
16:51:07	148.5	149.1	0.7	0.15	67.0	215.7		384.5	2688	0.0457	71.8%	1.3035
16:52:07	162.0	162.7	0.7	0.15	67.0	215.7		384.6	2727	0.0505	72.9%	1.2579
16:53:07	158.9	159.5	0.6	0.15	67.0	215.7		384.6	2704	0.0492	74.0%	1.2073
16:54:07	145.3	146.0	0.7	0.15	67.2	215.7		384.7	2719	0.0452	75.0%	1.1582
16:55:07	149.8	150.5	0.7	0.15	67.2	215.7		384.8	2723	0.0467	76.1%	1.1130
16:56:07	125.5	126.1	0.6	0.14	67.3	215.7		384.8	2653	0.0381	76.9%	1.0663
16:57:07	119.2	119.9	0.7	0.13	67.3	215.7		384.8	2569	0.0350	77.7%	1.0283
16:58:07	120.5	121.1	0.6	0.03	68.0	215.7		385.3	1161	0.0160	78.1%	0.9933
16:59:07	123.2	123.8	0.6	0.15	67.4	215.7		384.9	2694	0.0379	78.9%	0.9773
17:00:07	114.9	115.5	0.6	0.01	67.8	215.7		385.2	694	0.0091	79.1%	0.9394
17:01:07	123.5	124.1	0.6	0.14	67.5	215.7		385.0	2666	0.0376	80.0%	0.9302
17:02:07	120.6	121.3	0.7	0.14	67.5	215.7		385.0	2654	0.0366	80.8%	0.8926
17:03:07	118.2	118.8	0.6	0.14	67.5	215.7		384.9	2652	0.0358	81.6%	0.8560
17:04:07	106.0	106.6	0.7	0.14	67.4	215.7		384.9	2653	0.0321	82.3%	0.8202
17:05:08	110.6	111.3	0.7	0.14	67.5	215.7		384.9	2665	0.0337	83.1%	0.7881
17:06:07	109.8	110.4	0.6	0.14	67.5	215.7		385.0	2663	0.0334	83.8%	0.7544
17:07:07	106.1	106.7	0.6	0.14	67.5	215.7		384.9	2662	0.0323	84.5%	0.7210
17:08:07	103.6	104.3	0.7	0.14	67.5	215.7		385.0	2661	0.0315	85.2%	0.6887
17:09:07	96.1	96.7	0.6	0.14	67.6	215.7		385.0	2661	0.0292	85.9%	0.6572
17:10:07	98.2	98.8	0.6	0.14	67.6	215.7		385.0	2675	0.0300	86.6%	0.6280

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
17:11:07	92.3	92.9	0.5	0.15	67.7	215.7		385.1	2679	0.0283	87.2%	0.5980
17:12:07	88.7	89.2	0.5	0.15	67.8	215.7		385.2	2695	0.0273	87.8%	0.5697
17:13:07	89.0	89.5	0.5	0.14	67.8	215.7		385.2	2676	0.0272	88.4%	0.5424
17:14:07	81.1	81.8	0.7	0.14	67.8	215.7		385.1	2656	0.0246	89.0%	0.5152
17:15:07	82.8	83.4	0.6	0.14	67.8	215.7		385.2	2675	0.0253	89.6%	0.4906
17:16:07	79.5	80.1	0.6	0.14	67.8	215.7		385.2	2671	0.0243	90.1%	0.4653
17:17:07	78.6	79.2	0.6	0.14	67.9	215.7		385.2	2665	0.0239	90.6%	0.4410
17:18:07	66.2	66.8	0.6	0.15	67.9	215.7		385.2	2676	0.0202	91.1%	0.4171
17:19:07	71.6	72.2	0.6	0.15	67.9	215.7		385.2	2677	0.0219	91.6%	0.3968
17:20:07	69.2	69.8	0.6	0.14	67.8	215.7		385.2	2673	0.0211	92.1%	0.3749
17:21:07	64.7	65.3	0.6	0.14	67.9	215.7		385.2	2673	0.0198	92.5%	0.3538
17:22:07	61.1	61.7	0.6	0.14	67.9	215.6		385.2	2669	0.0186	92.9%	0.3341
17:23:07	63.9	64.4	0.6	0.14	67.9	215.6		385.3	2666	0.0194	93.4%	0.3154
17:24:07	56.8	57.4	0.6	0.14	68.0	215.6		385.3	2666	0.0173	93.7%	0.2960
17:25:07	51.2	51.8	0.6	0.14	67.9	215.6		385.3	2667	0.0156	94.1%	0.2787
17:26:07	54.6	55.1	0.5	0.15	67.9	215.6		385.2	2687	0.0168	94.5%	0.2631
17:27:07	47.8	48.3	0.5	0.14	67.8	215.6		385.2	2668	0.0146	94.8%	0.2463
17:28:07	47.3	47.7	0.4	0.14	67.7	215.7		385.1	2666	0.0144	95.1%	0.2318
17:29:07	49.7	50.2	0.5	0.15	67.6	215.6		385.1	2684	0.0152	95.5%	0.2174
17:30:07	45.2	45.7	0.5	0.14	67.7	215.6		385.1	2672	0.0138	95.8%	0.2021
17:31:07	39.6	40.1	0.5	0.14	67.7	215.6		385.1	2667	0.0121	96.0%	0.1883
17:32:07	40.4	40.8	0.5	0.14	67.7	215.6		385.1	2652	0.0122	96.3%	0.1762
17:33:07	36.2	36.7	0.5	0.15	67.7	215.6		385.1	2677	0.0111	96.6%	0.1640
17:34:07	36.3	36.8	0.5	0.14	67.7	215.6		385.1	2663	0.0111	96.8%	0.1529
17:35:07	32.6	33.0	0.4	0.15	67.7	215.6		385.1	2685	0.0100	97.0%	0.1419
17:36:07	29.4	29.8	0.4	0.14	67.7	215.6		385.1	2652	0.0089	97.2%	0.1319
17:37:07	27.8	28.1	0.4	0.14	67.7	215.6		385.1	2666	0.0085	97.4%	0.1230
17:38:07	30.9	31.2	0.4	0.15	67.7	215.6		385.1	2690	0.0095	97.6%	0.1145
17:39:07	25.8	26.3	0.4	0.14	67.7	215.6		385.1	2657	0.0078	97.8%	0.1050
17:40:07	25.3	25.7	0.4	0.15	67.6	215.6		385.1	2692	0.0078	98.0%	0.0972
17:41:07	22.1	22.5	0.4	0.15	67.6	215.6		385.0	2686	0.0068	98.1%	0.0894
17:42:07	21.9	22.3	0.4	0.14	67.7	215.6		385.1	2672	0.0067	98.3%	0.0826
17:43:07	19.5	19.9	0.5	0.14	67.6	215.6		385.1	2646	0.0059	98.4%	0.0760
17:44:07	18.1	18.5	0.5	0.14	67.6	215.6		385.1	2661	0.0055	98.5%	0.0701
17:45:07	18.8	19.3	0.4	0.14	67.7	215.6		385.1	2667	0.0057	98.7%	0.0646
17:46:07	17.2	17.6	0.4	0.14	67.7	215.6		385.1	2673	0.0052	98.8%	0.0589
17:47:07	14.7	15.1	0.4	0.14	67.7	215.6		385.1	2661	0.0045	98.9%	0.0536
17:48:07	14.7	15.1	0.4	0.14	67.7	215.6		385.1	2663	0.0045	99.0%	0.0492
17:49:07	15.0	15.4	0.4	0.14	67.7	215.6		385.1	2660	0.0046	99.1%	0.0447
17:50:07	13.3	13.8	0.5	0.15	67.8	215.6		385.2	2680	0.0041	99.2%	0.0401
17:51:07	12.3	12.9	0.5	0.15	67.8	215.6		385.2	2684	0.0038	99.3%	0.0361
17:52:07	10.6	11.1	0.5	0.15	67.8	215.6		385.2	2685	0.0032	99.3%	0.0323
17:53:07	9.5	9.9	0.5	0.14	67.8	215.6		385.2	2654	0.0029	99.4%	0.0290
17:54:07	9.5	10.0	0.5	0.14	67.8	215.6		385.1	2647	0.0029	99.5%	0.0262
17:55:07	9.5	10.0	0.4	0.14	67.8	215.6		385.2	2669	0.0029	99.5%	0.0233
17:56:07	9.0	9.4	0.4	0.15	67.7	215.6		385.1	2685	0.0028	99.6%	0.0204
17:57:07	8.5	9.0	0.5	0.14	67.7	215.6		385.1	2647	0.0026	99.7%	0.0176
17:58:07	8.1	8.5	0.5	0.15	67.7	215.6		385.1	2683	0.0025	99.7%	0.0151
17:59:07	8.0	8.4	0.4	0.14	67.5	215.6		385.0	2670	0.0024	99.8%	0.0126
18:00:07	7.1	7.5	0.4	0.14	67.0	215.6		384.6	2668	0.0022	99.8%	0.0101
18:01:07	6.7	7.1	0.4	0.15	66.7	215.6		384.4	2685	0.0021	99.9%	0.0080
18:02:07	6.5	7.0	0.4	0.14	66.4	215.6		384.1	2659	0.0020	99.9%	0.0059
18:03:07	6.6	6.9	0.4	0.14	66.4	215.6		384.1	2670	0.0020	100.0%	0.0039
18:04:07	6.3	6.7	0.4	0.14	66.5	215.6	End Run	384.2	2665	0.0019	100.0%	0.0019

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
8:36:52	1.6	2.3	0.7	0.16	62.0	-614.0	Start Run	380.9	3094	0.0006	0.0%	12.2727
8:37:52	1.6	2.2	0.6	0.16	62.5	182.4		381.3	3079	0.0006	0.0%	12.2721
8:39:52	1.5	2.2	0.7	0.16	63.0	341.9		381.7	3080	0.0005	0.0%	12.2716
8:40:52	1.9	2.3	0.4	0.16	63.4	342.0		382.0	3043	0.0007	0.0%	12.2710
8:41:52	1.5	2.2	0.7	0.16	63.5	342.1		382.0	3063	0.0005	0.0%	12.2704
8:42:52	1.5	2.2	0.7	0.16	63.5	342.2		382.0	3080	0.0005	0.0%	12.2698
8:43:52	1.5	2.2	0.8	0.16	63.7	342.2		382.2	3096	0.0005	0.0%	12.2693
8:44:52	1.8	2.2	0.5	0.16	63.8	342.2		382.3	3074	0.0006	0.0%	12.2688
8:45:52	13.4	13.9	0.5	0.16	63.9	341.5		382.3	3066	0.0047	0.1%	12.2681
8:46:52	112.5	113.1	0.6	0.16	63.6	339.0		382.1	3081	0.0399	0.4%	12.2634
8:47:52	176.6	177.1	0.5	0.16	63.6	336.6		382.1	3054	0.0621	0.9%	12.2235
8:48:52	268.6	269.1	0.5	0.16	63.6	334.2		382.1	3045	0.0942	1.7%	12.1614
8:49:52	252.4	253.0	0.6	0.16	63.6	332.1		382.1	3047	0.0886	2.4%	12.0672
8:50:52	344.7	345.0	0.3	0.16	63.5	329.9		382.1	3022	0.1200	3.4%	11.9786
8:51:52	294.2	294.4	0.2	0.15	63.7	328.0		382.2	2984	0.1011	4.2%	11.8587
8:52:52	307.6	308.2	0.6	0.16	63.7	326.6		382.2	3026	0.1072	5.1%	11.7576
8:53:52	355.6	356.3	0.7	0.15	63.6	324.2		382.1	2985	0.1222	6.1%	11.6504
8:55:03	420.6	421.4	0.9	0.15	63.6	322.1		382.1	2958	0.1432	7.2%	11.5282
8:56:08	391.5	392.2	0.7	0.15	63.5	319.7		382.0	2962	0.1336	8.3%	11.3850
8:56:52	471.5	471.5	0.0	0.15	63.5	317.3		382.0	2954	0.1604	9.6%	11.2514
8:57:52	499.1	498.9	-0.2	0.15	63.6	315.9		382.1	2941	0.1690	11.0%	11.0910
8:58:52	509.2	509.4	0.2	0.15	63.6	314.0		382.1	2947	0.1728	12.4%	10.9220
8:59:52	446.2	446.2	0.0	0.15	63.6	312.1		382.1	2947	0.1514	13.6%	10.7492
9:00:52	491.9	491.9	0.0	0.15	63.4	310.4		382.0	2956	0.1675	15.0%	10.5977
9:01:52	398.7	398.4	-0.3	0.15	62.6	309.0		381.4	2947	0.1356	16.1%	10.4302
9:02:52	408.8	408.4	-0.4	0.15	63.0	307.7		381.6	2938	0.1385	17.2%	10.2947
9:03:52	494.3	494.1	-0.2	0.14	63.3	306.5		381.9	2928	0.1667	18.6%	10.1562
9:04:52	460.7	460.7	0.0	0.14	63.7	305.5		382.1	2898	0.1538	19.9%	9.9895
9:05:52	417.5	417.3	-0.2	0.15	63.9	305.4		382.3	2938	0.1411	21.0%	9.8357
9:06:52	403.2	402.0	-1.1	0.14	64.1	304.2		382.4	2914	0.1352	22.1%	9.6946
9:07:52	478.0	476.8	-1.3	0.14	64.2	301.8		382.5	2899	0.1594	23.4%	9.5594
9:08:52	556.5	556.4	-0.1	0.15	64.1	299.4		382.5	2949	0.1888	24.9%	9.4000
9:09:52	602.2	602.4	0.2	0.14	64.2	297.3		382.5	2922	0.2024	26.6%	9.2112
9:10:52	596.3	596.4	0.1	0.14	64.1	295.1		382.5	2887	0.1980	28.2%	9.0088
9:11:52	670.4	670.5	0.1	0.14	64.2	293.4		382.5	2897	0.2234	30.0%	8.8108
9:12:52	666.9	666.7	-0.2	0.14	64.2	292.6		382.5	2893	0.2219	31.8%	8.5874
9:13:52	577.5	577.4	-0.1	0.14	64.1	291.5		382.5	2904	0.1930	33.4%	8.3655
9:14:52	608.9	608.8	-0.1	0.14	64.1	290.1		382.5	2885	0.2021	35.1%	8.1726
9:15:52	704.0	704.0	0.0	0.14	64.2	287.5		382.5	2860	0.2316	36.9%	7.9705
9:16:52	758.6	758.5	0.0	0.14	64.2	285.7		382.6	2849	0.2486	39.0%	7.7388
9:17:52	815.4	815.8	0.4	0.14	64.3	283.5		382.6	2854	0.2677	41.1%	7.4902
9:18:52	788.8	789.5	0.7	0.14	64.4	281.5		382.7	2865	0.2599	43.3%	7.2226
9:19:52	877.7	878.5	0.8	0.13	64.4	280.4		382.7	2847	0.2873	45.6%	6.9627
9:20:52	763.9	764.5	0.5	0.13	64.4	280.5		382.7	2843	0.2497	47.6%	6.6755
9:21:52	721.4	722.2	0.8	0.14	64.5	280.5		382.7	2864	0.2375	49.6%	6.4257
9:22:52	669.1	669.5	0.4	0.15	64.6	280.5		382.8	2935	0.2257	51.4%	6.1883
9:23:52	548.6	548.8	0.2	0.15	64.7	280.4		382.9	2955	0.1863	52.9%	5.9626
9:24:52	525.2	525.3	0.2	0.14	64.8	280.5		383.0	2852	0.1721	54.3%	5.7763
9:25:52	457.0	457.0	0.0	0.14	64.4	280.4		382.7	2865	0.1505	55.6%	5.6042
9:26:52	471.4	471.3	-0.1	0.14	64.5	280.4		382.8	2850	0.1544	56.8%	5.4536
9:27:52	448.3	448.3	-0.1	0.14	64.7	280.4		382.9	2858	0.1472	58.0%	5.2992
9:28:52	445.2	445.1	-0.1	0.14	64.8	280.4		383.0	2864	0.1465	59.2%	5.1520
9:29:52	430.3	430.1	-0.2	0.14	64.9	280.4		383.1	2869	0.1418	60.4%	5.0055
9:30:52	421.5	421.1	-0.4	0.14	65.0	280.4		383.1	2866	0.1387	61.5%	4.8637
9:31:52	448.3	448.0	-0.3	0.14	65.1	280.5		383.2	2854	0.1469	62.7%	4.7249
9:32:52	395.8	395.4	-0.4	0.14	65.2	280.4		383.2	2857	0.1298	63.8%	4.5780
9:33:52	403.9	403.6	-0.3	0.14	65.2	280.4		383.3	2872	0.1332	64.8%	4.4482
9:34:52	414.8	414.3	-0.5	0.14	65.3	280.4		383.4	2855	0.1359	65.9%	4.3150
9:35:52	377.8	377.6	-0.2	0.14	65.5	280.4		383.5	2865	0.1242	67.0%	4.1791
9:36:52	360.5	360.3	-0.2	0.14	65.6	280.4		383.5	2859	0.1183	67.9%	4.0549
9:37:52	388.5	388.0	-0.5	0.14	65.6	280.4		383.6	2856	0.1273	69.0%	3.9366
9:38:52	386.2	385.2	-1.0	0.14	65.8	280.4		383.7	2877	0.1274	70.0%	3.8093

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:39:52	347.1	345.9	-1.2	0.14	65.8	280.3		383.7	2882	0.1147	70.9%	3.6819
9:40:52	336.0	334.7	-1.3	0.14	65.9	280.3		383.8	2899	0.1117	71.8%	3.5672
9:41:52	333.2	332.0	-1.2	0.14	65.9	280.3		383.8	2884	0.1102	72.7%	3.4556
9:42:52	333.4	332.3	-1.2	0.14	66.0	280.3		383.8	2903	0.1110	73.6%	3.3454
9:43:52	295.0	293.7	-1.3	0.14	66.0	280.4		383.8	2906	0.0982	74.4%	3.2344
9:44:52	306.2	304.6	-1.6	0.14	66.1	280.4		383.9	2899	0.1017	75.3%	3.1362
9:45:52	321.7	321.4	-0.3	0.14	66.0	280.4		383.9	2898	0.1069	76.1%	3.0344
9:46:52	298.7	298.5	-0.2	0.14	66.1	280.4		383.9	2862	0.0980	76.9%	2.9276
9:47:52	283.2	283.0	-0.2	0.14	66.2	280.3		384.0	2860	0.0928	77.7%	2.8296
9:48:52	275.3	275.0	-0.3	0.14	66.1	280.3		383.9	2891	0.0912	78.4%	2.7368
9:49:52	300.9	300.5	-0.3	0.14	66.1	280.4		383.9	2883	0.0994	79.3%	2.6456
9:50:52	265.0	264.4	-0.6	0.14	66.2	280.4		384.0	2906	0.0882	80.0%	2.5462
9:51:52	236.4	235.6	-0.8	0.14	66.3	280.3		384.0	2900	0.0785	80.6%	2.4580
9:52:52	262.9	262.0	-0.8	0.14	66.3	280.3		384.1	2899	0.0873	81.3%	2.3795
9:53:52	260.2	259.2	-1.1	0.14	66.4	280.3		384.2	2903	0.0865	82.0%	2.2921
9:54:52	232.2	231.4	-0.8	0.14	66.5	280.3		384.2	2918	0.0776	82.7%	2.2056
9:55:52	230.8	230.4	-0.4	0.14	66.6	280.3		384.3	2895	0.0765	83.3%	2.1280
9:56:52	216.5	215.7	-0.7	0.14	66.6	280.3		384.3	2898	0.0718	83.9%	2.0515
9:57:52	218.6	217.7	-0.9	0.14	66.6	280.3		384.3	2901	0.0726	84.5%	1.9797
9:58:52	225.7	225.0	-0.7	0.14	66.6	280.3		384.3	2901	0.0750	85.1%	1.9071
9:59:52	195.1	194.5	-0.6	0.14	66.6	280.3		384.3	2908	0.0649	85.6%	1.8321
10:00:52	180.9	180.3	-0.7	0.14	66.6	280.3		384.3	2891	0.0599	86.1%	1.7672
10:01:52	201.1	200.4	-0.7	0.14	66.7	280.3		384.4	2916	0.0671	86.6%	1.7073
10:02:52	192.8	192.1	-0.6	0.14	66.9	280.3		384.5	2914	0.0643	87.2%	1.6402
10:03:52	176.5	175.7	-0.8	0.14	66.9	280.3		384.5	2904	0.0586	87.6%	1.5759
10:04:52	179.1	178.4	-0.7	0.14	67.0	280.3	***	384.6	2913	0.0597	88.1%	1.5173
10:05:52	173.0	172.4	-0.7	0.14	67.1	280.3		384.6	2913	0.0577	88.6%	1.4576
10:06:52	166.4	165.8	-0.6	0.14	67.1	280.3		384.6	2920	0.0556	89.0%	1.3999
10:07:52	157.1	156.5	-0.6	0.14	67.0	280.3		384.6	2913	0.0523	89.5%	1.3443
10:08:52	152.9	152.3	-0.6	0.14	66.9	280.3		384.5	2912	0.0510	89.9%	1.2920
10:09:52	148.8	148.3	-0.6	0.14	66.9	280.3		384.5	2916	0.0497	90.3%	1.2410
10:10:52	144.0	143.5	-0.5	0.14	66.9	280.3		384.5	2914	0.0480	90.7%	1.1913
10:11:54	136.6	136.4	-0.2	0.14	67.1	280.3		384.7	2913	0.0455	91.1%	1.1433
10:12:54	126.6	126.4	-0.2	0.14	67.1	280.3		384.7	2926	0.0424	91.4%	1.0978
10:13:54	101.0	100.5	-0.5	0.14	66.9	88.8	***	384.5	2906	0.0336	91.7%	1.0554
10:14:54	127.9	127.3	-0.6	0.14	66.8	280.3		384.4	2911	0.0426	92.0%	1.0218
10:15:54	124.3	123.9	-0.4	0.14	66.8	280.3		384.4	2921	0.0416	92.4%	0.9792
10:16:54	115.1	114.8	-0.3	0.14	66.9	280.3		384.5	2912	0.0383	92.7%	0.9376
10:17:54	115.5	115.1	-0.4	0.14	67.0	280.3		384.6	2909	0.0384	93.0%	0.8993
10:18:54	103.4	103.0	-0.4	0.14	67.2	280.3		384.7	2912	0.0344	93.3%	0.8609
10:19:54	98.9	98.6	-0.4	0.14	67.3	280.3		384.8	2912	0.0329	93.5%	0.8264
10:20:54	97.1	96.6	-0.5	0.15	67.3	280.3		384.8	2935	0.0326	93.8%	0.7935
10:21:54	93.4	92.9	-0.5	0.14	67.3	280.3		384.8	2919	0.0312	94.1%	0.7609
10:22:54	98.1	97.8	-0.3	0.14	67.4	280.3		384.9	2924	0.0328	94.3%	0.7297
10:23:54	92.9	92.3	-0.7	0.14	67.5	280.3		385.0	2928	0.0311	94.6%	0.6969
10:24:54	78.9	78.1	-0.8	0.14	67.6	280.3		385.0	2917	0.0263	94.8%	0.6658
10:25:54	89.3	88.6	-0.8	0.14	67.7	280.3		385.1	2916	0.0298	95.0%	0.6395
10:26:54	74.1	73.4	-0.7	0.14	67.7	280.3		385.1	2930	0.0248	95.2%	0.6098
10:27:54	72.1	71.5	-0.6	0.14	67.7	280.3		385.1	2912	0.0240	95.4%	0.5849
10:28:54	76.6	75.9	-0.8	0.15	67.6	280.3		385.0	2938	0.0257	95.6%	0.5609
10:29:54	63.4	62.4	-1.0	0.14	67.7	280.3		385.1	2917	0.0211	95.8%	0.5352
10:30:54	71.5	70.4	-1.0	0.14	67.9	280.3		385.2	2904	0.0237	96.0%	0.5141
10:31:54	62.7	61.6	-1.1	0.14	67.8	280.3		385.1	2910	0.0209	96.2%	0.4904
10:32:54	68.1	66.8	-1.3	0.14	67.7	280.3		385.1	2898	0.0225	96.4%	0.4695
10:33:54	58.7	57.9	-0.8	0.14	67.6	280.2		385.0	2923	0.0196	96.5%	0.4470
10:34:54	62.6	61.5	-1.1	0.14	67.7	280.3		385.1	2898	0.0207	96.7%	0.4274
10:35:54	56.5	55.5	-1.0	0.14	67.9	280.3		385.2	2911	0.0188	96.8%	0.4066
10:36:54	56.8	55.8	-1.0	0.14	67.9	280.3		385.3	2905	0.0188	97.0%	0.3878
10:37:54	51.6	50.5	-1.0	0.14	67.9	280.2		385.3	2922	0.0172	97.1%	0.3690
10:38:54	52.8	51.7	-1.1	0.14	67.9	280.2		385.3	2906	0.0175	97.3%	0.3518
10:39:54	53.1	51.8	-1.3	0.14	67.9	280.2		385.3	2913	0.0177	97.4%	0.3342
10:40:54	42.2	40.9	-1.3	0.14	67.9	280.2		385.3	2918	0.0141	97.5%	0.3166

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:41:54	50.6	49.5	-1.1	0.14	67.9	280.2		385.3	2913	0.0168	97.7%	0.3025
10:42:54	46.1	45.1	-1.1	0.14	68.0	280.2		385.3	2895	0.0153	97.8%	0.2857
10:43:54	41.8	41.0	-0.9	0.14	68.0	280.2		385.3	2913	0.0139	97.9%	0.2704
10:44:54	43.7	42.8	-0.9	0.14	68.1	280.2		385.4	2922	0.0146	98.0%	0.2565
10:45:54	41.4	40.4	-1.0	0.14	68.2	280.2		385.4	2925	0.0138	98.1%	0.2419
10:46:54	42.5	41.5	-1.0	0.14	68.3	280.2		385.5	2923	0.0142	98.3%	0.2281
10:47:54	36.5	35.5	-1.0	0.15	68.3	280.2		385.6	2957	0.0123	98.4%	0.2139
10:48:54	37.9	36.9	-1.0	0.15	68.4	280.2		385.6	2951	0.0128	98.5%	0.2016
10:49:54	32.1	31.0	-1.1	0.14	68.4	280.2		385.6	2902	0.0106	98.5%	0.1888
10:50:54	33.3	32.0	-1.3	0.14	68.4	280.2		385.6	2919	0.0111	98.6%	0.1782
10:51:54	34.0	32.9	-1.1	0.14	68.5	280.2		385.7	2928	0.0114	98.7%	0.1671
10:52:54	32.8	31.6	-1.2	0.14	68.5	280.2		385.7	2910	0.0109	98.8%	0.1557
10:53:54	26.6	25.5	-1.1	0.14	68.6	280.2		385.7	2915	0.0088	98.9%	0.1448
10:54:54	30.0	29.5	-0.5	0.14	68.7	280.1		385.8	2924	0.0100	99.0%	0.1360
10:55:54	27.0	26.7	-0.4	0.14	68.8	280.1		385.9	2910	0.0090	99.0%	0.1260
10:56:54	23.5	23.2	-0.4	0.14	68.8	280.1		385.9	2913	0.0078	99.1%	0.1170
10:57:54	20.3	19.9	-0.4	0.14	68.7	280.1		385.8	2925	0.0068	99.2%	0.1092
10:58:54	23.0	22.5	-0.5	0.14	68.7	280.1		385.8	2921	0.0077	99.2%	0.1024
10:59:54	22.1	21.5	-0.6	0.15	68.6	280.1		385.7	2980	0.0075	99.3%	0.0948
11:00:54	22.9	22.3	-0.7	0.14	68.7	280.2		385.8	2919	0.0076	99.4%	0.0872
11:01:54	21.1	20.7	-0.4	0.15	68.7	280.1		385.8	2944	0.0071	99.4%	0.0796
11:02:54	19.2	19.1	-0.1	0.14	68.7	280.1		385.8	2914	0.0064	99.5%	0.0725
11:03:54	17.2	17.0	-0.2	0.14	68.8	280.1		385.9	2928	0.0057	99.5%	0.0661
11:04:54	16.7	16.6	-0.1	0.14	68.9	280.1		386.0	2923	0.0056	99.6%	0.0604
11:05:54	16.6	16.3	-0.3	0.14	69.0	280.1		386.0	2923	0.0055	99.6%	0.0548
11:06:54	16.7	16.4	-0.3	0.14	68.9	280.1		386.0	2927	0.0056	99.6%	0.0493
11:07:54	14.6	14.3	-0.3	0.14	68.9	280.1		386.0	2924	0.0049	99.7%	0.0437
11:08:54	13.7	13.4	-0.2	0.14	69.0	280.1		386.0	2928	0.0046	99.7%	0.0389
11:09:54	14.6	14.4	-0.2	0.14	69.1	280.1		386.1	2923	0.0049	99.8%	0.0343
11:10:54	13.2	12.9	-0.3	0.14	69.2	280.1		386.2	2912	0.0044	99.8%	0.0294
11:11:54	12.6	12.4	-0.2	0.14	69.3	280.1		386.3	2906	0.0042	99.8%	0.0251
11:12:54	12.1	11.9	-0.2	0.14	69.4	280.1		386.3	2912	0.0040	99.9%	0.0209
11:13:54	11.2	11.0	-0.3	0.14	69.4	280.1		386.4	2914	0.0037	99.9%	0.0169
11:14:54	11.6	11.1	-0.5	0.15	69.4	280.1		386.3	2939	0.0039	99.9%	0.0131
11:15:54	10.5	10.2	-0.3	0.14	69.3	280.1		386.3	2928	0.0035	100.0%	0.0093
11:16:54	10.2	10.1	-0.1	0.14	69.2	280.0		386.2	2920	0.0034	100.0%	0.0057
11:17:54	7.2	6.9	-0.2	0.14	69.2	280.1	End Run	386.2	2894	0.0024	100.0%	0.0024

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:07:25	0.5	2.3	1.8	0.13	67.1	224.5		384.7	2879	0.0002	0.0%	8.3709
12:08:25	32.3	33.8	1.6	0.13	67.2	222.9		384.7	2869	0.0106	0.1%	8.3707
12:09:25	109.4	111.2	1.8	0.14	67.2	216.3		384.7	2891	0.0362	0.6%	8.3602
12:10:25	251.9	253.7	1.8	0.14	67.2	210.2		384.8	2887	0.0832	1.6%	8.3240
12:11:25	329.9	331.8	1.9	0.13	67.2	204.9		384.7	2878	0.1086	2.9%	8.2408
12:12:25	383.7	385.4	1.7	0.13	67.1	198.1		384.7	2872	0.1260	4.4%	8.1322
12:13:25	319.4	321.2	1.7	0.14	67.1	196.0		384.7	2890	0.1056	5.6%	8.0061
12:14:25	235.2	237.0	1.8	0.13	66.9	194.8		384.5	2871	0.0773	6.5%	7.9005
12:15:25	210.5	212.4	1.9	0.13	67.0	192.9		384.6	2851	0.0687	7.4%	7.8233
12:16:25	151.4	153.2	1.8	0.13	66.9	192.8		384.5	2874	0.0498	8.0%	7.7546
12:17:25	147.3	149.1	1.9	0.14	67.1	192.8		384.7	2882	0.0486	8.5%	7.7048
12:18:25	138.1	140.0	1.9	0.13	67.2	192.8		384.7	2874	0.0454	9.1%	7.6563
12:19:25	141.4	143.2	1.8	0.15	67.2	192.8		384.7	2996	0.0484	9.7%	7.6109
12:20:25	131.3	133.0	1.8	0.15	67.3	192.8		384.8	2987	0.0448	10.2%	7.5624
12:21:25	121.4	123.2	1.8	0.15	67.4	192.9		384.9	2991	0.0415	10.7%	7.5176
12:22:25	111.0	112.6	1.7	0.15	67.4	193.9		384.9	2988	0.0379	11.1%	7.4761
12:23:25	107.2	108.8	1.6	0.15	67.6	196.9		385.0	2991	0.0366	11.6%	7.4382
12:24:25	97.1	98.7	1.6	0.15	67.6	191.4		385.0	2986	0.0331	12.0%	7.4015
12:25:25	160.3	161.9	1.6	0.15	67.6	195.6		385.0	3000	0.0549	12.6%	7.3684
12:26:25	164.2	165.6	1.4	0.15	67.5	203.8		385.0	2991	0.0561	13.3%	7.3135
12:27:25	247.2	248.6	1.4	0.15	67.5	179.4		384.9	2978	0.0842	14.3%	7.2574
12:28:25	323.3	324.8	1.5	0.14	67.5	172.8		384.9	2951	0.1091	15.6%	7.1732
12:29:25	361.6	363.0	1.4	0.15	67.5	166.4		384.9	2981	0.1232	17.1%	7.0641
12:30:25	421.3	422.7	1.4	0.15	67.4	160.8		384.9	2977	0.1434	18.8%	6.9409
12:31:25	447.2	448.7	1.5	0.15	67.3	157.4		384.8	2966	0.1517	20.6%	6.7975
12:32:25	367.8	369.5	1.7	0.14	67.4	156.8		384.8	2947	0.1239	22.1%	6.6459
12:33:25	303.4	304.9	1.5	0.14	67.3	156.8		384.8	2958	0.1026	23.3%	6.5219
12:34:25	312.5	313.8	1.3	0.15	67.5	156.8		384.9	2976	0.1063	24.6%	6.4193
12:35:25	280.9	282.1	1.3	0.15	67.5	156.8		384.9	2999	0.0963	25.7%	6.3130
12:36:25	249.8	251.4	1.5	0.15	67.5	156.8		384.9	2984	0.0852	26.8%	6.2167
12:37:25	233.4	235.1	1.7	0.15	67.4	156.8		384.9	2978	0.0795	27.7%	6.1315
12:38:25	209.3	211.2	1.9	0.14	67.4	156.8		384.9	2964	0.0709	28.5%	6.0521
12:39:25	193.4	195.4	1.9	0.15	67.3	156.8		384.8	2976	0.0658	29.3%	5.9811
12:40:25	175.0	177.0	2.0	0.15	67.2	156.8		384.8	2992	0.0599	30.1%	5.9153
12:41:25	166.4	168.5	2.1	0.15	67.2	156.8		384.8	2980	0.0567	30.7%	5.8554
12:42:25	161.9	163.6	1.7	0.15	67.4	156.8		384.8	2967	0.0549	31.4%	5.7987
12:43:25	148.9	150.4	1.6	0.15	67.4	156.8		384.9	2979	0.0507	32.0%	5.7438
12:44:25	147.4	148.9	1.5	0.15	67.5	156.8		384.9	2988	0.0504	32.6%	5.6931
12:45:25	141.0	142.4	1.4	0.15	67.6	156.8		385.0	2988	0.0481	33.2%	5.6427
12:46:25	128.2	129.7	1.4	0.14	67.5	156.8		385.0	2963	0.0434	33.7%	5.5946
12:47:25	118.3	119.8	1.5	0.15	67.5	156.8		385.0	2977	0.0402	34.2%	5.5512
12:48:25	114.6	116.1	1.5	0.15	67.5	156.8		385.0	2977	0.0390	34.6%	5.5109
12:49:25	112.2	113.5	1.4	0.15	67.5	156.8		385.0	3005	0.0385	35.1%	5.4719
12:50:25	111.7	113.2	1.4	0.15	67.6	156.8		385.0	2986	0.0381	35.5%	5.4334
12:51:25	110.2	111.6	1.4	0.15	67.7	156.8		385.1	2984	0.0376	36.0%	5.3953
12:52:25	106.6	108.1	1.4	0.15	67.7	156.8		385.1	2973	0.0362	36.4%	5.3577
12:53:25	100.7	102.1	1.4	0.15	67.7	156.8		385.1	2978	0.0343	36.8%	5.3215
12:54:25	98.0	99.4	1.4	0.15	67.7	156.8		385.1	2986	0.0334	37.2%	5.2872
12:55:25	96.1	97.5	1.4	0.15	67.7	156.8		385.1	2968	0.0326	37.6%	5.2538
12:56:25	88.2	89.6	1.4	0.15	67.6	156.8		385.0	2970	0.0299	38.0%	5.2212
12:57:25	85.9	87.1	1.3	0.15	67.4	157.4		384.9	2969	0.0291	38.3%	5.1913
12:58:25	85.4	86.7	1.3	0.15	67.4	156.8		384.9	2978	0.0291	38.7%	5.1621
12:59:25	90.0	91.2	1.3	0.15	67.6	157.1		385.0	2979	0.0306	39.0%	5.1330
13:00:25	99.2	100.7	1.4	0.15	67.7	156.1		385.1	2989	0.0339	39.5%	5.1024
13:01:25	119.1	120.5	1.5	0.15	67.7	154.9		385.1	2973	0.0404	39.9%	5.0685
13:02:25	145.6	147.0	1.4	0.14	67.6	152.6		385.0	2953	0.0491	40.5%	5.0281
13:03:25	195.5	197.0	1.5	0.15	67.6	148.1		385.0	2973	0.0664	41.3%	4.9789
13:04:25	233.1	234.6	1.5	0.15	67.5	145.9		384.9	2966	0.0790	42.3%	4.9125
13:05:25	244.2	245.7	1.5	0.14	67.5	142.9		385.0	2960	0.0826	43.2%	4.8335
13:06:25	286.1	287.5	1.4	0.15	67.6	139.3		385.0	2974	0.0972	44.4%	4.7509
13:07:25	233.0	234.4	1.5	0.15	67.5	138.6		385.0	2966	0.0790	45.4%	4.6536
13:08:25	295.1	296.5	1.5	0.15	67.6	133.7		385.0	2967	0.1001	46.5%	4.5746

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:09:25	257.9	259.4	1.6	0.14	67.6	132.5		385.0	2962	0.0873	47.6%	4.4746
13:10:25	232.9	234.4	1.5	0.14	67.5	132.6		384.9	2947	0.0785	48.5%	4.3873
13:11:25	220.8	222.3	1.5	0.14	67.6	132.6		385.0	2960	0.0747	49.4%	4.3088
13:12:25	208.5	210.1	1.6	0.15	67.8	132.5		385.1	2978	0.0709	50.3%	4.2341
13:13:25	190.7	192.3	1.6	0.14	67.7	132.2		385.1	2955	0.0644	51.0%	4.1632
13:14:25	256.2	257.8	1.6	0.15	67.8	127.4		385.2	2973	0.0870	52.1%	4.0988
13:15:25	381.5	383.2	1.7	0.14	67.8	121.4		385.1	2912	0.1269	53.6%	4.0118
13:16:25	301.1	302.8	1.7	0.14	67.7	120.0		385.1	2946	0.1014	54.8%	3.8849
13:17:25	262.1	263.8	1.7	0.14	67.8	120.0		385.2	2958	0.0886	55.9%	3.7836
13:18:25	225.8	227.5	1.6	0.15	67.9	120.0		385.2	2973	0.0767	56.8%	3.6950
13:19:25	237.6	239.3	1.7	0.14	67.9	117.8		385.2	2953	0.0801	57.7%	3.6183
13:20:25	258.3	259.9	1.7	0.14	67.9	116.0		385.2	2955	0.0872	58.8%	3.5381
13:21:25	221.4	223.1	1.7	0.15	67.9	115.9		385.2	2970	0.0751	59.7%	3.4510
13:22:25	203.0	204.6	1.6	0.15	67.9	116.0		385.2	2980	0.0691	60.5%	3.3759
13:23:25	175.4	176.9	1.6	0.14	67.6	116.0		385.0	2962	0.0594	61.2%	3.3067
13:24:25	166.9	168.5	1.6	0.15	67.5	116.0		385.0	2975	0.0568	61.9%	3.2474
13:25:25	159.8	161.5	1.7	0.14	67.5	116.0		385.0	2960	0.0541	62.5%	3.1906
13:26:25	148.9	150.5	1.6	0.14	67.5	116.0		385.0	2959	0.0504	63.1%	3.1366
13:27:25	127.9	129.8	1.9	0.14	67.4	120.9		384.9	2947	0.0431	63.6%	3.0862
13:28:25	122.7	124.6	1.9	0.15	67.5	114.3		384.9	2981	0.0418	64.1%	3.0431
13:29:25	116.5	118.5	2.0	0.14	67.5	115.8		385.0	2946	0.0392	64.6%	3.0013
13:30:25	111.8	113.8	2.0	0.14	67.6	115.9		385.0	2960	0.0378	65.1%	2.9621
13:31:25	102.6	104.6	2.0	0.14	67.7	115.9		385.1	2957	0.0347	65.5%	2.9243
13:32:25	100.5	102.4	2.0	0.15	67.6	115.9		385.0	2971	0.0341	65.9%	2.8896
13:33:25	99.9	102.0	2.1	0.14	67.7	115.9		385.1	2954	0.0337	66.3%	2.8555
13:34:25	94.4	96.4	2.1	0.14	67.8	116.0		385.1	2962	0.0319	66.7%	2.8218
13:35:25	87.2	89.2	2.0	0.14	67.8	116.0		385.1	2942	0.0293	67.0%	2.7898
13:36:25	82.6	84.5	2.0	0.14	67.8	116.0		385.2	2960	0.0279	67.4%	2.7605
13:37:25	80.1	82.0	1.9	0.14	67.9	116.0		385.2	2961	0.0271	67.7%	2.7326
13:38:25	69.8	71.5	1.8	0.15	67.8	116.0		385.1	2969	0.0237	68.0%	2.7055
13:39:25	67.6	69.5	1.9	0.15	67.7	116.0		385.1	2967	0.0229	68.2%	2.6818
13:40:25	65.0	66.9	1.9	0.15	67.7	116.0		385.1	2970	0.0220	68.5%	2.6589
13:41:25	62.8	64.5	1.6	0.14	67.7	116.0		385.1	2953	0.0212	68.8%	2.6369
13:42:25	59.2	60.8	1.6	0.15	67.7	116.1		385.1	2978	0.0202	69.0%	2.6157
13:43:25	55.7	57.4	1.7	0.14	67.7	116.0		385.1	2962	0.0189	69.2%	2.5955
13:44:25	52.0	53.8	1.8	0.14	67.6	115.7		385.0	2951	0.0176	69.4%	2.5767
13:45:25	53.7	55.6	1.9	0.14	67.8	115.3		385.2	2937	0.0180	69.6%	2.5591
13:46:25	51.7	54.1	2.4	0.14	67.7	115.3		385.1	2934	0.0173	69.9%	2.5411
13:47:25	91.2	93.5	2.2	0.14	67.8	111.2		385.2	2921	0.0304	70.2%	2.5238
13:48:25	183.7	185.7	2.0	0.14	67.9	105.0		385.3	2955	0.0620	71.0%	2.4933
13:49:25	164.8	166.9	2.1	0.14	67.9	103.8		385.2	2936	0.0553	71.6%	2.4313
13:50:25	149.1	151.2	2.2	0.15	67.8	103.0		385.2	2987	0.0509	72.2%	2.3761
13:51:25	236.2	238.3	2.1	0.14	67.8	97.1		385.2	2939	0.0793	73.2%	2.3252
13:52:25	298.5	300.7	2.1	0.14	67.9	93.3		385.2	2938	0.1002	74.4%	2.2459
13:53:25	266.2	268.4	2.2	0.14	67.8	90.3		385.2	2930	0.0891	75.4%	2.1457
13:54:25	294.7	296.8	2.1	0.14	67.8	88.6		385.2	2961	0.0997	76.6%	2.0566
13:55:25	255.3	257.6	2.4	0.14	67.8	88.6		385.2	2954	0.0861	77.7%	1.9569
13:56:25	220.1	222.3	2.2	0.14	67.7	88.7		385.1	2927	0.0736	78.5%	1.8708
13:57:25	206.3	208.5	2.2	0.14	67.6	87.9		385.1	2930	0.0691	79.4%	1.7972
13:58:25	291.2	293.4	2.1	0.14	67.9	82.1		385.3	2945	0.0980	80.5%	1.7281
13:59:25	301.5	304.1	2.6	0.14	68.0	90.1		385.3	2933	0.1010	81.7%	1.6301
14:00:25	236.2	238.9	2.7	0.14	67.8	84.9		385.2	2933	0.0791	82.7%	1.5291
14:01:25	240.4	242.8	2.4	0.15	67.9	82.7		385.3	2966	0.0814	83.7%	1.4500
14:02:25	264.0	265.8	1.9	0.14	68.0	78.5		385.3	2955	0.0891	84.7%	1.3686
14:03:25	228.9	230.9	2.0	0.14	68.0	78.3		385.3	2950	0.0771	85.6%	1.2795
14:04:25	223.1	225.4	2.3	0.14	68.0	77.0		385.3	2921	0.0744	86.5%	1.2024
14:05:25	225.7	227.8	2.1	0.14	67.9	76.4		385.3	2927	0.0754	87.4%	1.1280
14:06:25	211.4	213.2	1.8	0.14	67.9	76.4		385.2	2946	0.0711	88.3%	1.0525
14:07:25	180.9	182.7	1.9	0.14	67.8	76.3		385.1	2948	0.0609	89.0%	0.9814
14:08:25	180.0	181.8	1.8	0.14	67.8	76.3		385.1	2943	0.0605	89.7%	0.9205
14:09:25	171.4	173.2	1.8	0.14	67.7	75.0		385.1	2952	0.0578	90.4%	0.8600
14:10:25	141.4	143.2	1.8	0.14	67.4	73.6		384.9	2934	0.0474	91.0%	0.8022

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:11:25	142.8	144.8	2.0	0.14	67.3	72.0		384.8	2950	0.0482	91.6%	0.7547
14:12:25	137.8	139.8	2.0	0.14	67.5	72.0		384.9	2955	0.0465	92.1%	0.7066
14:13:25	131.5	133.6	2.1	0.14	67.6	71.9		385.0	2917	0.0438	92.6%	0.6600
14:14:25	119.2	121.3	2.1	0.14	67.6	71.9		385.0	2924	0.0398	93.1%	0.6162
14:15:25	119.6	121.7	2.1	0.14	67.9	71.9		385.2	2931	0.0400	93.6%	0.5763
14:16:25	108.9	110.9	2.1	0.14	68.0	71.9		385.3	2951	0.0367	94.0%	0.5363
14:17:25	95.1	97.3	2.2	0.14	67.9	71.9		385.3	2943	0.0320	94.4%	0.4996
14:18:25	90.3	92.3	2.0	0.14	68.0	71.9		385.3	2939	0.0303	94.8%	0.4677
14:19:25	84.7	86.7	2.0	0.14	68.0	71.9		385.3	2956	0.0286	95.1%	0.4373
14:20:25	77.7	79.7	2.0	0.14	68.0	71.9		385.3	2941	0.0261	95.4%	0.4087
14:21:25	75.5	77.5	1.9	0.14	68.0	71.9		385.3	2937	0.0253	95.7%	0.3826
14:22:25	74.2	76.2	2.0	0.14	68.0	71.9		385.3	2944	0.0249	96.0%	0.3573
14:23:25	68.1	70.2	2.1	0.14	68.0	71.9		385.3	2955	0.0230	96.3%	0.3324
14:24:25	62.4	64.4	2.0	0.14	67.9	71.9		385.3	2937	0.0209	96.6%	0.3094
14:25:25	59.1	61.1	2.0	0.14	68.0	71.9		385.3	2952	0.0199	96.8%	0.2885
14:26:25	54.9	56.8	1.9	0.14	67.9	71.8		385.3	2919	0.0183	97.0%	0.2685
14:27:25	52.3	54.2	1.9	0.14	68.1	71.9		385.4	2936	0.0175	97.2%	0.2502
14:28:25	50.1	51.9	1.8	0.14	68.1	71.9		385.4	2946	0.0168	97.4%	0.2327
14:29:25	46.1	48.0	1.9	0.14	68.1	71.9		385.4	2953	0.0156	97.6%	0.2159
14:30:25	44.9	46.7	1.8	0.14	68.1	71.9		385.4	2919	0.0150	97.8%	0.2003
14:31:25	40.9	42.6	1.8	0.14	68.1	71.8		385.4	2943	0.0137	97.9%	0.1854
14:32:25	39.0	40.8	1.8	0.14	68.0	71.9		385.3	2921	0.0130	98.1%	0.1716
14:33:25	35.9	37.7	1.8	0.14	67.9	71.9		385.3	2938	0.0120	98.2%	0.1586
14:34:25	34.5	36.2	1.7	0.14	68.0	71.9		385.3	2947	0.0116	98.4%	0.1466
14:35:25	30.8	32.6	1.7	0.14	67.9	71.8		385.2	2935	0.0103	98.5%	0.1350
14:36:25	29.9	31.7	1.8	0.14	67.9	71.8		385.3	2947	0.0101	98.6%	0.1246
14:37:25	27.9	29.7	1.8	0.14	68.0	71.8		385.3	2929	0.0093	98.7%	0.1146
14:38:25	25.5	27.4	1.9	0.14	68.0	71.9		385.3	2911	0.0085	98.8%	0.1053
14:39:25	24.5	26.4	1.9	0.14	68.1	71.8		385.4	2948	0.0083	98.9%	0.0968
14:40:25	22.5	24.4	1.9	0.14	68.1	71.8		385.4	2913	0.0075	99.0%	0.0885
14:41:25	20.5	22.4	1.9	0.14	68.1	71.8		385.4	2935	0.0069	99.1%	0.0810
14:42:25	19.2	21.1	1.9	0.14	68.0	71.8		385.3	2920	0.0064	99.2%	0.0742
14:43:25	18.1	20.0	1.9	0.14	68.1	71.8		385.4	2922	0.0060	99.3%	0.0677
14:44:25	17.4	19.1	1.8	0.14	68.0	71.8		385.3	2923	0.0058	99.3%	0.0617
14:45:25	16.2	18.0	1.8	0.14	68.0	71.8		385.3	2925	0.0054	99.4%	0.0559
14:46:25	15.2	17.0	1.8	0.14	68.0	71.9		385.3	2922	0.0051	99.5%	0.0505
14:47:25	14.2	16.0	1.8	0.14	68.1	71.8		385.4	2937	0.0048	99.5%	0.0454
14:48:25	13.2	15.0	1.8	0.14	68.0	71.8		385.3	2919	0.0044	99.6%	0.0407
14:49:25	12.3	14.2	1.9	0.14	68.0	71.8		385.3	2926	0.0041	99.6%	0.0363
14:50:25	12.0	13.9	1.8	0.14	68.0	71.8		385.3	2941	0.0040	99.7%	0.0322
14:51:25	11.4	13.2	1.8	0.14	68.0	71.8		385.3	2929	0.0038	99.7%	0.0281
14:52:25	10.6	12.3	1.7	0.14	68.0	71.8		385.3	2939	0.0036	99.8%	0.0243
14:53:25	10.1	11.9	1.7	0.14	68.1	71.8		385.4	2946	0.0034	99.8%	0.0208
14:54:25	9.4	11.2	1.8	0.14	68.1	71.8		385.4	2947	0.0032	99.8%	0.0174
14:55:25	9.0	10.9	1.9	0.14	68.1	71.8		385.4	2944	0.0030	99.9%	0.0142
14:56:25	9.0	10.8	1.8	0.14	68.1	71.8		385.4	2937	0.0030	99.9%	0.0112
14:57:25	8.5	10.3	1.7	0.14	68.1	71.8		385.4	2939	0.0029	99.9%	0.0082
14:58:25	8.0	9.9	1.8	0.14	68.0	71.8		385.3	2924	0.0027	100.0%	0.0053
14:59:25	7.8	9.9	2.0	0.14	68.1	71.8		385.4	2939	0.0026	100.0%	0.0026
Average	143.4	145.2	1.8	0.143	67.7	152.7		385.1	2950	8.3709		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Flow (cfm)	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
9:34:35	0.0	0.0	2.1	0.186	62.4	550.1	381.2	3266	0.00000	0.00000	0.0%	23.0821
9:35:35	0.0	0.0	2.1	0.184	62.8	550.2	381.5	3244	0.00000	0.00000	0.0%	23.0821
9:36:35	0.0	0.0	2.3	0.181	63.2	550.3	381.8	3218	0.00000	0.00000	0.0%	23.0821
9:37:35	0.0	0.0	2.3	0.185	63.4	550.3	382.0	3250	0.00000	0.00000	0.0%	23.0821
9:38:35	19.2	21.6	2.4	0.187	63.8	549.3	382.2	3267	0.00723	0.00712	0.0%	23.0821
9:39:35	103.4	105.6	2.2	0.182	64.0	542.9	382.4	3228	0.03842	0.03782	0.2%	23.0749
9:40:35	283.5	285.8	2.3	0.176	63.6	536.1	382.1	3177	0.10371	0.10209	0.4%	23.0365
9:41:57	337.2	339.4	2.2	0.173	63.6	531.4	382.1	3147	0.12219	0.12029	0.5%	22.9328
9:42:35	217.5	219.9	2.4	0.174	63.9	528.6	382.3	3157	0.07904	0.07781	0.3%	22.8106
9:43:35	271.5	273.9	2.4	0.172	63.8	523.0	382.3	3137	0.09804	0.09652	0.4%	22.7315
9:44:35	414.3	416.7	2.4	0.171	63.7	517.0	382.2	3127	0.14919	0.14686	0.6%	22.6335
9:45:35	351.2	353.7	2.5	0.173	63.9	516.1	382.3	3145	0.12710	0.12512	0.6%	22.4843
9:46:35	303.8	306.3	2.5	0.174	64.0	516.1	382.4	3152	0.11020	0.10848	0.5%	22.3572
9:47:35	315.4	317.9	2.4	0.171	64.0	512.7	382.4	3130	0.11360	0.11183	0.5%	22.2470
9:48:35	343.9	346.3	2.5	0.171	64.0	505.9	382.4	3123	0.12357	0.12165	0.5%	22.1334
9:49:35	414.8	417.3	2.5	0.171	64.0	502.7	382.4	3127	0.14927	0.14695	0.6%	22.0098
9:50:35	424.1	426.6	2.5	0.170	64.1	498.3	382.5	3117	0.15207	0.14970	0.7%	21.8606
9:51:35	472.4	474.8	2.4	0.170	64.1	492.2	382.5	3114	0.16924	0.16661	0.7%	21.7085
9:52:35	453.9	456.5	2.6	0.172	64.1	491.2	382.5	3140	0.16393	0.16138	0.7%	21.5393
9:53:35	309.2	311.8	2.6	0.173	64.4	490.3	382.7	3150	0.11199	0.11025	0.5%	21.3753
9:54:35	275.3	277.9	2.6	0.178	64.4	487.9	382.7	3193	0.10106	0.09949	0.4%	21.2633
9:55:35	388.2	390.8	2.6	0.178	64.1	481.1	382.4	3188	0.14237	0.14016	0.6%	21.1623
9:56:35	487.3	490.0	2.6	0.170	63.8	474.2	382.2	3119	0.17498	0.17226	0.8%	21.0199
9:57:35	449.0	451.6	2.6	0.167	63.6	469.2	382.1	3092	0.15987	0.15738	0.7%	20.8449
9:58:35	430.0	432.6	2.5	0.171	63.7	468.9	382.2	3130	0.15495	0.15254	0.7%	20.6850
9:59:35	402.5	405.0	2.5	0.173	63.9	469.0	382.3	3144	0.14565	0.14339	0.6%	20.5301
10:00:35	369.0	371.4	2.4	0.171	64.0	469.0	382.4	3125	0.13269	0.13062	0.6%	20.3844
10:01:35	298.0	300.4	2.4	0.174	64.2	469.0	382.5	3151	0.10801	0.10633	0.5%	20.2517
10:02:35	263.4	265.9	2.5	0.173	64.3	470.3	382.6	3143	0.09521	0.09373	0.4%	20.1437
10:03:35	241.9	244.6	2.6	0.173	64.4	471.3	382.7	3142	0.08742	0.08606	0.4%	20.0485
10:04:35	262.4	265.1	2.7	0.174	64.5	470.0	382.8	3153	0.09511	0.09363	0.4%	19.9611
10:05:35	187.6	190.4	2.9	0.178	64.8	469.4	383.0	3190	0.06875	0.06768	0.3%	19.8660
10:06:35	157.0	159.9	2.9	0.181	64.8	469.5	383.0	3213	0.05797	0.05706	0.3%	19.7972
10:07:35	168.4	171.3	3.0	0.181	64.9	470.7	383.1	3216	0.06220	0.06123	0.3%	19.7393
10:08:35	195.9	198.7	2.9	0.177	64.9	469.4	383.0	3181	0.07156	0.07045	0.3%	19.6771
10:09:35	176.1	179.4	3.3	0.178	64.9	469.4	383.1	3186	0.06443	0.06343	0.3%	19.6055
10:10:35	163.0	166.1	3.1	0.179	65.0	469.4	383.1	3195	0.05982	0.05889	0.3%	19.5411
10:11:35	168.5	171.6	3.1	0.179	65.0	469.5	383.2	3198	0.06187	0.06090	0.3%	19.4813
10:12:35	164.0	167.3	3.2	0.177	65.1	469.5	383.2	3184	0.05996	0.05903	0.3%	19.4194
10:13:35	161.7	165.2	3.6	0.183	65.1	469.5	383.2	3232	0.05998	0.05905	0.3%	19.3594
10:14:35	150.1	153.8	3.7	0.180	65.1	469.5	383.2	3208	0.05530	0.05444	0.2%	19.2994
10:15:35	145.0	148.6	3.6	0.180	65.1	470.1	383.2	3207	0.05339	0.05256	0.2%	19.2441
10:16:35	133.8	137.4	3.6	0.180	65.2	469.5	383.3	3210	0.04932	0.04855	0.2%	19.1907
10:17:35	118.0	121.6	3.6	0.181	65.3	469.2	383.3	3215	0.04353	0.04285	0.2%	19.1414
10:18:35	130.6	134.2	3.6	0.179	65.3	467.9	383.3	3197	0.04792	0.04717	0.2%	19.0979
10:19:35	157.2	160.7	3.5	0.179	65.4	466.2	383.4	3195	0.05763	0.05674	0.2%	19.0500
10:20:35	235.2	238.8	3.6	0.175	65.1	460.0	383.2	3159	0.08530	0.08397	0.4%	18.9924
10:21:35	382.9	386.5	3.5	0.170	64.9	453.1	383.0	3117	0.13714	0.13500	0.6%	18.9071
10:22:35	444.8	448.5	3.7	0.171	64.8	449.5	382.9	3127	0.15983	0.15734	0.7%	18.7699
10:23:35	387.5	391.0	3.5	0.173	64.8	444.2	383.0	3145	0.14000	0.13782	0.6%	18.6101
10:24:35	447.8	451.5	3.7	0.181	64.8	437.6	383.0	3221	0.16573	0.16315	0.7%	18.4701
10:25:35	525.2	529.0	3.7	0.171	64.8	435.1	383.0	3123	0.18844	0.18551	0.8%	18.3044
10:26:35	480.2	483.7	3.5	0.168	64.8	433.9	383.0	3103	0.17119	0.16852	0.7%	18.1159
10:27:35	500.9	504.4	3.6	0.167	64.9	428.9	383.0	3090	0.17778	0.17501	0.8%	17.9447
10:28:35	480.4	483.8	3.4	0.169	65.0	425.5	383.1	3112	0.17170	0.16903	0.7%	17.7670
10:29:35	536.0	539.5	3.5	0.171	65.0	422.3	383.1	3127	0.19252	0.18953	0.8%	17.5953
10:30:35	471.2	474.8	3.6	0.174	65.0	422.3	383.2	3151	0.17049	0.16784	0.7%	17.4027
10:31:35	388.1	391.6	3.5	0.177	65.2	422.4	383.2	3178	0.14158	0.13937	0.6%	17.2322
10:32:35	356.6	360.1	3.4	0.170	65.2	420.6	383.3	3119	0.12768	0.12569	0.6%	17.0907
10:33:35	405.0	408.5	3.4	0.172	65.2	414.0	383.3	3138	0.14592	0.14365	0.6%	16.9630
10:34:35	486.0	489.5	3.4	0.168	65.1	410.3	383.2	3103	0.17317	0.17047	0.8%	16.8171
10:35:35	432.3	435.9	3.6	0.164	64.9	404.3	383.1	3064	0.15215	0.14978	0.7%	16.6439

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Flow (cfm)	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
10:36:35	500.4	503.8	3.4	0.169	64.9	397.5	383.0	3105	0.17850	0.17572	0.8%	16.4917
10:37:35	551.6	554.9	3.3	0.164	64.9	394.4	383.0	3064	0.19415	0.19112	0.8%	16.3132
10:38:35	583.5	586.8	3.3	0.166	64.9	394.3	383.1	3082	0.20659	0.20338	0.9%	16.1191
10:39:35	505.7	509.1	3.3	0.168	65.0	394.3	383.2	3099	0.17996	0.17716	0.8%	15.9125
10:40:35	464.0	467.2	3.3	0.165	65.2	394.3	383.2	3076	0.16383	0.16128	0.7%	15.7325
10:41:35	380.5	383.7	3.2	0.166	65.3	394.3	383.3	3083	0.13467	0.13257	0.6%	15.5687
10:42:35	320.8	324.1	3.3	0.170	65.4	394.3	383.4	3121	0.11489	0.11310	0.5%	15.4340
10:43:35	286.5	289.9	3.4	0.172	65.5	394.3	383.5	3138	0.10317	0.10156	0.4%	15.3192
10:44:35	263.6	267.0	3.4	0.171	65.5	394.3	383.5	3128	0.09461	0.09314	0.4%	15.2160
10:45:35	242.7	246.0	3.3	0.171	65.6	394.3	383.5	3131	0.08718	0.08583	0.4%	15.1214
10:46:35	218.9	222.3	3.4	0.174	65.7	394.3	383.6	3153	0.07917	0.07794	0.3%	15.0342
10:47:35	198.2	201.6	3.5	0.168	65.7	394.3	383.6	3098	0.07040	0.06931	0.3%	14.9550
10:48:35	163.5	166.6	3.1	0.175	65.7	394.3	383.6	3164	0.05933	0.05841	0.3%	14.8846
10:49:35	187.4	190.5	3.1	0.173	65.8	394.3	383.7	3143	0.06755	0.06649	0.3%	14.8253
10:50:35	157.3	160.1	2.8	0.170	65.8	394.3	383.7	3122	0.05630	0.05542	0.2%	14.7577
10:51:35	159.0	161.7	2.7	0.173	65.8	394.3	383.7	3147	0.05737	0.05648	0.2%	14.7014
10:52:35	165.9	168.7	2.8	0.171	65.9	394.3	383.7	3128	0.05950	0.05857	0.3%	14.6441
10:53:35	145.4	148.0	2.6	0.177	65.9	394.3	383.8	3180	0.05301	0.05218	0.2%	14.5846
10:54:35	154.8	157.5	2.7	0.174	66.0	394.3	383.8	3151	0.05591	0.05504	0.2%	14.5316
10:55:35	155.0	157.6	2.7	0.176	66.0	394.3	383.8	3173	0.05637	0.05549	0.2%	14.4757
10:56:35	154.0	156.6	2.6	0.171	66.0	394.3	383.8	3127	0.05520	0.05434	0.2%	14.4193
10:57:35	124.0	126.7	2.8	0.176	66.0	394.3	383.8	3171	0.04506	0.04436	0.2%	14.3641
10:58:35	143.3	145.9	2.6	0.171	66.0	394.3	383.9	3129	0.05140	0.05060	0.2%	14.3190
10:59:35	125.7	128.3	2.6	0.175	66.1	394.3	383.9	3159	0.04550	0.04479	0.2%	14.2676
11:00:35	123.8	126.6	2.8	0.172	66.1	394.3	383.9	3136	0.04451	0.04381	0.2%	14.2221
11:01:35	119.9	123.0	3.0	0.174	66.1	394.3	384.0	3154	0.04335	0.04267	0.2%	14.1776
11:02:35	107.9	110.1	2.2	0.172	66.2	394.3	384.0	3132	0.03873	0.03813	0.2%	14.1343
11:03:35	113.1	115.1	2.0	0.171	66.2	394.3	384.0	3131	0.04059	0.03996	0.2%	14.0955
11:04:35	101.0	103.3	2.4	0.170	66.2	394.3	384.0	3121	0.03610	0.03554	0.2%	14.0550
11:05:35	102.1	104.3	2.2	0.177	66.3	394.3	384.1	3180	0.03721	0.03663	0.2%	14.0188
11:06:35	100.1	102.2	2.0	0.155	66.3	394.3	384.1	2977	0.03416	0.03363	0.1%	13.9816
11:07:35	92.7	95.2	2.5	0.130	66.4	394.3	384.1	2723	0.02892	0.02847	0.1%	13.9475
11:08:35	91.9	95.4	3.4	0.116	66.3	394.2	384.1	2581	0.02717	0.02675	0.1%	13.9186
11:09:35	95.5	99.0	3.4	0.166	66.4	394.3	384.2	3083	0.03372	0.03320	0.1%	13.8914
11:10:35	89.2	92.5	3.3	0.127	66.4	394.2	384.1	2693	0.02752	0.02709	0.1%	13.8577
11:11:35	84.7	87.9	3.2	0.171	66.6	394.2	384.3	3128	0.03032	0.02985	0.1%	13.8301
11:12:35	91.4	94.7	3.3	0.169	66.6	394.2	384.3	3113	0.03257	0.03207	0.1%	13.7998
11:13:35	86.0	89.3	3.3	0.170	66.7	394.2	384.3	3116	0.03069	0.03021	0.1%	13.7672
11:14:35	84.0	85.3	1.3	0.173	66.7	394.2	384.4	3146	0.03026	0.02979	0.1%	13.7366
11:15:35	88.8	83.9	-4.9	0.172	66.7	394.2	384.4	3138	0.03190	0.03140	0.1%	13.7063
11:16:35	88.4	82.3	-6.1	0.173	66.8	394.2	384.4	3144	0.03182	0.03133	0.1%	13.6744
11:17:35	89.9	79.0	-11.0	0.176	66.8	394.2	384.4	3168	0.03262	0.03211	0.1%	13.6426
11:18:35	96.0	79.7	-16.3	0.176	66.8	394.2	384.5	3171	0.03484	0.03429	0.2%	13.6100
11:19:35	94.6	79.6	-15.0	0.174	66.8	394.2	384.5	3155	0.03416	0.03363	0.1%	13.5751
11:20:35	90.7	73.5	-17.3	0.174	66.9	394.2	384.5	3155	0.03275	0.03224	0.1%	13.5410
11:21:35	71.0	74.2	3.2	0.173	66.9	394.2	384.5	3150	0.02558	0.02519	0.1%	13.5082
11:22:35	70.4	75.0	4.6	0.172	66.9	394.2	384.5	3139	0.02529	0.02489	0.1%	13.4826
11:23:35	69.7	75.1	5.4	0.174	66.9	394.2	384.5	3157	0.02519	0.02480	0.1%	13.4573
11:24:35	69.6	75.2	5.6	0.174	66.9	394.2	384.5	3150	0.02509	0.02470	0.1%	13.4321
11:25:35	67.2	72.8	5.6	0.173	67.0	394.2	384.6	3149	0.02420	0.02383	0.1%	13.4071
11:26:35	64.3	70.2	5.9	0.176	67.0	394.2	384.6	3169	0.02331	0.02294	0.1%	13.3828
11:27:35	64.0	70.7	6.7	0.176	67.0	394.2	384.6	3170	0.02321	0.02285	0.1%	13.3595
11:28:35	63.6	70.3	6.7	0.176	67.0	394.2	384.6	3177	0.02311	0.02275	0.1%	13.3363
11:29:35	62.1	69.2	7.1	0.173	67.1	394.2	384.6	3144	0.02232	0.02198	0.1%	13.3132
11:30:35	58.7	65.9	7.3	0.176	67.2	394.2	384.7	3175	0.02130	0.02096	0.1%	13.2909
11:31:35	60.9	68.8	7.8	0.175	67.2	394.2	384.8	3168	0.02208	0.02173	0.1%	13.2696
11:32:35	56.1	63.7	7.6	0.172	67.3	394.1	384.8	3137	0.02013	0.01982	0.1%	13.2475
11:33:35	53.8	61.8	8.0	0.176	67.3	394.1	384.8	3174	0.01951	0.01921	0.1%	13.2274
11:34:35	46.9	55.7	8.7	0.178	67.4	394.1	384.8	3188	0.01711	0.01684	0.1%	13.2079
11:35:35	43.3	52.5	9.2	0.179	67.3	394.1	384.8	3203	0.01587	0.01562	0.1%	13.1908
11:36:35	39.1	48.6	9.5	0.172	67.2	394.1	384.8	3139	0.01405	0.01383	0.1%	13.1749
11:37:35	42.9	52.4	9.6	0.173	67.3	394.1	384.8	3145	0.01541	0.01517	0.1%	13.1609

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Flow (cfm)	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
11:38:35	39.6	49.6	10.0	0.174	67.4	394.1	384.8	3154	0.01426	0.01404	0.1%	13.1455
11:39:35	45.0	50.3	5.4	0.172	67.5	394.1	384.9	3137	0.01612	0.01587	0.1%	13.1312
11:40:35	48.5	47.5	-1.0	0.174	67.5	394.1	385.0	3152	0.01748	0.01721	0.1%	13.1151
11:41:35	37.5	42.9	5.3	0.168	67.6	394.1	385.0	3104	0.01332	0.01311	0.1%	13.0976
11:42:35	30.8	41.6	10.8	0.173	67.6	394.1	385.0	3142	0.01108	0.01090	0.0%	13.0843
11:43:35	27.7	38.7	11.0	0.175	67.6	394.1	385.0	3164	0.01003	0.00988	0.0%	13.0732
11:44:35	25.1	36.1	11.0	0.172	67.6	394.1	385.0	3133	0.00898	0.00884	0.0%	13.0632
11:45:35	22.4	33.4	11.0	0.174	67.6	394.1	385.1	3155	0.00808	0.00796	0.0%	13.0542
11:46:35	20.4	31.7	11.3	0.171	67.7	394.1	385.1	3129	0.00729	0.00718	0.0%	13.0461
11:47:35	18.4	29.9	11.5	0.173	67.6	394.1	385.0	3143	0.00662	0.00652	0.0%	13.0388
11:48:35	14.7	26.4	11.6	0.172	67.6	394.1	385.0	3136	0.00528	0.00520	0.0%	13.0322
11:49:35	13.3	25.2	11.8	0.175	67.7	393.9	385.1	3162	0.00482	0.00474	0.0%	13.0269
11:50:35	12.3	23.8	11.4	0.176	67.7	394.0	385.1	3170	0.00447	0.00440	0.0%	13.0221
11:51:35	47.0	58.7	11.8	0.178	67.7	391.6	385.1	3187	0.01711	0.01684	0.1%	13.0176
11:52:35	134.0	145.7	11.7	0.174	67.8	385.1	385.2	3155	0.04828	0.04753	0.2%	13.0005
11:53:35	191.8	198.7	6.9	0.175	67.9	382.0	385.2	3164	0.06930	0.06822	0.3%	12.9522
11:54:35	253.5	238.5	-14.9	0.174	68.0	377.3	385.3	3154	0.09130	0.08988	0.4%	12.8829
11:55:35	302.0	301.0	-1.1	0.179	68.0	375.6	385.3	3202	0.11043	0.10871	0.5%	12.7916
11:56:35	391.5	394.9	3.4	0.178	68.0	369.7	385.3	3190	0.14259	0.14037	0.6%	12.6812
11:57:35	437.9	449.5	11.6	0.177	68.0	364.9	385.3	3182	0.15912	0.15664	0.7%	12.5386
11:58:35	449.5	461.0	11.5	0.177	68.1	360.9	385.4	3183	0.16339	0.16084	0.7%	12.3795
11:59:35	431.7	443.2	11.5	0.176	68.0	357.0	385.3	3175	0.15651	0.15408	0.7%	12.2161
12:00:35	548.1	559.3	11.2	0.177	68.1	352.3	385.4	3183	0.19915	0.19605	0.9%	12.0596
12:01:35	602.3	613.3	11.0	0.175	68.0	346.7	385.3	3164	0.21762	0.21423	0.9%	11.8604
12:02:35	527.6	538.5	10.9	0.176	68.0	345.8	385.3	3171	0.19099	0.18802	0.8%	11.6428
12:03:35	463.2	474.0	10.8	0.172	68.1	340.4	385.4	3138	0.16596	0.16338	0.7%	11.4518
12:04:35	491.2	501.9	10.7	0.172	68.0	336.2	385.3	3138	0.17599	0.17325	0.8%	11.2859
12:05:35	511.2	521.7	10.6	0.174	68.0	332.4	385.3	3157	0.18429	0.18142	0.8%	11.1099
12:06:35	558.2	568.6	10.4	0.173	68.1	330.4	385.4	3146	0.20053	0.19741	0.9%	10.9256
12:07:35	497.3	507.4	10.2	0.173	68.0	326.7	385.3	3147	0.17869	0.17591	0.8%	10.7251
12:08:35	500.4	510.3	9.9	0.175	68.1	325.3	385.4	3165	0.18082	0.17801	0.8%	10.5464
12:09:35	415.0	424.8	9.8	0.174	68.1	323.5	385.4	3157	0.14960	0.14727	0.6%	10.3655
12:10:35	415.9	425.6	9.6	0.172	68.1	317.2	385.4	3134	0.14882	0.14650	0.6%	10.2159
12:11:35	513.3	522.8	9.5	0.175	68.1	313.6	385.4	3166	0.18555	0.18267	0.8%	10.0671
12:12:35	559.7	569.0	9.3	0.172	68.2	310.6	385.4	3135	0.20032	0.19720	0.9%	9.8816
12:13:35	544.6	553.8	9.1	0.177	68.2	307.6	385.5	3178	0.19756	0.19448	0.9%	9.6813
12:14:35	514.6	523.7	9.0	0.179	68.2	301.3	385.4	3201	0.18804	0.18511	0.8%	9.4837
12:15:35	517.5	526.3	8.8	0.177	68.2	299.3	385.4	3178	0.18775	0.18483	0.8%	9.2957
12:16:35	526.9	535.6	8.7	0.175	68.2	297.1	385.4	3164	0.19031	0.18735	0.8%	9.1079
12:17:35	432.9	441.4	8.5	0.174	68.0	296.2	385.3	3153	0.15586	0.15343	0.7%	8.9176
12:18:35	395.2	403.6	8.4	0.173	68.1	296.3	385.4	3148	0.14207	0.13986	0.6%	8.7617
12:19:35	386.7	394.9	8.2	0.174	68.1	296.3	385.4	3153	0.13920	0.13704	0.6%	8.6197
12:20:35	320.5	328.6	8.1	0.177	68.3	296.3	385.5	3179	0.11629	0.11448	0.5%	8.4805
12:21:35	285.1	293.1	8.0	0.175	68.3	296.3	385.5	3162	0.10291	0.10131	0.4%	8.3642
12:22:35	254.4	262.2	7.8	0.175	68.3	296.3	385.5	3162	0.09179	0.09037	0.4%	8.2613
12:23:35	231.2	238.9	7.7	0.191	68.3	296.3	385.5	3309	0.08730	0.08594	0.4%	8.1695
12:24:35	227.2	234.9	7.7	0.178	68.3	296.3	385.5	3187	0.08266	0.08138	0.4%	8.0822
12:25:35	211.3	218.9	7.7	0.178	68.3	296.3	385.5	3190	0.07690	0.07570	0.3%	7.9995
12:26:35	190.1	197.6	7.5	0.178	68.3	296.3	385.6	3189	0.06917	0.06810	0.3%	7.9226
12:27:35	173.5	180.9	7.4	0.178	68.4	296.3	385.6	3188	0.06313	0.06215	0.3%	7.8534
12:28:35	172.0	179.3	7.3	0.177	68.3	296.3	385.6	3181	0.06244	0.06147	0.3%	7.7903
12:29:35	161.2	168.2	7.1	0.179	68.4	296.3	385.6	3199	0.05883	0.05791	0.3%	7.7279
12:30:35	148.7	155.8	7.0	0.177	68.4	296.3	385.6	3180	0.05397	0.05313	0.2%	7.6690
12:31:35	131.6	138.5	6.9	0.178	68.4	296.3	385.6	3187	0.04787	0.04713	0.2%	7.6151
12:32:35	129.8	136.6	6.8	0.178	68.4	296.3	385.6	3193	0.04730	0.04657	0.2%	7.5672
12:33:35	126.3	132.9	6.6	0.181	68.5	296.3	385.6	3216	0.04634	0.04562	0.2%	7.5199
12:34:35	121.7	128.2	6.5	0.179	68.5	296.3	385.7	3198	0.04441	0.04371	0.2%	7.4735
12:35:35	118.8	125.2	6.4	0.181	68.5	296.3	385.7	3213	0.04354	0.04287	0.2%	7.4291
12:36:35	117.7	124.0	6.3	0.179	68.6	296.3	385.8	3200	0.04296	0.04229	0.2%	7.3856
12:37:35	109.6	115.8	6.2	0.179	68.6	296.3	385.8	3203	0.04006	0.03943	0.2%	7.3426
12:38:35	102.8	108.9	6.0	0.179	68.6	296.3	385.8	3196	0.03748	0.03690	0.2%	7.3026
12:39:35	101.4	107.4	6.0	0.181	68.6	296.3	385.8	3221	0.03726	0.03668	0.2%	7.2651

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Molar Volume	Flow (cfm)	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
12:40:35	99.3	105.1	5.8	0.178	68.7	296.3	385.8	3187	0.03609	0.03552	0.2%	7.2278
12:41:35	96.4	102.1	5.7	0.180	68.7	296.3	385.8	3209	0.03529	0.03474	0.2%	7.1917
12:42:35	93.5	99.1	5.6	0.181	68.7	296.3	385.8	3216	0.03429	0.03375	0.1%	7.1565
12:43:35	89.4	94.9	5.5	0.180	68.7	296.3	385.9	3207	0.03270	0.03219	0.1%	7.1222
12:44:35	83.5	89.0	5.5	0.181	68.7	296.4	385.8	3220	0.03066	0.03019	0.1%	7.0895
12:45:35	86.4	91.8	5.4	0.178	68.8	296.4	385.9	3186	0.03140	0.03091	0.1%	7.0588
12:46:35	86.4	91.7	5.3	0.183	68.9	296.3	386.0	3238	0.03190	0.03140	0.1%	7.0274
12:47:35	78.1	83.2	5.2	0.179	68.9	296.4	386.0	3196	0.02844	0.02799	0.1%	6.9955
12:48:35	83.1	88.2	5.0	0.181	69.0	296.4	386.0	3214	0.03046	0.02999	0.1%	6.9671
12:49:35	83.3	88.2	5.0	0.183	69.1	296.2	386.1	3232	0.03068	0.03020	0.1%	6.9366
12:50:35	68.8	73.7	4.9	0.183	69.0	296.3	386.1	3235	0.02538	0.02498	0.1%	6.9059
12:51:35	65.5	70.3	4.8	0.198	69.1	296.3	386.1	3363	0.02509	0.02470	0.1%	6.8806
12:52:35	58.0	62.8	4.7	0.184	69.1	296.3	386.1	3242	0.02144	0.02111	0.1%	6.8555
12:53:35	54.1	58.8	4.8	0.180	69.1	295.8	386.1	3213	0.01980	0.01950	0.1%	6.8340
12:54:35	128.5	133.1	4.6	0.179	69.1	290.3	386.1	3195	0.04679	0.04606	0.2%	6.8142
12:55:35	216.4	221.0	4.6	0.180	69.1	286.2	386.1	3206	0.07904	0.07781	0.3%	6.7674
12:56:35	212.9	217.5	4.6	0.181	69.2	283.4	386.2	3221	0.07813	0.07691	0.3%	6.6884
12:57:35	292.7	297.1	4.5	0.179	69.3	279.6	386.2	3203	0.10679	0.10513	0.5%	6.6103
12:58:35	334.4	338.9	4.5	0.179	69.1	276.1	386.1	3198	0.12188	0.11999	0.5%	6.5035
12:59:35	451.6	456.0	4.4	0.175	69.1	269.4	386.1	3163	0.16281	0.16028	0.7%	6.3816
13:00:35	436.6	440.9	4.3	0.179	69.1	267.4	386.1	3195	0.15896	0.15648	0.7%	6.2188
13:01:35	305.8	310.1	4.3	0.179	69.3	267.4	386.2	3204	0.11162	0.10988	0.5%	6.0598
13:02:35	280.1	284.4	4.3	0.184	69.3	267.3	386.2	3244	0.10351	0.10190	0.4%	5.9482
13:03:35	262.4	266.6	4.2	0.178	69.3	266.4	386.3	3194	0.09547	0.09398	0.4%	5.8447
13:04:35	412.2	416.4	4.1	0.176	69.3	261.0	386.2	3174	0.14906	0.14674	0.6%	5.7492
13:05:35	401.5	405.6	4.1	0.179	69.3	258.6	386.2	3195	0.14617	0.14390	0.6%	5.6002
13:06:35	447.0	450.9	4.0	0.178	69.2	253.0	386.2	3187	0.16228	0.15976	0.7%	5.4540
13:07:35	484.6	488.5	3.9	0.178	69.2	249.0	386.2	3189	0.17606	0.17332	0.8%	5.2917
13:08:35	430.5	434.4	3.9	0.179	69.2	248.6	386.2	3195	0.15672	0.15428	0.7%	5.1157
13:09:35	470.7	474.6	3.8	0.179	69.2	243.1	386.2	3202	0.17174	0.16907	0.7%	4.9589
13:10:35	471.4	475.2	3.8	0.178	69.2	241.0	386.2	3189	0.17129	0.16863	0.7%	4.7872
13:11:35	436.7	440.4	3.7	0.177	69.3	194.1	386.3	3181	0.15821	0.15575	0.7%	4.6159
13:12:35	435.0	438.6	3.6	0.179	69.3	235.4	386.3	3198	0.15844	0.15597	0.7%	4.4577
13:13:35	431.4	435.1	3.6	0.181	69.4	234.5	386.3	3221	0.15828	0.15581	0.7%	4.2993
13:14:35	362.2	365.8	3.6	0.180	69.5	233.1	386.4	3207	0.13230	0.13024	0.6%	4.1410
13:15:35	424.8	428.3	3.5	0.181	69.4	229.1	386.3	3221	0.15585	0.15342	0.7%	4.0087
13:16:35	397.4	400.9	3.5	0.183	69.4	228.7	386.4	3236	0.14645	0.14417	0.6%	3.8528
13:17:35	393.6	397.0	3.5	0.184	69.5	225.9	386.4	3243	0.14537	0.14310	0.6%	3.7064
13:18:35	488.1	491.6	3.5	0.177	69.4	220.7	386.3	3184	0.17699	0.17423	0.8%	3.5610
13:19:35	451.6	455.1	3.5	0.178	69.4	219.3	386.3	3189	0.16404	0.16149	0.7%	3.3840
13:20:35	448.1	451.7	3.5	0.177	69.5	216.5	386.4	3178	0.16215	0.15963	0.7%	3.2200
13:21:35	516.4	519.9	3.5	0.179	69.4	210.6	386.4	3196	0.18795	0.18502	0.8%	3.0578
13:22:35	642.8	646.3	3.5	0.176	69.5	206.3	386.4	3174	0.23235	0.22873	1.0%	2.8699
13:23:35	519.0	522.6	3.6	0.179	69.5	204.0	386.4	3201	0.18915	0.18620	0.8%	2.6375
13:24:35	458.9	462.4	3.6	0.180	69.4	202.3	386.4	3212	0.16784	0.16523	0.7%	2.4484
13:25:35	369.3	372.9	3.6	0.178	69.5	202.2	386.4	3189	0.13410	0.13202	0.6%	2.2805
13:26:35	382.8	386.4	3.6	0.181	69.5	200.9	386.4	3217	0.14023	0.13805	0.6%	2.1464
13:27:35	333.0	336.5	3.5	0.191	69.6	200.6	386.5	3305	0.12531	0.12336	0.5%	2.0062
13:28:35	295.1	298.7	3.6	0.189	69.6	200.6	386.5	3284	0.11034	0.10863	0.5%	1.8809
13:29:35	273.0	276.7	3.7	0.183	69.5	200.6	386.4	3233	0.10051	0.09894	0.4%	1.7706
13:30:35	237.6	241.3	3.7	0.183	69.5	200.6	386.4	3237	0.08756	0.08620	0.4%	1.6701
13:31:35	213.6	217.4	3.8	0.183	69.5	200.6	386.4	3231	0.07860	0.07737	0.3%	1.5825
13:32:35	195.3	199.2	4.0	0.182	69.6	200.6	386.5	3228	0.07176	0.07064	0.3%	1.5039
13:33:35	183.4	187.5	4.0	0.183	69.6	200.6	386.5	3233	0.06753	0.06648	0.3%	1.4321
13:34:35	153.5	157.6	4.1	0.181	69.6	200.6	386.5	3217	0.05624	0.05536	0.2%	1.3646
13:35:35	130.4	134.5	4.1	0.182	69.6	200.6	386.5	3224	0.04788	0.04714	0.2%	1.3084
13:36:35	133.5	137.5	4.0	0.184	69.6	200.6	386.5	3242	0.04926	0.04849	0.2%	1.2605
13:37:35	124.2	128.2	4.0	0.182	69.6	200.6	386.5	3229	0.04566	0.04495	0.2%	1.2112
13:38:35	116.9	120.9	4.0	0.180	69.6	200.6	386.5	3213	0.04274	0.04208	0.2%	1.1656
13:39:35	107.3	111.4	4.1	0.183	69.6	200.6	386.5	3239	0.03956	0.03895	0.2%	1.1228
13:40:35	103.6	107.6	4.0	0.182	69.6	200.6	386.5	3230	0.03809	0.03750	0.2%	1.0833
13:41:35	96.4	100.4	4.0	0.184	69.7	200.6	386.5	3240	0.03557	0.03502	0.2%	1.0452

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)		Molar Volume	Flow (cfm)	Mass as Propane	Mass as Styrene	Cum Percent	Declining Mass
13:42:35	90.7	94.8	4.1	0.186	69.7	200.6		386.6	3259	0.03365	0.03313	0.1%	1.0096
13:43:35	98.0	102.2	4.1	0.182	69.8	200.6		386.6	3230	0.03603	0.03547	0.2%	0.9760
13:44:35	101.8	106.1	4.3	0.183	69.8	200.6		386.7	3234	0.03746	0.03688	0.2%	0.9399
13:45:35	95.5	100.0	4.6	0.179	69.8	200.6		386.6	3202	0.03480	0.03425	0.2%	0.9025
13:46:35	93.8	98.4	4.6	0.184	69.7	200.6		386.6	3248	0.03466	0.03412	0.2%	0.8677
13:47:35	94.0	98.8	4.8	0.180	69.7	200.6		386.6	3209	0.03434	0.03381	0.1%	0.8330
13:48:35	93.9	98.6	4.6	0.184	69.8	200.6		386.6	3241	0.03466	0.03412	0.2%	0.7987
13:49:35	91.0	95.6	4.6	0.184	69.8	200.5		386.6	3240	0.03355	0.03303	0.1%	0.7640
13:50:35	85.3	89.9	4.6	0.185	69.7	200.6		386.6	3249	0.03153	0.03104	0.1%	0.7305
13:51:35	97.8	102.4	4.6	0.184	69.8	200.6		386.6	3243	0.03612	0.03555	0.2%	0.6989
13:52:35	99.3	103.8	4.5	0.184	69.8	200.6		386.7	3247	0.03667	0.03610	0.2%	0.6628
13:53:35	94.8	99.4	4.6	0.182	69.9	200.6		386.7	3228	0.03483	0.03428	0.2%	0.6261
13:54:35	88.7	93.4	4.7	0.181	69.9	200.6		386.7	3217	0.03246	0.03196	0.1%	0.5913
13:55:35	89.3	94.0	4.7	0.185	69.9	200.5		386.7	3254	0.03305	0.03253	0.1%	0.5588
13:56:35	83.1	87.7	4.6	0.182	69.8	200.5		386.7	3229	0.03053	0.03006	0.1%	0.5258
13:57:35	80.8	85.4	4.6	0.185	69.8	200.5		386.7	3253	0.02992	0.02945	0.1%	0.4953
13:58:35	80.2	84.7	4.5	0.181	69.8	200.5		386.7	3221	0.02939	0.02894	0.1%	0.4653
13:59:35	79.6	84.1	4.5	0.184	69.9	200.5		386.7	3247	0.02941	0.02895	0.1%	0.4360
14:00:35	73.6	78.0	4.5	0.185	69.9	200.5		386.7	3253	0.02723	0.02681	0.1%	0.4065
14:01:35	69.2	73.7	4.6	0.190	69.7	200.5		386.6	3298	0.02596	0.02556	0.1%	0.3793
14:02:35	64.3	68.6	4.3	0.185	69.5	200.5		386.4	3257	0.02385	0.02348	0.1%	0.3534
14:03:35	60.5	64.5	4.0	0.189	69.4	200.5		386.3	3291	0.02266	0.02230	0.1%	0.3295
14:04:35	56.8	60.8	4.0	0.187	69.3	200.6		386.3	3273	0.02118	0.02085	0.1%	0.3068
14:05:35	54.4	58.3	4.0	0.189	69.3	200.6		386.2	3287	0.02036	0.02004	0.1%	0.2857
14:06:35	52.3	56.1	3.9	0.188	69.2	200.6		386.2	3283	0.01955	0.01925	0.1%	0.2653
14:07:35	48.9	52.6	3.7	0.186	69.2	200.6		386.2	3258	0.01817	0.01789	0.1%	0.2458
14:08:35	44.9	48.5	3.6	0.187	69.0	200.6		386.1	3271	0.01672	0.01646	0.1%	0.2276
14:09:35	43.6	47.1	3.5	0.189	69.0	200.6		386.0	3288	0.01634	0.01608	0.1%	0.2109
14:10:35	39.7	43.1	3.4	0.190	69.0	200.6		386.1	3297	0.01493	0.01469	0.1%	0.1945
14:11:35	36.7	40.1	3.4	0.188	69.0	200.6		386.0	3279	0.01370	0.01349	0.1%	0.1796
14:12:35	33.2	36.5	3.3	0.189	68.9	200.6		386.0	3290	0.01245	0.01226	0.1%	0.1659
14:13:35	31.3	34.5	3.2	0.193	68.8	200.6		385.9	3318	0.01183	0.01165	0.1%	0.1534
14:14:35	28.7	31.8	3.1	0.192	68.8	200.6		385.9	3317	0.01085	0.01068	0.0%	0.1416
14:15:35	26.8	29.8	3.1	0.190	68.9	200.6		385.9	3292	0.01005	0.00989	0.0%	0.1308
14:16:35	24.9	27.9	3.0	0.189	68.9	200.6		385.9	3289	0.00933	0.00919	0.0%	0.1207
14:17:35	23.3	26.3	2.9	0.188	69.0	200.6		386.0	3275	0.00871	0.00857	0.0%	0.1114
14:18:35	21.5	24.5	2.9	0.191	69.0	200.6		386.1	3302	0.00811	0.00798	0.0%	0.1027
14:19:35	20.5	23.3	2.8	0.191	69.1	200.6		386.1	3306	0.00772	0.00760	0.0%	0.0946
14:20:35	18.7	21.4	2.7	0.191	69.1	200.6		386.1	3305	0.00705	0.00694	0.0%	0.0869
14:21:35	17.5	20.1	2.6	0.193	69.0	200.6		386.1	3326	0.00663	0.00653	0.0%	0.0798
14:22:35	16.8	19.4	2.6	0.192	69.0	200.6		386.0	3311	0.00633	0.00623	0.0%	0.0732
14:23:35	15.4	18.0	2.6	0.193	69.0	200.5		386.0	3326	0.00584	0.00575	0.0%	0.0668
14:24:35	14.6	17.1	2.5	0.194	68.9	200.6		386.0	3331	0.00554	0.00545	0.0%	0.0610
14:25:35	13.5	15.9	2.4	0.192	68.9	200.5		385.9	3317	0.00510	0.00503	0.0%	0.0555
14:26:35	12.9	15.3	2.4	0.193	68.9	200.5		386.0	3324	0.00488	0.00481	0.0%	0.0504
14:27:35	11.9	14.2	2.4	0.190	68.8	200.5		385.9	3292	0.00445	0.00439	0.0%	0.0455
14:28:35	11.2	13.5	2.3	0.191	68.8	200.5		385.9	3304	0.00421	0.00415	0.0%	0.0410
14:29:35	10.7	13.1	2.4	0.190	68.8	200.5		385.9	3299	0.00403	0.00397	0.0%	0.0368
14:30:35	10.4	12.7	2.3	0.191	68.8	200.5		385.9	3305	0.00393	0.00387	0.0%	0.0328
14:31:35	10.4	12.6	2.2	0.193	68.9	200.5		386.0	3323	0.00393	0.00387	0.0%	0.0288
14:32:35	9.5	11.7	2.2	0.191	68.9	200.5		386.0	3304	0.00357	0.00352	0.0%	0.0249
14:33:35	9.3	11.5	2.2	0.190	68.9	200.5		386.0	3300	0.00348	0.00343	0.0%	0.0213
14:34:35	8.8	10.9	2.1	0.192	68.9	200.5		386.0	3314	0.00331	0.00325	0.0%	0.0179
14:35:35	8.5	10.6	2.1	0.191	68.9	200.5		386.0	3305	0.00321	0.00316	0.0%	0.0145
14:36:35	7.7	9.7	2.0	0.190	68.8	200.5		385.9	3301	0.00288	0.00284	0.0%	0.0113
14:37:35	7.7	9.7	2.0	0.192	68.7	200.5		385.9	3312	0.00291	0.00286	0.0%	0.0085
14:38:35	7.7	9.6	1.9	0.190	68.7	200.5		385.8	3298	0.00290	0.00286	0.0%	0.0055
14:39:35	7.0	8.9	1.8	0.189	68.7	200.5	End Test	385.8	3292	0.00264	0.00260	0.0%	0.0026
	208.2	212.5		0.178	67.4			384.9	3187	23.08	22.72		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:39:30	0.0	3.0	4.8	0.215	65.6	244.1		383.6	3339	0.0000	0.0%	3.5618
9:40:30	13.9	18.8	4.9	0.213	66.1	243.0		383.9	3327	0.0053	0.1%	3.5618
9:41:30	53.1	58.0	4.9	0.215	66.3	241.9		384.1	3340	0.0203	0.7%	3.5565
9:42:30	62.1	67.0	4.9	0.213	66.4	241.5		384.1	3326	0.0237	1.4%	3.5362
9:43:30	62.6	67.5	4.9	0.213	66.5	241.5		384.2	3322	0.0238	2.1%	3.5125
9:44:30	57.9	62.8	4.9	0.212	66.6	241.3		384.3	3316	0.0220	2.7%	3.4887
9:45:30	74.5	79.3	4.8	0.213	66.6	240.5		384.3	3324	0.0284	3.5%	3.4667
9:46:30	115.7	120.5	4.8	0.213	66.6	239.4		384.3	3319	0.0440	4.7%	3.4383
9:47:30	136.5	141.3	4.8	0.212	66.8	238.7		384.4	3314	0.0518	6.2%	3.3944
9:48:30	154.9	159.6	4.7	0.216	66.7	237.5		384.4	3346	0.0593	7.8%	3.3426
9:49:30	189.1	193.8	4.7	0.211	66.7	236.4		384.4	3308	0.0716	9.8%	3.2832
9:50:30	240.7	245.5	4.7	0.213	66.8	235.3		384.4	3324	0.0916	12.4%	3.2116
9:51:30	243.6	248.2	4.7	0.216	66.9	234.0		384.5	3345	0.0933	15.0%	3.1201
9:52:30	246.8	251.5	4.6	0.214	66.9	233.1		384.5	3329	0.0940	17.7%	3.0268
9:54:14	246.1	250.7	4.6	0.214	66.8	232.3		384.4	3328	0.0937	20.3%	2.9328
9:54:30	229.5	234.1	4.6	0.214	66.7	231.3		384.3	3328	0.0874	22.7%	2.8391
9:55:30	227.9	232.5	4.6	0.215	66.7	231.2		384.4	3340	0.0871	25.2%	2.7516
9:56:30	185.4	189.9	4.5	0.213	66.7	231.2		384.4	3325	0.0705	27.2%	2.6645
9:57:30	172.1	176.6	4.5	0.209	66.7	231.1		384.4	3289	0.0648	29.0%	2.5940
9:58:30	211.7	216.2	4.5	0.215	66.8	230.0		384.4	3337	0.0809	31.3%	2.5292
9:59:30	269.0	273.5	4.5	0.214	66.8	228.4		384.5	3328	0.1025	34.1%	2.4483
10:00:30	265.1	269.7	4.6	0.211	66.9	227.8		384.5	3306	0.1003	37.0%	2.3459
10:01:30	287.9	292.5	4.6	0.211	66.9	226.5		384.5	3309	0.1090	40.0%	2.2456
10:02:30	272.1	276.9	4.7	0.213	67.0	225.6		384.6	3319	0.1033	42.9%	2.1365
10:03:30	295.2	300.0	4.8	0.210	66.9	224.1		384.5	3297	0.1114	46.0%	2.0332
10:04:30	312.5	317.4	4.9	0.212	66.9	223.1		384.5	3314	0.1185	49.4%	1.9218
10:05:30	295.1	300.1	5.0	0.209	67.1	222.8		384.6	3293	0.1112	52.5%	1.8033
10:06:30	256.8	261.8	5.1	0.213	67.2	222.8		384.7	3321	0.0975	55.2%	1.6921
10:07:30	223.2	228.5	5.3	0.211	67.2	222.9		384.7	3305	0.0844	57.6%	1.5946
10:08:30	186.7	192.1	5.4	0.214	67.0	222.9		384.6	3331	0.0711	59.6%	1.5102
10:09:30	179.7	185.7	5.9	0.209	67.1	222.9		384.6	3290	0.0676	61.5%	1.4391
10:10:30	172.5	178.5	6.0	0.213	67.1	222.9		384.7	3319	0.0655	63.3%	1.3714
10:11:30	159.4	165.2	5.8	0.213	67.2	222.9		384.7	3323	0.0606	65.0%	1.3059
10:12:30	161.8	167.3	5.5	0.211	67.3	222.9		384.8	3309	0.0612	66.8%	1.2453
10:13:30	149.1	154.5	5.4	0.212	67.4	222.9		384.8	3318	0.0566	68.3%	1.1841
10:14:30	125.9	131.1	5.2	0.211	67.4	222.9		384.9	3305	0.0476	69.7%	1.1276
10:15:30	123.7	128.7	5.0	0.209	67.4	222.9		384.9	3291	0.0465	71.0%	1.0800
10:16:30	124.8	129.7	4.8	0.213	67.5	222.9		384.9	3325	0.0474	72.3%	1.0334
10:17:30	107.4	112.2	4.8	0.215	67.5	222.8		385.0	3338	0.0410	73.5%	0.9860
10:18:30	108.5	113.3	4.8	0.213	67.6	222.8		385.0	3319	0.0412	74.6%	0.9450
10:19:30	90.6	95.4	4.7	0.209	67.5	222.8		385.0	3291	0.0341	75.6%	0.9039
10:20:30	90.6	95.3	4.7	0.210	67.5	222.8		385.0	3296	0.0341	76.5%	0.8698
10:21:30	95.0	99.5	4.6	0.213	67.7	222.8		385.1	3324	0.0361	77.6%	0.8356
10:22:30	93.3	97.8	4.5	0.213	67.8	222.8		385.1	3325	0.0354	78.5%	0.7995
10:23:30	92.9	97.8	4.9	0.214	67.9	222.7		385.2	3332	0.0354	79.5%	0.7641
10:24:30	89.2	94.5	5.4	0.212	68.0	222.7		385.3	3317	0.0338	80.5%	0.7288
10:25:30	89.7	95.9	6.1	0.215	68.1	222.7		385.4	3335	0.0342	81.4%	0.6950
10:26:30	93.5	100.3	6.8	0.214	68.3	222.7		385.5	3327	0.0355	82.4%	0.6608
10:27:30	75.9	83.1	7.2	0.224	68.3	222.7		385.5	3406	0.0295	83.3%	0.6253
10:28:30	73.2	80.8	7.6	0.223	68.4	222.7		385.6	3400	0.0284	84.1%	0.5958
10:29:30	72.0	80.0	7.9	0.227	68.5	222.7		385.7	3432	0.0282	84.9%	0.5674
10:30:30	72.5	80.8	8.3	0.228	68.6	222.7		385.8	3435	0.0284	85.7%	0.5392
10:31:30	57.9	67.1	9.1	0.225	68.6	222.7		385.8	3418	0.0226	86.3%	0.5107
10:32:30	57.4	66.9	9.6	0.228	68.7	222.7		385.8	3435	0.0225	86.9%	0.4882
10:33:30	60.6	70.8	10.2	0.230	68.8	222.6		385.9	3451	0.0238	87.6%	0.4657
10:34:30	53.8	64.2	10.5	0.223	68.9	222.6		386.0	3401	0.0208	88.2%	0.4418
10:35:30	59.5	70.2	10.7	0.213	68.9	222.6		386.0	3320	0.0225	88.8%	0.4210

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:36:30	43.5	54.4	10.9	0.212	68.9	222.6		386.0	3315	0.0164	89.3%	0.3985
10:37:30	46.5	57.6	11.2	0.208	69.0	222.5		386.0	3287	0.0174	89.8%	0.3820
10:38:30	44.5	55.9	11.5	0.220	69.0	222.3		386.1	3378	0.0171	90.2%	0.3646
10:39:30	44.5	56.1	11.6	0.231	69.1	222.3		386.1	3464	0.0176	90.7%	0.3475
10:40:30	42.3	53.7	11.4	0.230	69.3	222.3		386.3	3452	0.0166	91.2%	0.3299
10:41:30	38.8	50.2	11.5	0.228	69.2	222.3		386.2	3439	0.0152	91.6%	0.3133
10:42:30	34.5	46.0	11.5	0.231	69.2	222.3		386.2	3462	0.0136	92.0%	0.2981
10:43:30	36.1	47.8	11.7	0.228	69.3	222.2		386.2	3440	0.0141	92.4%	0.2845
10:44:30	33.5	44.9	11.5	0.223	69.3	222.2		386.3	3401	0.0130	92.8%	0.2703
10:45:30	37.4	48.7	11.2	0.230	69.4	222.2		386.3	3454	0.0147	93.2%	0.2574
10:46:30	31.4	42.7	11.3	0.230	69.4	222.2		386.3	3451	0.0124	93.5%	0.2426
10:47:30	33.7	45.2	11.4	0.233	69.5	222.1		386.4	3479	0.0134	93.9%	0.2303
10:48:30	31.8	43.3	11.5	0.231	69.6	222.1		386.5	3460	0.0125	94.3%	0.2169
10:49:30	24.5	35.8	11.3	0.231	69.5	222.1		386.4	3457	0.0097	94.5%	0.2044
10:50:30	26.1	37.5	11.4	0.216	69.6	222.1		386.4	3345	0.0100	94.8%	0.1947
10:51:30	25.5	36.9	11.4	0.218	69.5	222.1		386.4	3362	0.0098	95.1%	0.1848
10:52:30	25.2	36.3	11.1	0.214	69.5	222.1		386.4	3332	0.0095	95.4%	0.1750
10:53:30	25.7	36.5	10.8	0.219	69.6	222.1		386.5	3370	0.0098	95.6%	0.1655
10:54:30	20.4	31.0	10.6	0.214	69.4	222.0		386.3	3332	0.0077	95.8%	0.1556
10:55:30	22.0	32.4	10.4	0.214	69.2	222.0		386.2	3333	0.0084	96.1%	0.1479
10:56:30	21.8	32.1	10.3	0.216	69.0	222.0		386.1	3349	0.0083	96.3%	0.1395
10:57:30	19.7	29.8	10.1	0.216	68.9	222.0		385.9	3345	0.0075	96.5%	0.1312
10:58:30	19.2	28.9	9.8	0.214	68.8	222.0		385.9	3330	0.0073	96.7%	0.1237
10:59:30	20.3	29.9	9.6	0.215	68.7	222.0		385.8	3340	0.0077	96.9%	0.1164
11:00:30	20.6	30.2	9.6	0.218	68.7	222.0		385.9	3365	0.0079	97.2%	0.1087
11:01:30	19.5	29.4	9.9	0.216	68.8	222.0		385.9	3350	0.0075	97.4%	0.1008
11:02:30	18.9	29.0	10.1	0.219	68.6	222.0		385.8	3365	0.0073	97.6%	0.0933
11:03:30	17.2	27.6	10.3	0.218	68.7	221.9		385.8	3361	0.0066	97.8%	0.0861
11:04:30	17.3	27.7	10.4	0.217	68.8	221.9		385.9	3353	0.0066	98.0%	0.0794
11:05:30	16.0	26.6	10.6	0.221	68.8	221.9		385.9	3382	0.0062	98.1%	0.0728
11:06:30	14.5	25.4	10.9	0.215	68.8	221.9		385.9	3340	0.0055	98.3%	0.0667
11:07:30	15.7	26.7	11.0	0.215	68.9	221.9		386.0	3341	0.0060	98.5%	0.0611
11:08:30	14.2	25.4	11.2	0.217	68.9	221.9		386.0	3356	0.0054	98.6%	0.0552
11:09:30	12.7	24.1	11.4	0.218	68.9	221.8		386.0	3360	0.0049	98.7%	0.0497
11:10:30	13.7	25.2	11.5	0.215	68.9	221.8		386.0	3336	0.0052	98.9%	0.0449
11:11:30	13.2	24.9	11.7	0.220	68.9	221.8		386.0	3376	0.0051	99.0%	0.0397
11:12:30	10.8	23.0	12.1	0.214	68.9	221.8		385.9	3334	0.0041	99.1%	0.0346
11:13:30	9.7	22.2	12.5	0.215	68.8	221.8		385.9	3342	0.0037	99.2%	0.0304
11:14:30	9.4	22.4	13.0	0.219	68.7	221.8		385.8	3367	0.0036	99.3%	0.0267
11:15:30	8.3	21.7	13.5	0.212	68.7	221.7		385.8	3314	0.0031	99.4%	0.0232
11:16:48	7.4	21.1	13.7	0.215	68.6	221.7		385.8	3342	0.0028	99.5%	0.0200
11:17:30	7.0	20.8	13.8	0.217	68.5	221.7		385.7	3351	0.0027	99.6%	0.0172
11:18:30	8.1	21.8	13.6	0.214	68.6	221.7		385.7	3334	0.0031	99.7%	0.0145
11:19:30	7.4	20.9	13.5	0.214	68.5	221.7		385.7	3329	0.0028	99.8%	0.0114
11:20:30	6.9	20.4	13.5	0.215	68.6	221.7		385.7	3340	0.0026	99.8%	0.0086
11:21:30	5.8	20.0	14.2	0.218	68.6	221.7		385.8	3363	0.0022	99.9%	0.0060
11:22:30	3.9	19.4	15.5	0.214	68.6	221.7		385.7	3333	0.0015	99.9%	0.0038
11:23:30	3.2	19.4	16.2	0.215	68.6	221.7		385.7	3339	0.0012	100.0%	0.0023
11:24:30	2.8	19.3	16.5	0.215	68.6	221.7		385.7	3337	0.0011	100.0%	0.0011
	88.2	96.6		0.217	68.1			385.4	3350	3.56		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:01:20	0.0	10.1	11.4	0.212	67.7	311.3		385.1	3287	0.0000	0.0%	4.9795
12:02:20	45.3	56.5	11.2	0.209	67.7	309.8		385.1	3261	0.0169	0.3%	4.9795
12:03:20	133.1	144.3	11.1	0.211	67.4	307.9		384.9	3275	0.0498	1.3%	4.9626
12:04:20	155.0	165.9	10.9	0.210	67.0	306.7		384.6	3270	0.0580	2.5%	4.9128
12:05:20	269.5	280.6	11.1	0.212	66.7	304.0		384.4	3284	0.1013	4.5%	4.8548
12:06:20	295.6	307.2	11.6	0.208	66.5	302.2		384.2	3252	0.1101	6.7%	4.7535
12:07:20	321.8	333.7	11.9	0.210	66.3	300.3		384.1	3268	0.1205	9.2%	4.6434
12:08:20	370.1	381.7	11.6	0.209	66.1	298.6		384.0	3258	0.1382	11.9%	4.5230
12:09:20	382.4	393.6	11.1	0.209	66.0	297.3		383.8	3260	0.1429	14.8%	4.3848
12:10:20	353.5	364.3	10.7	0.208	65.7	296.7		383.7	3254	0.1320	17.5%	4.2419
12:11:20	396.8	407.1	10.3	0.208	65.6	295.1		383.6	3250	0.1479	20.4%	4.1099
12:12:20	504.0	514.0	10.0	0.208	65.4	293.1		383.4	3256	0.1883	24.2%	3.9620
12:13:20	496.5	506.1	9.6	0.208	65.3	291.6		383.3	3253	0.1853	27.9%	3.7737
12:14:20	525.7	534.9	9.2	0.208	65.3	289.7		383.4	3250	0.1961	31.9%	3.5884
12:15:20	538.1	547.1	9.0	0.206	65.4	287.5		383.4	3235	0.1998	35.9%	3.3923
12:16:20	498.6	507.3	8.8	0.205	65.3	286.7		383.4	3233	0.1850	39.6%	3.1925
12:17:20	373.4	382.0	8.6	0.202	65.3	286.7		383.3	3207	0.1375	42.4%	3.0075
12:18:20	304.1	312.5	8.4	0.204	65.1	286.7		383.2	3225	0.1126	44.6%	2.8701
12:19:20	262.9	271.2	8.2	0.201	65.1	286.7		383.2	3200	0.0966	46.6%	2.7575
12:20:20	256.0	264.1	8.0	0.204	65.0	286.7		383.1	3223	0.0948	48.5%	2.6609
12:21:20	239.1	247.0	7.9	0.203	64.9	286.8		383.1	3213	0.0882	50.2%	2.5661
12:22:20	227.5	235.2	7.6	0.205	64.9	286.9		383.0	3227	0.0843	51.9%	2.4778
12:23:20	216.3	223.8	7.4	0.206	64.9	286.8		383.0	3240	0.0805	53.5%	2.3935
12:24:20	203.6	210.8	7.2	0.203	65.1	286.8		383.2	3210	0.0750	55.1%	2.3130
12:25:20	184.9	191.9	7.1	0.202	65.0	286.9		383.1	3207	0.0681	56.4%	2.2380
12:26:20	170.3	177.1	6.9	0.204	64.9	286.9		383.1	3223	0.0630	57.7%	2.1699
12:27:20	161.8	168.5	6.7	0.205	64.8	286.9		383.0	3226	0.0600	58.9%	2.1069
12:28:20	166.0	172.6	6.6	0.201	64.8	286.9		383.0	3195	0.0609	60.1%	2.0469
12:29:20	156.0	162.4	6.5	0.204	64.8	286.9		383.0	3221	0.0577	61.3%	1.9860
12:30:20	162.0	168.3	6.3	0.202	64.9	286.9		383.1	3202	0.0596	62.5%	1.9282
12:31:20	162.0	168.3	6.3	0.198	65.0	286.9		383.1	3177	0.0591	63.7%	1.8687
12:32:20	142.2	148.3	6.2	0.203	64.9	286.9		383.0	3212	0.0524	64.7%	1.8096
12:33:20	128.5	134.6	6.1	0.198	64.6	286.9		382.9	3175	0.0469	65.7%	1.7571
12:34:20	139.6	145.5	5.9	0.203	64.6	287.0		382.8	3216	0.0516	66.7%	1.7102
12:35:20	140.3	146.1	5.8	0.199	64.5	287.0		382.8	3182	0.0513	67.7%	1.6586
12:36:20	137.9	143.7	5.7	0.205	64.6	287.0		382.8	3227	0.0512	68.7%	1.6073
12:37:20	140.3	145.9	5.6	0.209	64.7	287.0		382.9	3259	0.0525	69.8%	1.5562
12:38:20	137.6	143.2	5.6	0.206	64.7	287.0		382.9	3240	0.0512	70.8%	1.5036
12:39:20	123.7	129.3	5.6	0.201	64.8	287.0		383.0	3194	0.0454	71.7%	1.4524
12:40:20	119.9	125.5	5.6	0.201	64.7	287.0		382.9	3197	0.0440	72.6%	1.4070
12:41:20	111.3	116.9	5.6	0.200	64.5	287.0		382.7	3187	0.0408	73.4%	1.3630
12:42:20	108.8	114.2	5.4	0.196	64.4	287.0		382.7	3160	0.0395	74.2%	1.3222
12:43:20	134.5	139.8	5.3	0.193	64.5	287.0		382.8	3137	0.0485	75.2%	1.2826
12:44:20	122.0	127.1	5.1	0.194	64.7	287.0		382.9	3139	0.0440	76.1%	1.2341
12:45:20	124.9	130.0	5.1	0.197	64.7	287.1		382.9	3162	0.0454	77.0%	1.1901
12:46:20	103.1	108.1	5.0	0.195	64.6	287.2		382.8	3150	0.0373	77.8%	1.1447
12:47:20	96.2	101.2	5.0	0.201	64.6	287.2		382.8	3198	0.0354	78.5%	1.1074
12:48:20	102.9	107.8	4.9	0.213	64.6	287.2		382.8	3289	0.0389	79.3%	1.0720
12:49:20	98.4	103.2	4.8	0.210	64.5	287.2		382.7	3268	0.0370	80.0%	1.0331
12:50:20	99.2	103.9	4.7	0.211	64.3	287.2		382.6	3273	0.0373	80.7%	0.9962
12:51:20	93.3	97.9	4.6	0.211	64.3	287.1		382.6	3274	0.0351	81.5%	0.9588
12:52:20	105.6	110.2	4.6	0.211	64.5	287.1		382.7	3276	0.0398	82.2%	0.9237
12:53:20	93.9	98.4	4.5	0.210	64.5	287.2		382.8	3265	0.0352	83.0%	0.8839
12:54:20	96.4	100.9	4.5	0.210	64.6	287.2		382.8	3265	0.0362	83.7%	0.8487
12:55:20	85.2	89.6	4.4	0.207	64.5	287.2		382.8	3245	0.0318	84.3%	0.8125
12:56:20	88.4	92.8	4.4	0.203	64.5	287.2		382.8	3217	0.0327	85.0%	0.7807
12:57:20	79.9	84.2	4.4	0.198	64.5	287.2		382.7	3176	0.0292	85.6%	0.7480
12:58:20	85.4	89.7	4.4	0.197	64.4	287.2		382.7	3161	0.0310	86.2%	0.7188

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:59:20	86.8	91.2	4.3	0.195	64.4	287.2		382.7	3151	0.0315	86.8%	0.6878
13:00:20	87.3	91.6	4.3	0.195	64.4	287.2		382.7	3149	0.0316	87.5%	0.6564
13:01:20	83.4	87.7	4.3	0.197	64.5	287.2		382.8	3165	0.0303	88.1%	0.6248
13:02:20	80.1	84.3	4.3	0.198	64.6	287.2		382.8	3174	0.0292	88.6%	0.5944
13:03:20	74.8	79.0	4.3	0.195	64.6	287.2		382.8	3152	0.0271	89.2%	0.5652
13:04:20	70.6	74.8	4.2	0.195	64.6	287.2		382.8	3146	0.0255	89.7%	0.5381
13:05:20	70.2	74.4	4.2	0.194	64.7	287.2		382.9	3139	0.0253	90.2%	0.5126
13:06:20	71.6	75.8	4.2	0.199	64.9	287.2		383.0	3183	0.0262	90.7%	0.4873
13:07:20	60.1	64.3	4.2	0.198	64.8	287.2		383.0	3172	0.0219	91.2%	0.4611
13:08:20	60.5	64.7	4.2	0.199	64.7	287.2		382.9	3181	0.0221	91.6%	0.4392
13:09:20	60.3	64.5	4.2	0.197	64.8	287.2		382.9	3164	0.0219	92.1%	0.4170
13:10:20	59.5	63.6	4.2	0.197	64.7	287.2		382.9	3166	0.0216	92.5%	0.3951
13:11:20	54.8	59.0	4.2	0.198	64.6	287.3		382.8	3170	0.0200	92.9%	0.3735
13:12:20	57.8	61.9	4.2	0.197	64.7	287.3		382.9	3164	0.0210	93.3%	0.3535
13:13:20	56.3	60.5	4.2	0.197	64.8	287.3		383.0	3162	0.0205	93.7%	0.3325
13:14:20	47.9	52.0	4.2	0.198	64.7	287.3		382.9	3174	0.0175	94.1%	0.3121
13:15:20	49.1	53.2	4.1	0.197	64.7	287.3		382.9	3163	0.0179	94.4%	0.2946
13:16:20	51.1	55.2	4.1	0.198	64.7	287.3		382.9	3170	0.0186	94.8%	0.2768
13:17:20	46.7	50.8	4.1	0.197	64.7	287.3		382.9	3163	0.0170	95.2%	0.2582
13:18:20	46.0	50.0	4.1	0.197	64.9	287.3		383.0	3168	0.0167	95.5%	0.2412
13:19:20	46.7	50.8	4.1	0.198	65.0	287.3		383.2	3171	0.0170	95.8%	0.2245
13:20:20	37.1	41.3	4.2	0.199	65.0	287.3		383.1	3184	0.0136	96.1%	0.2075
13:21:20	34.0	38.4	4.4	0.206	64.8	287.3		383.0	3238	0.0126	96.4%	0.1939
13:22:20	32.0	36.6	4.6	0.181	64.8	287.3		383.0	3036	0.0112	96.6%	0.1813
13:23:20	30.7	35.3	4.6	0.144	64.9	287.3		383.1	2709	0.0096	96.8%	0.1701
13:24:20	31.0	35.7	4.7	0.171	64.8	287.3		383.0	2946	0.0105	97.0%	0.1605
13:25:20	30.4	34.8	4.5	0.191	64.8	287.3		383.0	3119	0.0109	97.2%	0.1500
13:26:20	29.0	33.4	4.4	0.108	65.0	287.3		383.1	2341	0.0078	97.4%	0.1391
13:27:20	29.3	33.7	4.4	0.194	64.9	287.3		383.0	3141	0.0106	97.6%	0.1313
13:28:20	29.3	33.6	4.3	0.196	65.0	287.3		383.2	3157	0.0106	97.8%	0.1208
13:29:20	23.6	27.9	4.3	0.195	65.0	287.4		383.1	3148	0.0085	98.0%	0.1102
13:30:20	21.6	26.0	4.4	0.194	64.9	287.4		383.0	3142	0.0078	98.1%	0.1016
13:31:20	20.9	25.4	4.5	0.198	64.8	287.4		383.0	3173	0.0076	98.3%	0.0938
13:32:20	20.5	25.1	4.6	0.196	64.8	287.4		383.0	3155	0.0074	98.4%	0.0862
13:33:20	18.4	22.9	4.5	0.196	64.7	287.4		382.9	3154	0.0067	98.6%	0.0788
13:34:20	18.0	22.5	4.4	0.196	64.6	287.4		382.9	3161	0.0066	98.7%	0.0721
13:35:20	16.6	20.9	4.4	0.196	64.7	287.3		382.9	3154	0.0060	98.8%	0.0656
13:36:20	16.6	20.9	4.3	0.196	64.8	287.3		382.9	3154	0.0060	98.9%	0.0596
13:37:20	14.4	18.6	4.2	0.195	64.8	287.4		383.0	3150	0.0052	99.0%	0.0536
13:38:20	14.0	18.2	4.2	0.198	64.8	287.4		383.0	3175	0.0051	99.1%	0.0483
13:39:20	13.1	17.3	4.2	0.197	64.8	287.4		383.0	3168	0.0048	99.2%	0.0432
13:40:20	11.6	15.7	4.1	0.196	64.8	287.4		383.0	3161	0.0042	99.3%	0.0385
13:41:20	10.6	14.8	4.2	0.197	64.8	287.4		382.9	3168	0.0039	99.4%	0.0343
13:42:20	9.6	13.8	4.1	0.195	64.7	287.4		382.9	3153	0.0035	99.5%	0.0304
13:43:20	9.3	13.5	4.2	0.194	64.7	287.4		382.9	3138	0.0034	99.5%	0.0269
13:44:20	8.7	12.8	4.1	0.196	64.7	287.4		382.9	3157	0.0032	99.6%	0.0236
13:45:20	8.0	12.1	4.1	0.197	64.6	287.4		382.9	3168	0.0029	99.6%	0.0204
13:46:20	7.4	11.5	4.1	0.192	64.6	287.4		382.8	3121	0.0026	99.7%	0.0175
13:47:20	6.7	10.8	4.1	0.198	64.5	287.4		382.8	3172	0.0024	99.8%	0.0149
13:48:20	4.3	8.4	4.1	0.196	64.0	287.4		382.4	3159	0.0016	99.8%	0.0124
13:49:20	5.9	10.0	4.1	0.195	64.3	287.4		382.6	3147	0.0021	99.8%	0.0108
13:50:20	6.4	10.4	4.0	0.197	64.6	287.4		382.8	3166	0.0023	99.9%	0.0087
13:51:20	5.3	9.4	4.0	0.198	64.7	287.4		382.9	3174	0.0020	99.9%	0.0064
13:52:20	4.5	8.5	4.0	0.195	64.6	287.4		382.8	3148	0.0016	99.9%	0.0044
13:53:20	4.1	8.1	4.0	0.197	64.6	287.4		382.8	3166	0.0015	100.0%	0.0028
13:54:20	3.6	7.5	3.9	0.201	64.6	287.4		382.9	3195	0.0013	100.0%	0.0013
	118.2	124.0		0.199	64.9			383.1	3180	4.98		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:43:58	39.4	42.4	3.0	0.198	64.6	258.3		382.8	3204	0.0145	0.3%	5.4484
14:44:58	61.1	64.2	3.1	0.195	64.6	255.5		382.8	3179	0.0223	0.7%	5.4339
14:45:58	106.1	109.1	3.0	0.199	64.6	250.3		382.9	3210	0.0391	1.4%	5.4116
14:46:58	137.6	140.6	3.0	0.194	64.7	247.0		382.9	3176	0.0502	2.3%	5.3724
14:47:58	159.4	162.4	3.0	0.197	64.8	243.8		383.0	3200	0.0586	3.4%	5.3222
14:48:58	155.4	158.3	2.9	0.198	64.9	241.6		383.0	3203	0.0572	4.4%	5.2636
14:49:58	184.0	186.9	2.9	0.198	64.9	237.0		383.0	3210	0.0678	5.7%	5.2064
14:50:58	201.0	203.9	2.9	0.196	64.9	234.6		383.0	3191	0.0737	7.0%	5.1386
14:51:58	184.7	187.6	2.9	0.197	64.9	231.7		383.0	3201	0.0679	8.3%	5.0650
14:52:58	243.3	246.1	2.9	0.196	64.9	226.1		383.1	3186	0.0890	9.9%	4.9970
14:53:58	270.1	272.9	2.8	0.195	65.0	221.8		383.1	3182	0.0987	11.7%	4.9080
14:54:58	301.7	304.4	2.7	0.196	64.9	218.8		383.1	3186	0.1104	13.8%	4.8093
14:55:58	273.0	275.7	2.8	0.195	65.0	218.7		383.1	3185	0.0998	15.6%	4.6989
14:56:58	234.4	237.2	2.8	0.197	65.1	218.7		383.2	3196	0.0860	17.2%	4.5991
14:57:58	212.9	215.7	2.8	0.196	65.1	218.7		383.2	3186	0.0779	18.6%	4.5130
14:58:58	188.9	191.6	2.7	0.195	65.1	218.7		383.2	3184	0.0690	19.9%	4.4352
14:59:58	173.3	176.0	2.7	0.195	65.2	218.7		383.3	3183	0.0633	21.0%	4.3661
15:00:58	154.9	157.6	2.7	0.193	65.2	218.7		383.3	3165	0.0563	22.1%	4.3028
15:01:58	162.4	165.0	2.7	0.196	65.2	218.7		383.3	3193	0.0595	23.2%	4.2465
15:02:58	151.0	153.6	2.6	0.192	65.2	218.7		383.3	3153	0.0547	24.2%	4.1870
15:03:58	139.0	141.7	2.6	0.196	65.1	218.7		383.2	3190	0.0509	25.1%	4.1324
15:04:58	130.8	133.4	2.6	0.197	65.2	218.8		383.2	3194	0.0480	26.0%	4.0814
15:05:58	118.2	120.8	2.6	0.195	65.2	218.7		383.3	3180	0.0431	26.8%	4.0334
15:06:58	111.7	114.3	2.6	0.197	65.2	218.7		383.3	3200	0.0410	27.5%	3.9903
15:07:58	109.5	112.2	2.7	0.195	65.2	218.8		383.3	3181	0.0400	28.2%	3.9493
15:08:58	102.2	104.8	2.7	0.196	65.1	218.7		383.2	3187	0.0374	28.9%	3.9093
15:09:58	96.1	98.8	2.7	0.198	65.1	218.8		383.2	3202	0.0353	29.6%	3.8719
15:10:58	93.3	96.1	2.7	0.195	65.1	218.7		383.2	3184	0.0341	30.2%	3.8365
15:11:58	89.9	92.5	2.7	0.195	65.2	218.7		383.3	3184	0.0328	30.8%	3.8024
15:12:58	84.8	87.5	2.7	0.195	65.3	218.7		383.3	3179	0.0310	31.4%	3.7696
15:13:58	82.2	84.8	2.7	0.192	65.3	218.7		383.3	3155	0.0298	31.9%	3.7386
15:14:58	74.7	77.3	2.6	0.196	65.3	218.7		383.3	3186	0.0273	32.4%	3.7089
15:15:58	74.8	77.4	2.6	0.194	65.3	218.7		383.3	3175	0.0273	32.9%	3.6815
15:16:58	69.7	72.3	2.6	0.196	65.3	218.7		383.3	3188	0.0255	33.4%	3.6543
15:17:58	66.4	69.1	2.6	0.196	65.3	218.7		383.4	3190	0.0243	33.8%	3.6288
15:18:58	63.9	66.5	2.6	0.196	65.3	218.7		383.4	3189	0.0234	34.3%	3.6044
15:19:58	63.7	66.3	2.6	0.196	65.3	218.7		383.4	3192	0.0233	34.7%	3.5810
15:20:58	58.3	60.9	2.6	0.195	65.3	218.7		383.3	3180	0.0213	35.1%	3.5577
15:21:58	54.7	57.2	2.6	0.203	65.3	218.7		383.3	3243	0.0203	35.5%	3.5364
15:22:58	56.3	58.9	2.6	0.205	65.3	218.7		383.3	3265	0.0211	35.9%	3.5161
15:23:58	56.4	59.0	2.5	0.195	65.3	218.7		383.4	3179	0.0206	36.2%	3.4950
15:24:58	55.6	58.1	2.5	0.199	65.4	218.7		383.4	3217	0.0205	36.6%	3.4744
15:25:58	54.5	57.0	2.5	0.194	65.3	218.7		383.3	3176	0.0199	37.0%	3.4538
15:26:58	50.5	53.0	2.5	0.197	65.3	218.7		383.3	3197	0.0185	37.3%	3.4340
15:27:58	52.3	54.8	2.5	0.196	65.3	218.7		383.4	3193	0.0192	37.7%	3.4155
15:28:58	53.2	55.7	2.5	0.195	65.4	218.7		383.4	3185	0.0194	38.0%	3.3963
15:29:58	49.3	51.7	2.5	0.195	65.4	218.7		383.4	3182	0.0180	38.4%	3.3768
15:30:58	49.9	52.4	2.4	0.197	65.5	218.7		383.5	3201	0.0183	38.7%	3.3589
15:31:58	44.7	47.2	2.4	0.198	65.3	218.7		383.4	3202	0.0164	39.0%	3.3405
15:32:58	43.6	46.0	2.5	0.196	65.3	218.7		383.3	3188	0.0159	39.3%	3.3241
15:33:58	43.4	46.0	2.5	0.196	65.2	218.7		383.3	3189	0.0159	39.6%	3.3081
15:34:58	44.1	46.6	2.5	0.196	65.1	218.7		383.2	3186	0.0161	39.9%	3.2922
15:35:58	45.8	48.4	2.6	0.198	65.3	218.7		383.3	3210	0.0169	40.2%	3.2761
15:36:58	48.0	50.6	2.6	0.197	65.5	218.7		383.5	3195	0.0176	40.5%	3.2592
15:37:58	45.0	47.6	2.6	0.196	65.6	218.7		383.5	3190	0.0165	40.8%	3.2416
15:38:58	44.4	47.0	2.6	0.199	65.6	218.7		383.5	3213	0.0164	41.1%	3.2251
15:39:58	42.3	44.9	2.6	0.195	65.6	218.7		383.6	3183	0.0155	41.4%	3.2088
15:40:58	42.8	45.4	2.7	0.200	65.6	218.7		383.6	3224	0.0158	41.7%	3.1933

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:41:58	47.0	49.8	2.7	0.195	65.7	218.1		383.7	3185	0.0172	42.0%	3.1775
15:42:58	106.9	109.6	2.7	0.196	65.9	212.6		383.7	3191	0.0391	42.7%	3.1603
15:43:58	125.0	127.8	2.8	0.203	65.9	207.5		383.8	3248	0.0466	43.6%	3.1212
15:44:58	184.0	186.8	2.7	0.195	66.0	201.8		383.8	3184	0.0672	44.8%	3.0747
15:45:58	206.9	209.7	2.7	0.197	65.9	196.6		383.8	3201	0.0759	46.2%	3.0075
15:46:58	237.6	240.4	2.8	0.195	65.9	191.0		383.8	3184	0.0867	47.8%	2.9315
15:47:58	213.2	216.1	2.9	0.195	66.1	188.3		383.9	3185	0.0778	49.2%	2.8448
15:48:58	272.7	275.6	2.9	0.193	66.1	184.0		383.9	3163	0.0988	51.0%	2.7670
15:49:58	241.7	244.6	3.0	0.189	66.0	178.8		383.9	3135	0.0868	52.6%	2.6682
15:50:58	267.5	270.5	3.0	0.192	65.9	173.1		383.8	3160	0.0969	54.4%	2.5814
15:51:58	293.3	296.3	3.0	0.191	65.8	169.2		383.7	3150	0.1060	56.3%	2.4844
15:52:58	312.9	316.1	3.2	0.193	65.8	164.2		383.7	3164	0.1135	58.4%	2.3785
15:53:58	301.9	305.2	3.3	0.191	65.8	160.3		383.7	3148	0.1090	60.4%	2.2650
15:54:58	306.0	309.6	3.6	0.193	65.8	156.5		383.7	3165	0.1111	62.5%	2.1560
15:55:58	223.6	227.2	3.6	0.199	65.1	156.5		383.2	3213	0.0825	64.0%	2.0449
15:56:58	190.9	194.7	3.8	0.198	64.8	156.5		383.0	3208	0.0704	65.3%	1.9624
15:57:58	189.5	193.5	4.0	0.198	64.6	156.4		382.8	3204	0.0698	66.6%	1.8920
15:58:58	202.8	207.1	4.3	0.193	64.7	155.6		382.9	3169	0.0738	67.9%	1.8223
15:59:58	248.9	253.4	4.5	0.192	65.3	150.6		383.3	3155	0.0901	69.6%	1.7484
16:00:58	295.9	300.2	4.3	0.195	65.7	146.9		383.6	3178	0.1079	71.5%	1.6583
16:01:58	269.3	273.5	4.2	0.195	65.8	146.8		383.7	3185	0.0983	73.3%	1.5504
16:02:58	242.3	246.4	4.1	0.191	66.1	146.5		383.9	3150	0.0875	75.0%	1.4521
16:03:58	221.1	225.4	4.3	0.196	66.1	145.1		383.9	3189	0.0808	76.4%	1.3646
16:04:58	204.4	208.5	4.1	0.193	66.1	145.1		383.9	3168	0.0742	77.8%	1.2838
16:05:58	144.0	148.4	4.3	0.196	65.4	145.1		383.4	3187	0.0527	78.8%	1.2096
16:06:58	160.8	165.3	4.4	0.192	65.2	145.1		383.3	3153	0.0582	79.8%	1.1569
16:07:58	169.5	174.0	4.5	0.195	65.7	145.1		383.6	3182	0.0619	81.0%	1.0986
16:08:58	167.4	171.9	4.4	0.194	66.0	145.1		383.8	3171	0.0609	82.1%	1.0368
16:09:58	150.8	155.1	4.4	0.193	66.1	145.1		383.9	3163	0.0547	83.1%	0.9759
16:10:58	142.1	146.4	4.3	0.194	66.1	145.1		383.9	3176	0.0517	84.0%	0.9213
16:11:58	133.5	137.8	4.3	0.193	66.2	145.1		384.0	3167	0.0485	84.9%	0.8696
16:12:58	118.9	123.1	4.2	0.193	66.1	145.1		383.9	3168	0.0432	85.7%	0.8211
16:13:58	116.1	120.3	4.2	0.196	66.0	145.1		383.9	3186	0.0424	86.5%	0.7779
16:14:58	116.2	120.3	4.1	0.194	66.1	145.1		383.9	3170	0.0422	87.3%	0.7355
16:15:58	112.3	116.3	4.1	0.193	66.2	145.1		384.0	3167	0.0407	88.0%	0.6933
16:16:58	109.3	113.3	4.0	0.190	66.3	145.1		384.1	3139	0.0393	88.7%	0.6526
16:17:58	101.9	105.8	4.0	0.192	66.4	145.1		384.1	3160	0.0369	89.4%	0.6133
16:18:58	96.6	100.5	4.0	0.195	66.4	145.1		384.2	3178	0.0352	90.1%	0.5764
16:19:58	88.4	92.3	3.9	0.193	66.3	145.0		384.0	3167	0.0321	90.7%	0.5412
16:20:58	89.7	93.5	3.8	0.191	66.2	145.1		384.0	3149	0.0324	91.2%	0.5092
16:21:58	86.9	90.6	3.8	0.196	66.3	145.1		384.0	3192	0.0318	91.8%	0.4768
16:22:58	84.6	88.3	3.7	0.194	66.3	145.1		384.1	3171	0.0307	92.4%	0.4450
16:23:58	78.8	82.5	3.7	0.191	66.3	145.1		384.1	3152	0.0285	92.9%	0.4143
16:24:58	74.2	77.9	3.7	0.194	66.3	145.1		384.1	3176	0.0270	93.4%	0.3858
16:25:58	71.5	75.2	3.7	0.194	66.4	145.1		384.1	3177	0.0260	93.9%	0.3588
16:26:58	71.6	75.2	3.6	0.192	66.4	145.1		384.2	3160	0.0259	94.4%	0.3328
16:27:58	67.8	71.4	3.6	0.193	66.5	145.1		384.2	3166	0.0246	94.8%	0.3069
16:28:58	63.2	66.7	3.5	0.193	66.5	145.1		384.2	3166	0.0229	95.2%	0.2823
16:29:58	59.9	63.4	3.5	0.190	66.5	145.0		384.2	3137	0.0215	95.6%	0.2594
16:30:58	56.5	60.0	3.5	0.190	66.5	145.1		384.2	3144	0.0203	96.0%	0.2379
16:31:58	52.9	56.4	3.5	0.193	66.5	145.1		384.3	3164	0.0192	96.4%	0.2176
16:32:58	49.9	53.3	3.4	0.194	66.6	145.0		384.3	3171	0.0181	96.7%	0.1984
16:33:58	45.9	49.3	3.4	0.192	66.6	145.0		384.3	3157	0.0166	97.0%	0.1803
16:34:58	43.0	46.4	3.4	0.193	66.6	145.0		384.3	3162	0.0156	97.3%	0.1637
16:35:58	39.7	43.1	3.3	0.190	66.6	145.0		384.3	3142	0.0143	97.5%	0.1482
16:36:58	36.1	39.4	3.3	0.191	66.5	145.0		384.2	3151	0.0130	97.8%	0.1339
16:37:58	33.8	37.1	3.3	0.188	66.6	145.0		384.3	3126	0.0121	98.0%	0.1209
16:38:58	30.3	33.6	3.3	0.191	66.5	145.0		384.2	3146	0.0109	98.2%	0.1088

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:39:58	28.0	31.2	3.3	0.194	66.5	145.0		384.2	3170	0.0102	98.4%	0.0978
16:40:58	26.0	29.2	3.2	0.195	66.6	145.0		384.3	3179	0.0095	98.6%	0.0877
16:41:58	23.3	26.5	3.2	0.190	66.7	145.0		384.3	3142	0.0084	98.7%	0.0782
16:42:58	21.0	24.1	3.2	0.190	66.6	145.0		384.3	3144	0.0075	98.9%	0.0699
16:43:58	18.9	22.1	3.2	0.192	66.6	145.0		384.3	3157	0.0068	99.0%	0.0623
16:44:58	17.2	20.3	3.1	0.192	66.6	145.0		384.3	3154	0.0062	99.1%	0.0555
16:45:58	15.5	18.6	3.1	0.190	66.7	145.0		384.4	3142	0.0056	99.2%	0.0493
16:46:58	15.1	18.2	3.1	0.197	66.9	145.0		384.5	3194	0.0055	99.3%	0.0437
16:47:58	14.1	17.1	3.1	0.191	67.1	145.0		384.7	3146	0.0051	99.4%	0.0382
16:48:58	12.0	15.1	3.1	0.189	67.3	145.0		384.8	3135	0.0043	99.5%	0.0331
16:49:58	10.8	13.9	3.1	0.190	67.4	145.1		384.9	3138	0.0039	99.5%	0.0288
16:50:58	9.7	12.9	3.1	0.189	67.5	145.1		385.0	3135	0.0035	99.6%	0.0250
16:51:58	8.4	11.5	3.1	0.192	67.6	145.0		385.0	3154	0.0030	99.7%	0.0215
16:52:58	7.5	10.7	3.1	0.195	67.6	145.0		385.0	3183	0.0027	99.7%	0.0184
16:53:58	6.9	10.1	3.1	0.192	67.7	145.1		385.1	3157	0.0025	99.8%	0.0157
16:54:58	6.0	9.1	3.2	0.188	67.7	145.0		385.1	3122	0.0021	99.8%	0.0132
16:55:58	5.4	8.5	3.2	0.198	67.8	145.0		385.2	3208	0.0020	99.8%	0.0111
16:56:58	4.4	7.6	3.2	0.139	67.8	145.0		385.2	2690	0.0014	99.9%	0.0091
16:57:58	3.8	6.9	3.2	0.170	67.8	145.0		385.2	2972	0.0013	99.9%	0.0078
16:58:58	3.6	6.8	3.2	0.155	68.0	145.0		385.3	2840	0.0012	99.9%	0.0065
16:59:58	3.8	6.9	3.1	0.195	67.9	145.0		385.3	3178	0.0014	99.9%	0.0053
17:00:58	2.8	6.0	3.1	0.193	68.0	145.0		385.3	3168	0.0010	99.9%	0.0039
17:01:58	2.8	5.9	3.1	0.192	68.0	145.0		385.3	3159	0.0010	100.0%	0.0029
17:02:58	2.8	5.9	3.1	0.194	67.9	145.0		385.3	3170	0.0010	100.0%	0.0019
17:03:58	2.4	5.5	3.1	0.193	67.9	145.0		385.3	3164	0.0009	100.0%	0.0009
	106.0	109.1	3.2	0.194	65.9	113.2		383.8	3170	5.4484		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:51:56	0.0	1.7	3.8	0.186	65.5	300.6		383.5	2952	0.0000	0.0%	6.7551
9:52:56	0.0	1.9	3.6	0.186	65.7	300.7		383.7	2945	0.0000	0.0%	6.7551
9:53:56	37.6	41.1	3.5	0.187	65.8	297.6		383.7	2957	0.0128	0.2%	6.7551
9:54:56	135.1	138.4	3.3	0.186	65.8	291.5		383.7	2944	0.0456	0.9%	6.7424
9:55:56	212.4	215.6	3.2	0.184	65.8	286.4		383.7	2930	0.0713	1.9%	6.6968
9:56:56	178.2	181.3	3.1	0.190	65.7	282.9		383.7	2978	0.0609	2.8%	6.6254
9:57:56	198.3	201.4	3.0	0.186	65.7	279.6		383.6	2948	0.0671	3.8%	6.5646
9:58:56	256.7	259.7	3.0	0.188	65.7	273.6		383.6	2963	0.0872	5.1%	6.4975
9:59:56	258.4	261.3	2.9	0.190	65.7	270.9		383.6	2982	0.0884	6.4%	6.4103
10:00:56	177.3	180.2	2.9	0.193	65.5	271.0		383.5	3007	0.0612	7.3%	6.3219
10:01:56	162.6	165.3	2.8	0.199	65.6	271.3		383.6	3048	0.0568	8.2%	6.2607
10:02:56	146.9	149.6	2.7	0.204	65.6	272.7		383.5	3085	0.0520	8.9%	6.2039
10:03:56	142.0	144.7	2.7	0.202	65.8	272.2		383.7	3075	0.0501	9.7%	6.1519
10:04:56	152.4	155.0	2.6	0.201	65.7	269.7		383.7	3066	0.0536	10.5%	6.1018
10:05:56	170.0	172.6	2.6	0.204	65.8	268.1		383.7	3091	0.0602	11.4%	6.0482
10:06:56	215.9	218.5	2.6	0.202	65.9	262.9		383.8	3069	0.0760	12.5%	5.9880
10:07:56	279.3	281.9	2.6	0.217	66.0	256.8		383.9	3184	0.1020	14.0%	5.9120
10:08:56	334.1	336.7	2.6	0.204	66.2	251.2		384.0	3090	0.1183	15.7%	5.8100
10:09:56	371.0	373.5	2.6	0.203	66.3	245.8		384.0	3079	0.1308	17.7%	5.6918
10:10:56	390.2	392.8	2.5	0.201	66.4	242.8		384.1	3061	0.1368	19.7%	5.5609
10:11:56	305.8	308.3	2.5	0.205	66.6	242.7		384.3	3096	0.1084	21.3%	5.4241
10:12:56	256.6	259.0	2.4	0.201	66.6	242.7		384.3	3065	0.0900	22.6%	5.3157
10:13:56	227.8	230.2	2.4	0.201	66.4	242.7		384.2	3064	0.0800	23.8%	5.2256
10:14:56	197.5	199.9	2.4	0.203	66.3	242.7		384.1	3081	0.0697	24.9%	5.1457
10:15:56	189.5	191.9	2.4	0.205	66.2	242.7		384.0	3094	0.0672	25.9%	5.0760
10:16:56	185.5	187.9	2.4	0.199	66.5	242.7		384.2	3050	0.0648	26.8%	5.0088
10:17:56	182.0	184.4	2.4	0.201	66.7	242.7		384.3	3068	0.0639	27.8%	4.9440
10:18:56	159.4	161.8	2.4	0.206	66.8	242.7		384.4	3105	0.0566	28.6%	4.8801
10:19:56	144.4	146.8	2.4	0.201	66.7	242.7		384.4	3065	0.0507	29.3%	4.8234
10:20:56	134.3	136.8	2.5	0.203	66.8	242.7		384.4	3077	0.0473	30.0%	4.7728
10:21:56	124.1	126.5	2.5	0.201	66.9	242.7		384.5	3061	0.0435	30.7%	4.7255
10:22:56	119.3	121.8	2.5	0.202	67.0	242.7		384.6	3071	0.0419	31.3%	4.6820
10:23:56	108.2	110.7	2.5	0.203	66.9	242.7		384.5	3082	0.0382	31.9%	4.6401
10:24:56	100.5	103.0	2.5	0.201	66.8	242.7		384.5	3063	0.0352	32.4%	4.6020
10:25:56	91.7	94.2	2.5	0.206	66.7	242.7		384.4	3099	0.0325	32.9%	4.5668
10:26:56	84.2	86.7	2.5	0.200	66.5	242.7		384.2	3060	0.0295	33.3%	4.5342
10:27:56	86.8	89.3	2.4	0.203	66.5	242.7		384.2	3079	0.0306	33.8%	4.5047
10:28:56	79.1	81.5	2.4	0.204	66.3	242.7		384.0	3087	0.0280	34.2%	4.4741
10:29:56	77.6	80.0	2.3	0.205	66.1	242.7		383.9	3095	0.0275	34.6%	4.4461
10:30:56	79.0	81.3	2.3	0.206	66.0	242.7		383.9	3100	0.0281	35.0%	4.4186
10:31:56	76.0	78.2	2.2	0.204	66.1	242.7		383.9	3085	0.0269	35.4%	4.3905
10:32:56	74.6	76.7	2.2	0.205	66.1	242.7		383.9	3098	0.0265	35.8%	4.3636
10:33:56	71.6	73.8	2.1	0.204	66.0	242.8		383.9	3084	0.0253	36.2%	4.3372
10:34:56	66.2	68.3	2.1	0.207	65.8	242.8		383.7	3113	0.0236	36.5%	4.3118
10:35:56	69.9	72.0	2.1	0.215	65.9	242.8		383.8	3170	0.0254	36.9%	4.2882
10:36:56	71.0	73.1	2.0	0.221	66.1	242.8		383.9	3214	0.0262	37.3%	4.2628
10:37:56	65.9	67.9	2.0	0.212	66.2	242.8		384.0	3147	0.0238	37.6%	4.2366
10:38:56	65.5	67.5	2.0	0.207	66.2	242.8		384.0	3107	0.0233	38.0%	4.2128
10:39:56	64.9	66.9	2.0	0.206	66.3	242.8		384.0	3100	0.0230	38.3%	4.1895
10:40:56	63.6	65.5	1.9	0.203	66.3	242.8		384.1	3078	0.0224	38.7%	4.1665
10:41:56	60.4	62.4	2.0	0.209	66.1	242.8		384.0	3122	0.0216	39.0%	4.1440
10:42:56	37.3	39.3	2.0	0.210	64.3	242.7		382.6	3131	0.0134	39.2%	4.1224
10:43:56	45.7	47.6	1.9	0.208	63.5	243.8		382.0	3120	0.0164	39.4%	4.1090
10:44:56	63.0	64.9	1.9	0.207	64.5	243.9		382.8	3108	0.0225	39.7%	4.0926
10:45:56	68.3	70.1	1.8	0.206	65.1	243.9		383.2	3099	0.0243	40.1%	4.0701
10:46:56	110.4	112.2	1.8	0.204	65.8	239.7		383.7	3088	0.0391	40.7%	4.0457
10:47:56	163.9	165.6	1.8	0.206	65.8	235.0		383.7	3101	0.0583	41.5%	4.0066

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:48:56	190.2	192.0	1.7	0.206	65.6	230.4		383.6	3104	0.0677	42.6%	3.9484
10:49:56	254.9	256.6	1.7	0.206	65.7	225.6		383.6	3102	0.0907	43.9%	3.8806
10:50:56	244.4	246.1	1.7	0.206	65.6	222.5		383.6	3100	0.0869	45.2%	3.7900
10:51:56	227.2	228.9	1.7	0.209	65.5	221.4		383.5	3121	0.0813	46.4%	3.7031
10:52:56	287.8	289.5	1.7	0.205	65.7	215.8		383.6	3096	0.1022	47.9%	3.6217
10:53:56	300.2	301.9	1.7	0.209	65.7	211.7		383.7	3128	0.1077	49.5%	3.5195
10:54:56	274.1	275.7	1.6	0.207	65.7	211.3		383.6	3111	0.0978	50.9%	3.4118
10:55:56	256.7	258.3	1.6	0.207	65.7	210.0		383.6	3112	0.0916	52.3%	3.3140
10:56:56	268.1	269.7	1.6	0.211	65.7	208.6		383.7	3140	0.0965	53.7%	3.2224
10:57:56	247.9	249.5	1.6	0.213	65.7	208.6		383.6	3156	0.0897	55.1%	3.1259
10:58:56	228.2	229.8	1.6	0.207	65.6	208.6		383.6	3108	0.0814	56.3%	3.0361
10:59:56	197.1	198.7	1.6	0.208	65.8	208.6		383.7	3120	0.0705	57.3%	2.9548
11:00:56	174.8	176.4	1.6	0.212	65.7	208.5		383.6	3148	0.0631	58.2%	2.8843
11:01:56	163.6	165.3	1.7	0.211	65.7	208.5		383.6	3140	0.0589	59.1%	2.8212
11:02:56	148.4	150.2	1.8	0.211	65.5	208.5		383.5	3139	0.0535	59.9%	2.7622
11:03:56	135.3	137.1	1.8	0.209	65.4	208.5		383.4	3128	0.0486	60.6%	2.7088
11:04:56	126.7	128.4	1.8	0.212	65.4	208.5		383.4	3144	0.0457	61.3%	2.6602
11:05:56	123.7	125.5	1.8	0.210	65.7	208.5		383.6	3132	0.0444	62.0%	2.6145
11:06:56	111.4	113.1	1.7	0.210	65.9	208.5		383.8	3132	0.0400	62.5%	2.5701
11:07:56	106.3	108.0	1.7	0.212	66.1	208.4		383.9	3151	0.0384	63.1%	2.5301
11:09:22	97.4	99.1	1.7	0.213	66.1	208.4		384.0	3157	0.0352	63.6%	2.4917
11:09:56	89.3	91.0	1.7	0.213	65.9	207.2		383.8	3158	0.0323	64.1%	2.4564
11:10:56	90.0	91.6	1.6	0.211	66.0	207.0		383.8	3138	0.0324	64.6%	2.4241
11:11:56	82.3	83.9	1.5	0.210	65.8	207.3		383.7	3136	0.0296	65.0%	2.3917
11:12:56	73.1	74.6	1.5	0.212	65.7	207.1		383.6	3151	0.0264	65.4%	2.3621
11:13:56	69.2	70.7	1.5	0.212	65.9	207.0		383.7	3146	0.0250	65.8%	2.3357
11:14:56	62.9	64.3	1.5	0.213	65.8	206.9		383.7	3157	0.0228	66.1%	2.3107
11:15:56	66.8	68.3	1.5	0.215	65.7	206.5		383.6	3172	0.0243	66.5%	2.2880
11:16:56	66.5	67.9	1.4	0.213	65.8	206.4		383.7	3152	0.0240	66.8%	2.2636
11:17:56	66.6	68.1	1.5	0.215	65.9	204.4		383.8	3173	0.0242	67.2%	2.2396
11:18:56	117.7	119.1	1.5	0.215	66.0	198.3		383.9	3173	0.0428	67.8%	2.2154
11:19:56	165.1	166.6	1.5	0.215	66.3	195.2		384.1	3173	0.0600	68.7%	2.1726
11:20:56	179.0	180.5	1.5	0.211	66.3	191.2		384.1	3141	0.0644	69.7%	2.1126
11:21:56	241.4	242.9	1.5	0.215	66.6	185.8		384.3	3168	0.0876	71.0%	2.0482
11:22:56	281.4	282.8	1.5	0.212	66.6	180.9		384.3	3147	0.1014	72.5%	1.9606
11:23:56	289.6	291.1	1.4	0.215	66.7	179.2		384.3	3172	0.1052	74.0%	1.8592
11:24:56	294.9	296.3	1.4	0.212	66.8	177.3		384.4	3149	0.1063	75.6%	1.7540
11:25:56	269.8	271.2	1.4	0.213	66.8	175.4		384.5	3157	0.0975	77.1%	1.6478
11:26:56	296.2	297.6	1.4	0.211	67.0	169.5		384.6	3141	0.1064	78.6%	1.5503
11:27:56	329.9	331.3	1.4	0.213	67.1	167.3		384.6	3154	0.1190	80.4%	1.4439
11:28:56	276.0	277.4	1.4	0.213	67.0	166.5		384.6	3158	0.0997	81.9%	1.3248
11:29:56	265.0	266.4	1.4	0.214	66.9	164.5		384.5	3160	0.0958	83.3%	1.2251
11:30:56	239.9	241.3	1.4	0.212	66.7	164.5		384.3	3148	0.0864	84.6%	1.1293
11:31:56	229.0	230.4	1.4	0.217	66.7	164.5		384.3	3184	0.0835	85.8%	1.0428
11:32:56	207.0	208.5	1.5	0.215	66.8	164.5		384.4	3171	0.0751	86.9%	0.9593
11:33:56	180.1	181.6	1.5	0.218	66.5	164.5		384.3	3192	0.0658	87.9%	0.8842
11:34:56	169.6	171.0	1.5	0.216	66.6	164.5		384.3	3177	0.0617	88.8%	0.8184
11:35:56	152.6	154.1	1.5	0.214	66.6	164.5		384.3	3160	0.0552	89.6%	0.7567
11:36:56	142.1	143.6	1.5	0.213	66.8	164.5		384.4	3158	0.0514	90.4%	0.7015
11:37:56	127.6	129.2	1.5	0.215	66.7	164.5		384.4	3167	0.0463	91.1%	0.6501
11:38:56	119.9	121.4	1.5	0.213	66.7	164.5		384.4	3152	0.0433	91.7%	0.6038
11:39:56	107.2	108.7	1.5	0.215	66.6	164.5		384.3	3166	0.0389	92.3%	0.5606
11:40:56	103.9	105.4	1.5	0.214	66.8	164.5		384.4	3160	0.0376	92.8%	0.5217
11:41:56	94.5	95.9	1.5	0.217	66.7	164.5		384.4	3187	0.0345	93.3%	0.4841
11:42:56	85.9	87.4	1.4	0.216	66.7	164.5		384.4	3181	0.0313	93.8%	0.4496
11:43:56	83.8	85.3	1.4	0.217	66.8	164.5		384.4	3185	0.0306	94.3%	0.4183
11:44:56	76.5	77.9	1.4	0.214	66.9	164.5		384.5	3165	0.0277	94.7%	0.3878

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:45:56	71.6	73.0	1.4	0.217	67.0	164.5		384.5	3182	0.0261	95.1%	0.3601
11:46:56	65.2	66.6	1.4	0.218	67.0	164.5		384.6	3193	0.0238	95.4%	0.3340
11:47:56	62.0	63.3	1.4	0.218	67.1	164.5		384.6	3194	0.0226	95.7%	0.3102
11:48:56	59.3	60.7	1.4	0.216	67.1	164.5		384.7	3180	0.0216	96.1%	0.2875
11:49:56	54.7	56.1	1.3	0.219	67.0	164.5		384.6	3198	0.0200	96.4%	0.2660
11:50:56	50.9	52.3	1.4	0.218	66.9	164.5		384.5	3195	0.0186	96.6%	0.2460
11:51:56	48.9	50.3	1.3	0.220	66.9	164.4		384.5	3204	0.0179	96.9%	0.2273
11:52:56	47.0	48.3	1.3	0.216	67.0	164.4		384.6	3178	0.0171	97.2%	0.2094
11:53:56	42.7	44.0	1.3	0.214	66.9	164.4		384.5	3165	0.0155	97.4%	0.1923
11:54:56	42.2	43.5	1.3	0.216	67.2	164.4		384.7	3179	0.0153	97.6%	0.1768
11:55:56	38.6	39.9	1.3	0.216	67.2	164.4		384.7	3175	0.0140	97.8%	0.1615
11:56:56	37.8	39.2	1.3	0.217	67.2	164.4		384.7	3181	0.0138	98.0%	0.1475
11:57:56	34.0	35.3	1.3	0.179	67.0	164.4		384.6	2890	0.0112	98.2%	0.1337
11:58:56	30.0	31.3	1.3	0.147	67.0	164.4		384.6	2625	0.0090	98.3%	0.1225
11:59:56	30.3	31.6	1.3	0.214	67.1	164.4		384.7	3161	0.0109	98.5%	0.1135
12:00:56	27.1	28.4	1.3	0.111	67.2	164.4		384.7	2273	0.0071	98.6%	0.1025
12:01:56	25.7	26.9	1.3	0.213	66.9	164.4		384.5	3156	0.0093	98.7%	0.0955
12:02:56	23.7	25.0	1.3	0.211	66.8	164.4		384.5	3143	0.0085	98.8%	0.0862
12:03:56	22.7	24.0	1.3	0.212	66.9	164.4		384.5	3146	0.0082	99.0%	0.0777
12:04:56	20.4	21.7	1.3	0.213	66.9	164.4		384.5	3158	0.0074	99.1%	0.0695
12:05:56	19.1	20.4	1.3	0.211	66.9	164.4		384.5	3142	0.0069	99.2%	0.0621
12:06:56	17.3	18.6	1.3	0.212	66.8	164.4		384.5	3150	0.0063	99.3%	0.0553
12:07:56	15.6	16.9	1.3	0.210	66.7	164.4		384.4	3130	0.0056	99.4%	0.0490
12:08:56	14.9	16.1	1.3	0.211	66.7	164.4		384.4	3138	0.0053	99.4%	0.0434
12:09:56	13.4	14.7	1.3	0.211	66.7	164.4		384.3	3139	0.0048	99.5%	0.0381
12:10:56	12.6	13.8	1.2	0.214	66.7	164.4		384.4	3165	0.0046	99.6%	0.0333
12:11:56	11.8	13.1	1.2	0.212	66.8	164.4		384.4	3148	0.0043	99.6%	0.0287
12:12:56	11.6	12.8	1.2	0.212	67.1	164.4		384.7	3144	0.0042	99.7%	0.0244
12:13:56	10.4	11.7	1.2	0.213	67.3	164.4		384.8	3152	0.0038	99.8%	0.0203
12:14:56	9.6	10.8	1.2	0.213	67.5	164.4		385.0	3155	0.0035	99.8%	0.0165
12:15:56	8.3	9.6	1.2	0.212	67.5	164.4		385.0	3150	0.0030	99.9%	0.0130
12:16:56	7.8	9.0	1.2	0.213	67.6	164.4		385.0	3152	0.0028	99.9%	0.0100
12:17:56	7.2	8.5	1.2	0.219	67.8	164.4		385.1	3202	0.0026	99.9%	0.0073
12:18:56	6.6	7.9	1.2	0.212	67.9	164.4		385.2	3150	0.0024	100.0%	0.0046
12:19:56	6.2	7.4	1.3	0.212	67.9	164.4		385.3	3151	0.0022	100.0%	0.0022
	127.2	129.0	1.8	0.207	66.3	136.2		384.1	3111	6.76		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:17:49	16.4	18.8	2.4	0.199	71.1	281.5		387.6	3164	0.0059	1.1%	0.5580
13:18:49	69.2	71.7	2.5	0.203	71.2	280.3		387.7	3192	0.0251	5.5%	0.5521
13:19:49	99.3	101.8	2.6	0.200	71.4	279.6		387.8	3170	0.0357	11.9%	0.5271
13:20:49	107.7	110.2	2.6	0.202	71.4	279.0		387.8	3186	0.0389	18.9%	0.4914
13:21:49	107.0	109.5	2.6	0.201	71.5	278.6		387.9	3181	0.0386	25.8%	0.4524
13:22:49	97.0	99.6	2.6	0.200	71.7	278.5		388.0	3174	0.0349	32.1%	0.4138
13:23:49	95.2	97.8	2.6	0.202	71.8	278.5		388.1	3183	0.0344	38.3%	0.3789
13:24:49	88.5	91.0	2.5	0.200	71.9	278.5		388.2	3170	0.0318	44.0%	0.3445
13:25:49	80.2	82.7	2.5	0.200	72.0	278.5		388.2	3173	0.0288	49.1%	0.3127
13:26:49	72.1	74.6	2.6	0.200	72.0	278.5		388.3	3169	0.0259	53.8%	0.2839
13:27:49	63.6	66.2	2.6	0.200	72.1	278.5		388.3	3167	0.0228	57.9%	0.2580
13:28:49	61.4	64.0	2.5	0.200	72.2	278.5		388.4	3173	0.0221	61.8%	0.2351
13:29:49	58.2	60.7	2.5	0.202	72.3	278.5		388.4	3190	0.0210	65.6%	0.2131
13:30:49	50.9	53.4	2.5	0.203	72.3	278.5		388.5	3198	0.0184	68.9%	0.1920
13:31:49	46.8	49.3	2.5	0.201	72.4	278.6		388.5	3180	0.0169	71.9%	0.1736
13:32:49	42.8	45.3	2.5	0.201	72.4	278.6		388.5	3179	0.0154	74.7%	0.1568
13:33:49	38.1	40.6	2.5	0.200	72.5	278.6		388.6	3171	0.0137	77.1%	0.1413
13:34:49	35.4	37.9	2.5	0.200	72.5	278.6		388.6	3173	0.0127	79.4%	0.1276
13:35:49	32.0	34.5	2.5	0.199	72.5	278.6		388.6	3163	0.0114	81.5%	0.1149
13:36:49	30.0	32.5	2.5	0.200	72.6	278.6		388.6	3173	0.0108	83.4%	0.1035
13:37:49	27.5	29.9	2.4	0.196	72.6	278.5		388.7	3136	0.0098	85.1%	0.0927
13:38:49	25.0	27.4	2.4	0.218	72.6	278.5		388.7	3307	0.0093	86.8%	0.0830
13:39:49	23.4	25.9	2.4	0.163	72.6	278.5		388.7	2863	0.0076	88.2%	0.0736
13:40:49	19.9	22.3	2.4	0.151	72.4	278.5		388.5	2753	0.0062	89.3%	0.0660
13:41:49	19.6	21.9	2.4	0.195	72.8	278.5		388.8	3130	0.0069	90.5%	0.0598
13:42:49	16.5	18.9	2.4	0.155	73.0	278.5		389.0	2791	0.0052	91.5%	0.0529
13:43:49	16.3	18.7	2.4	0.205	72.8	278.5		388.8	3212	0.0059	92.5%	0.0477
13:44:49	15.1	17.4	2.4	0.207	72.9	278.5		388.9	3227	0.0055	93.5%	0.0418
13:45:49	13.7	16.0	2.3	0.205	73.0	278.5		389.0	3207	0.0050	94.4%	0.0363
13:46:49	12.6	14.9	2.3	0.207	73.1	278.5		389.0	3222	0.0046	95.2%	0.0313
13:47:49	11.2	13.6	2.3	0.207	73.1	278.5		389.1	3223	0.0041	95.9%	0.0267
13:48:49	10.7	13.0	2.3	0.208	73.1	278.5		389.0	3232	0.0039	96.6%	0.0226
13:49:49	7.7	10.0	2.3	0.210	72.3	278.5		388.5	3250	0.0028	97.2%	0.0187
13:50:49	6.9	9.2	2.2	0.211	71.6	278.5		387.9	3261	0.0026	97.6%	0.0159
13:51:49	6.4	8.5	2.2	0.212	71.0	278.5		387.5	3264	0.0024	98.0%	0.0133
13:52:49	5.6	7.7	2.1	0.209	70.5	278.6		387.1	3245	0.0021	98.4%	0.0110
13:53:49	5.9	7.9	2.0	0.206	70.5	278.6		387.1	3216	0.0022	98.8%	0.0089
13:54:49	5.1	7.2	2.0	0.207	70.6	278.5		387.2	3223	0.0019	99.1%	0.0067
13:55:49	5.0	7.1	2.0	0.207	70.8	278.4		387.4	3226	0.0018	99.5%	0.0048
13:56:49	4.9	7.0	2.0	0.208	71.0	278.3		387.5	3237	0.0018	99.8%	0.0030
13:57:49	3.3	5.3	2.0	0.207	71.1	278.3		387.6	3224	0.0012	100.0%	0.0012
	37.9	40.3		0.200	72.0	3.2		388.3	3170	0.56		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:17:09	0.2	2.9	2.7	0.208	71.4	174.0		387.8	3234	0.0001	0.0%	0.0702
14:18:09	0.1	2.9	2.8	0.205	71.3	174.0		387.7	3211	0.0000	0.0%	0.0640
14:19:09	0.0	2.9	2.8	0.200	71.4	174.0		387.8	3171	0.0000	0.0%	0.0601
14:20:09	0.0	2.8	2.8	0.200	71.4	173.0		387.8	3168	0.0000	0.0%	0.0558
14:21:09	16.4	19.3	2.8	0.201	71.5	172.0		387.9	3176	0.0059	1.6%	0.0586
14:22:09	62.8	65.6	2.8	0.199	71.4	168.0		387.8	3167	0.0226	7.5%	0.0718
14:23:09	66.7	69.5	2.8	0.201	71.3	171.2		387.7	3182	0.0241	13.8%	0.0701
14:24:09	59.0	61.8	2.8	0.198	71.3	171.0		387.7	3151	0.0211	19.4%	0.0640
14:25:09	65.4	68.2	2.8	0.201	71.1	170.9		387.6	3175	0.0236	25.6%	0.0601
14:26:09	59.7	62.4	2.7	0.198	71.1	170.9		387.5	3158	0.0214	31.2%	0.0558
14:27:09	58.1	60.9	2.7	0.198	71.0	170.9		387.5	3153	0.0208	36.7%	0.0526
14:28:09	55.5	58.3	2.8	0.197	71.0	170.9		387.5	3148	0.0198	41.9%	0.0492
14:29:09	50.0	52.8	2.9	0.201	71.0	170.9		387.5	3180	0.0180	46.6%	0.0461
14:30:09	46.9	49.8	2.8	0.200	71.0	170.9		387.5	3171	0.0169	51.1%	0.0429
14:31:09	41.1	43.9	2.8	0.195	70.9	170.8		387.5	3132	0.0146	54.9%	0.0365
14:32:09	37.9	40.7	2.9	0.197	70.9	170.8		387.4	3145	0.0135	58.5%	0.0344
14:33:09	34.6	37.5	2.9	0.199	70.9	170.8		387.4	3160	0.0124	61.7%	0.0318
14:34:09	31.3	34.1	2.8	0.200	70.8	170.8		387.4	3170	0.0113	64.7%	0.0294
14:35:09	30.3	33.1	2.8	0.198	70.8	170.8		387.4	3151	0.0109	67.6%	0.0280
14:36:09	28.0	30.8	2.8	0.196	70.8	170.8		387.4	3137	0.0100	70.2%	0.0260
14:37:09	24.6	27.4	2.7	0.198	70.8	170.7		387.4	3154	0.0088	72.5%	0.0219
14:38:09	24.3	27.0	2.7	0.197	70.8	170.7		387.4	3146	0.0087	74.8%	0.0209
14:39:09	22.5	25.3	2.7	0.196	70.8	170.7		387.4	3139	0.0080	76.9%	0.0194
14:40:09	20.9	23.5	2.7	0.195	70.8	170.7		387.3	3128	0.0074	78.9%	0.0181
14:41:09	18.9	21.6	2.7	0.199	70.8	170.7		387.4	3162	0.0068	80.6%	0.0172
14:42:09	18.1	20.8	2.7	0.196	70.8	170.7		387.3	3135	0.0065	82.3%	0.0160
14:43:09	17.1	19.8	2.6	0.197	70.7	170.7		387.3	3151	0.0061	83.9%	0.0130
14:44:09	15.5	18.1	2.6	0.197	70.7	170.6		387.3	3149	0.0056	85.4%	0.0122
14:45:09	14.8	17.4	2.6	0.193	70.7	170.6		387.3	3111	0.0052	86.8%	0.0114
14:46:09	13.9	16.5	2.5	0.196	70.7	170.6		387.3	3137	0.0050	88.1%	0.0107
14:47:09	13.6	16.1	2.5	0.198	70.6	170.6		387.2	3157	0.0049	89.4%	0.0104
14:48:09	12.0	14.5	2.5	0.214	70.3	170.6		387.0	3284	0.0045	90.6%	0.0096
14:49:09	11.1	13.5	2.4	0.202	69.9	170.5		386.7	3187	0.0040	91.6%	0.0069
14:50:09	11.1	13.5	2.4	0.201	69.9	170.5		386.7	3175	0.0040	92.7%	0.0066
14:51:09	10.5	12.9	2.4	0.201	69.9	170.5		386.7	3177	0.0038	93.7%	0.0062
14:52:09	9.8	12.2	2.4	0.200	70.0	170.5		386.7	3171	0.0035	94.6%	0.0057
14:53:09	9.4	11.8	2.4	0.204	70.0	170.5		386.8	3203	0.0034	95.5%	0.0055
14:54:09	9.3	11.6	2.3	0.198	70.0	170.5		386.8	3153	0.0033	96.4%	0.0051
14:55:09	8.0	10.3	2.3	0.199	70.0	170.5		386.8	3163	0.0029	97.1%	0.0029
14:56:09	7.3	9.6	2.3	0.198	70.1	170.5		386.8	3152	0.0026	97.8%	0.0026
14:57:09	6.5	8.8	2.2	0.198	70.1	170.4		386.9	3153	0.0023	98.4%	0.0023
14:58:09	6.0	8.2	2.2	0.200	70.1	170.4		386.9	3168	0.0022	99.0%	0.0022
14:59:09	5.7	7.9	2.2	0.202	70.1	170.4		386.9	3183	0.0021	99.5%	0.0021
15:00:09	4.8	7.0	2.2	0.199	70.2	170.4		386.9	3166	0.0017	100.0%	0.0017
	24.1	26.7		0.199	70.7	3.5		387.3	3165	0.38		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:18:54	5.6	7.8	2.1	0.220	66.3	349.5		384.1	3281	0.0021	0.0%	4.5306
9:19:54	19.4	21.5	2.1	0.220	66.4	344.2		384.1	3278	0.0073	0.2%	4.5284
9:20:54	35.2	37.3	2.1	0.220	66.6	340.5		384.3	3283	0.0132	0.5%	4.5212
9:21:54	53.5	55.5	2.1	0.220	66.5	336.5		384.2	3282	0.0201	0.9%	4.5079
9:22:54	52.4	54.5	2.1	0.220	66.3	335.2		384.1	3284	0.0197	1.4%	4.4878
9:23:54	66.3	68.4	2.1	0.219	66.2	331.7		384.0	3276	0.0249	1.9%	4.4681
9:24:54	88.3	90.4	2.1	0.221	66.4	331.1		384.1	3287	0.0332	2.7%	4.4432
9:25:54	77.7	79.8	2.1	0.221	66.7	330.5		384.3	3286	0.0292	3.3%	4.4100
9:26:54	83.3	85.4	2.1	0.221	66.7	327.2		384.4	3289	0.0314	4.0%	4.3807
9:27:56	104.6	106.7	2.1	0.221	66.9	325.2		384.5	3286	0.0393	4.9%	4.3493
9:28:56	117.3	119.3	2.0	0.217	66.8	322.2		384.4	3258	0.0437	5.8%	4.3100
9:29:54	139.1	141.1	2.0	0.218	66.8	314.2		384.4	3266	0.0520	7.0%	4.2663
9:30:54	170.2	172.2	2.0	0.222	67.0	309.3		384.6	3296	0.0642	8.4%	4.2143
9:31:54	188.9	190.9	2.0	0.222	66.9	305.7		384.5	3296	0.0712	10.0%	4.1501
9:32:54	172.8	174.8	2.0	0.221	66.7	305.7		384.4	3286	0.0650	11.4%	4.0789
9:33:54	171.4	173.4	2.0	0.220	66.8	305.7		384.5	3280	0.0644	12.8%	4.0139
9:34:54	163.2	165.2	2.0	0.220	66.9	305.7		384.5	3281	0.0613	14.2%	3.9495
9:35:54	155.8	157.8	1.9	0.221	67.0	305.7		384.6	3286	0.0586	15.5%	3.8882
9:36:54	146.6	148.5	1.9	0.219	67.0	305.7		384.6	3275	0.0549	16.7%	3.8297
9:37:54	141.3	143.2	1.9	0.219	67.0	305.7		384.6	3271	0.0529	17.9%	3.7747
9:38:54	135.5	137.4	1.9	0.223	66.9	305.7		384.5	3302	0.0512	19.0%	3.7219
9:39:54	130.4	132.3	1.9	0.221	66.8	305.7		384.4	3291	0.0491	20.1%	3.6707
9:40:54	122.0	123.9	1.9	0.220	66.9	305.7		384.5	3279	0.0458	21.1%	3.6215
9:41:54	124.3	126.2	1.9	0.223	67.0	305.7		384.6	3303	0.0470	22.1%	3.5758
9:42:54	114.1	116.0	1.9	0.220	67.0	305.7		384.6	3283	0.0428	23.1%	3.5288
9:43:54	111.0	112.9	1.9	0.221	67.1	305.7		384.6	3286	0.0417	24.0%	3.4859
9:44:54	103.6	105.5	1.9	0.223	67.1	305.7		384.7	3300	0.0391	24.8%	3.4442
9:45:54	100.3	102.3	2.0	0.222	67.1	305.7		384.6	3293	0.0378	25.7%	3.4051
9:46:54	97.3	99.4	2.1	0.225	67.1	305.7		384.7	3320	0.0369	26.5%	3.3673
9:47:54	93.5	95.7	2.1	0.225	67.1	305.7		384.7	3319	0.0355	27.3%	3.3304
9:48:54	90.1	92.3	2.2	0.234	67.1	305.7		384.7	3385	0.0349	28.0%	3.2949
9:49:54	86.1	88.4	2.3	0.235	67.3	305.7		384.8	3390	0.0334	28.8%	3.2600
9:50:54	82.4	84.7	2.3	0.237	67.2	305.7		384.8	3408	0.0321	29.5%	3.2266
9:51:54	82.1	84.2	2.1	0.237	67.3	305.6		384.8	3405	0.0319	30.2%	3.1945
9:52:54	79.0	81.0	2.0	0.221	67.4	305.6		384.9	3289	0.0297	30.8%	3.1626
9:53:54	76.9	78.9	1.9	0.224	67.5	305.6		385.0	3313	0.0291	31.5%	3.1329
9:54:54	73.9	75.8	1.9	0.220	67.6	305.6		385.0	3279	0.0277	32.1%	3.1038
9:55:54	68.7	70.6	1.9	0.226	67.4	305.6		384.8	3323	0.0261	32.7%	3.0761
9:56:54	57.3	59.1	1.9	0.227	66.0	305.6		383.8	3334	0.0219	33.2%	3.0500
9:57:54	71.0	72.9	1.9	0.219	66.4	305.6		384.2	3271	0.0266	33.8%	3.0281
9:58:54	71.5	73.3	1.9	0.221	67.1	305.6		384.6	3286	0.0269	34.3%	3.0015
9:59:54	69.9	71.7	1.9	0.219	67.5	305.6		384.9	3274	0.0262	34.9%	2.9746
10:00:54	66.6	68.5	1.9	0.216	67.7	305.6		385.1	3252	0.0247	35.5%	2.9484
10:01:54	67.3	69.1	1.8	0.218	68.0	305.6		385.3	3265	0.0251	36.0%	2.9237
10:02:54	66.3	68.1	1.8	0.220	68.3	305.6		385.6	3278	0.0248	36.6%	2.8986
10:03:54	61.8	63.6	1.8	0.216	68.3	305.6		385.6	3249	0.0229	37.1%	2.8738
10:04:54	60.3	62.1	1.8	0.218	68.2	305.6		385.5	3269	0.0225	37.6%	2.8509
10:05:54	58.7	60.5	1.9	0.217	68.3	305.6		385.5	3257	0.0218	38.1%	2.8284
10:06:54	56.6	58.5	1.9	0.218	68.4	305.6		385.6	3267	0.0211	38.5%	2.8066
10:07:54	56.5	58.5	2.0	0.219	68.4	305.6		385.6	3275	0.0211	39.0%	2.7855
10:08:54	55.1	57.2	2.1	0.218	68.6	305.6		385.7	3265	0.0205	39.4%	2.7644
10:09:54	54.2	56.3	2.2	0.217	68.6	305.6		385.7	3261	0.0202	39.9%	2.7439
10:10:54	52.8	55.0	2.2	0.223	68.4	305.5		385.6	3305	0.0199	40.3%	2.7237
10:11:54	45.6	47.9	2.3	0.221	67.7	306.0		385.1	3290	0.0171	40.7%	2.7038
10:12:54	67.1	69.5	2.4	0.220	67.9	300.1		385.3	3283	0.0252	41.3%	2.6866
10:13:54	87.7	90.2	2.5	0.216	68.3	293.8		385.6	3251	0.0326	42.0%	2.6615
10:14:54	107.4	109.9	2.5	0.218	68.4	287.5		385.6	3269	0.0401	42.9%	2.6289

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:15:54	129.8	132.3	2.5	0.218	68.4	280.8		385.6	3262	0.0483	43.9%	2.5888
10:16:54	132.0	134.5	2.4	0.218	68.5	277.7		385.7	3263	0.0491	45.0%	2.5405
10:17:54	136.8	139.2	2.4	0.218	68.6	274.9		385.7	3268	0.0510	46.1%	2.4914
10:18:54	145.2	147.5	2.3	0.219	68.5	270.9		385.7	3272	0.0542	47.3%	2.4404
10:19:54	156.6	158.8	2.2	0.217	68.5	267.0		385.7	3256	0.0582	48.6%	2.3862
10:20:54	162.3	164.4	2.2	0.219	68.4	263.7		385.6	3275	0.0606	50.0%	2.3280
10:21:54	175.1	177.2	2.1	0.218	68.4	259.6		385.6	3264	0.0652	51.4%	2.2674
10:22:54	204.7	206.8	2.1	0.218	68.4	254.2		385.6	3268	0.0763	53.1%	2.2021
10:23:54	249.5	251.6	2.1	0.220	68.5	248.7		385.7	3283	0.0935	55.1%	2.1258
10:25:08	255.0	257.0	2.0	0.225	68.5	245.3		385.7	3321	0.0966	57.3%	2.0323
10:25:54	237.3	239.3	2.0	0.236	68.6	242.5		385.7	3399	0.0920	59.3%	1.9357
10:26:54	252.8	254.8	2.0	0.222	68.7	238.9		385.8	3293	0.0949	61.4%	1.8437
10:27:54	252.6	254.6	2.0	0.221	68.7	234.9		385.8	3285	0.0946	63.5%	1.7488
10:28:54	236.9	238.8	1.9	0.222	68.5	234.5		385.7	3293	0.0890	65.5%	1.6542
10:29:54	223.0	224.9	1.9	0.224	68.6	234.5		385.8	3310	0.0842	67.3%	1.5652
10:30:54	214.8	216.7	1.9	0.221	68.6	234.5		385.8	3287	0.0806	69.1%	1.4810
10:31:54	208.0	209.8	1.8	0.221	68.6	234.5		385.8	3285	0.0779	70.8%	1.4004
10:32:54	201.1	202.9	1.8	0.220	68.6	234.5		385.8	3277	0.0752	72.5%	1.3225
10:33:54	190.8	192.5	1.8	0.219	68.6	234.5		385.8	3273	0.0712	74.0%	1.2473
10:34:54	181.9	183.6	1.8	0.219	68.5	234.5		385.7	3274	0.0679	75.5%	1.1761
10:35:54	183.8	185.6	1.7	0.220	68.4	234.5		385.6	3283	0.0689	77.1%	1.1082
10:36:54	167.7	169.4	1.8	0.221	68.5	234.5		385.7	3288	0.0629	78.4%	1.0393
10:37:54	163.9	165.6	1.8	0.221	68.5	234.5		385.7	3288	0.0615	79.8%	0.9764
10:38:54	155.4	157.2	1.8	0.219	68.6	234.5		385.8	3276	0.0581	81.1%	0.9149
10:39:54	146.7	148.6	1.8	0.220	68.5	234.5		385.7	3284	0.0550	82.3%	0.8569
10:40:54	143.2	145.1	1.9	0.218	68.6	234.5		385.7	3264	0.0533	83.5%	0.8019
10:41:54	134.0	135.8	1.8	0.228	68.6	234.6		385.8	3337	0.0510	84.6%	0.7486
10:42:54	124.8	126.7	1.8	0.206	68.5	234.5		385.7	3178	0.0453	85.6%	0.6976
10:43:54	119.4	121.1	1.7	0.163	68.5	234.5		385.7	2825	0.0385	86.5%	0.6523
10:44:54	121.7	123.4	1.7	0.210	68.7	234.5		385.8	3205	0.0445	87.4%	0.6138
10:45:54	113.3	114.9	1.7	0.148	68.6	234.5		385.8	2693	0.0348	88.2%	0.5694
10:46:54	110.3	111.9	1.7	0.226	68.6	234.5		385.7	3328	0.0419	89.1%	0.5346
10:47:54	103.4	105.1	1.7	0.226	68.4	234.5		385.6	3323	0.0392	90.0%	0.4927
10:48:54	98.3	99.9	1.6	0.222	68.3	234.4		385.5	3294	0.0369	90.8%	0.4535
10:49:54	93.6	95.2	1.6	0.224	68.5	234.5		385.6	3312	0.0354	91.6%	0.4166
10:50:54	88.8	90.4	1.6	0.223	68.5	234.4		385.7	3305	0.0335	92.3%	0.3812
10:51:54	81.6	83.2	1.6	0.228	68.5	234.4		385.7	3337	0.0311	93.0%	0.3477
10:52:54	76.9	78.5	1.6	0.227	68.7	234.4		385.8	3329	0.0292	93.7%	0.3167
10:53:54	70.9	72.5	1.6	0.225	68.6	234.4		385.8	3321	0.0269	94.2%	0.2875
10:54:54	64.9	66.4	1.6	0.227	68.4	234.4		385.6	3332	0.0247	94.8%	0.2606
10:55:54	59.5	61.1	1.6	0.224	68.6	234.4		385.7	3309	0.0225	95.3%	0.2359
10:56:54	58.3	59.9	1.6	0.223	68.9	234.4		386.0	3303	0.0220	95.8%	0.2135
10:57:54	54.6	56.1	1.5	0.224	69.3	234.4		386.3	3313	0.0206	96.2%	0.1915
10:58:54	47.2	48.7	1.5	0.224	69.2	234.4		386.2	3312	0.0178	96.6%	0.1709
10:59:54	43.7	45.2	1.5	0.223	69.5	234.4		386.4	3303	0.0164	97.0%	0.1531
11:00:54	40.5	42.0	1.4	0.224	69.7	234.4		386.5	3312	0.0153	97.3%	0.1366
11:01:54	34.8	36.2	1.4	0.227	69.5	234.4		386.4	3335	0.0132	97.6%	0.1213
11:02:54	28.9	30.3	1.4	0.228	68.9	234.4		386.0	3339	0.0110	97.9%	0.1081
11:03:54	27.2	28.6	1.4	0.224	68.9	234.4		386.0	3312	0.0103	98.1%	0.0972
11:04:54	25.5	26.9	1.4	0.226	69.0	234.4		386.0	3324	0.0097	98.3%	0.0869
11:05:54	23.1	24.5	1.4	0.224	69.2	234.4		386.2	3308	0.0087	98.5%	0.0772
11:06:54	20.5	21.9	1.4	0.226	69.3	234.4		386.2	3324	0.0078	98.7%	0.0685
11:07:54	18.7	20.1	1.4	0.224	69.4	234.4		386.3	3308	0.0071	98.8%	0.0607
11:08:54	16.7	18.1	1.4	0.226	69.4	234.4		386.3	3322	0.0063	99.0%	0.0537
11:09:54	14.8	16.2	1.4	0.227	69.3	234.4		386.2	3331	0.0056	99.1%	0.0474
11:10:54	13.2	14.5	1.4	0.223	69.3	234.4		386.3	3302	0.0050	99.2%	0.0417
11:11:54	11.9	13.3	1.4	0.227	69.3	234.4		386.3	3333	0.0045	99.3%	0.0368

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:12:54	10.9	12.2	1.4	0.223	69.3	234.4		386.3	3301	0.0041	99.4%	0.0323
11:13:54	10.0	11.4	1.3	0.222	69.4	234.4		386.3	3298	0.0038	99.5%	0.0282
11:14:54	9.1	10.4	1.3	0.225	69.4	234.4		386.4	3321	0.0034	99.5%	0.0244
11:15:54	8.2	9.6	1.3	0.226	69.4	234.4		386.3	3327	0.0031	99.6%	0.0210
11:16:54	7.6	8.9	1.3	0.223	69.4	234.4		386.4	3305	0.0028	99.7%	0.0179
11:17:54	6.8	8.1	1.3	0.221	69.5	234.4		386.4	3285	0.0025	99.7%	0.0150
11:18:54	6.1	7.4	1.3	0.228	69.4	234.4		386.4	3342	0.0023	99.8%	0.0125
11:19:54	5.7	7.0	1.3	0.223	69.4	234.4		386.4	3305	0.0021	99.8%	0.0102
11:20:54	5.0	6.3	1.3	0.226	69.5	234.4		386.4	3326	0.0019	99.9%	0.0080
11:21:54	4.6	6.0	1.3	0.226	69.6	234.4		386.5	3328	0.0018	99.9%	0.0061
11:22:54	4.6	6.0	1.3	0.226	69.7	234.4		386.6	3322	0.0018	99.9%	0.0044
11:23:54	3.8	5.1	1.3	0.227	69.8	234.4		386.6	3332	0.0014	100.0%	0.0026
11:24:54	3.1	4.4	1.3	0.229	69.0	234.4		386.0	3351	0.0012	100.0%	0.0012
	95.2	97.0		0.221	68.1	115.1		385.4	3289	4.53		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:42:47	33.4	35.8	2.4	0.219	65.2	363.3		383.3	3262	0.0125	0.2%	0.8955
12:43:47	41.4	43.8	2.4	0.221	65.5	360.6		383.5	3279	0.0156	0.5%	0.9009
12:44:47	56.4	58.8	2.4	0.220	65.7	359.1		383.6	3272	0.0212	0.9%	0.9044
12:45:47	60.0	62.3	2.4	0.218	65.8	358.7		383.7	3254	0.0224	1.3%	0.9082
12:46:47	59.1	61.5	2.3	0.216	65.8	358.6		383.7	3246	0.0220	1.7%	0.8802
12:47:47	59.1	61.4	2.4	0.221	65.8	358.1		383.7	3282	0.0222	2.2%	0.8781
12:48:47	74.7	77.0	2.3	0.221	65.9	353.0		383.8	3282	0.0281	2.7%	0.8829
12:49:47	90.3	92.6	2.3	0.221	66.0	348.3		383.8	3279	0.0339	3.3%	0.8853
12:50:47	130.0	132.3	2.3	0.220	66.0	342.7		383.9	3275	0.0488	4.2%	0.8832
12:51:47	127.3	129.6	2.3	0.220	66.0	342.0		383.8	3270	0.0477	5.1%	0.8858
12:52:47	128.4	130.7	2.3	0.218	66.0	342.0		383.9	3256	0.0479	6.0%	0.8582
12:53:47	123.2	125.5	2.3	0.218	66.0	342.0		383.9	3259	0.0460	6.9%	0.8559
12:54:47	125.5	127.8	2.3	0.221	66.1	341.7		383.9	3280	0.0472	7.7%	0.8548
12:55:47	106.7	109.0	2.3	0.218	66.1	340.8		383.9	3260	0.0399	8.5%	0.8513
12:56:47	97.7	100.0	2.3	0.221	66.0	340.2		383.8	3284	0.0368	9.2%	0.8344
12:57:47	116.0	118.3	2.3	0.216	65.8	333.4		383.7	3246	0.0432	10.0%	0.8381
12:58:47	149.3	151.6	2.3	0.219	65.7	328.3		383.7	3265	0.0559	11.0%	0.8103
12:59:47	156.9	159.2	2.3	0.217	65.7	323.8		383.6	3247	0.0584	12.1%	0.8098
13:00:47	187.3	189.4	2.2	0.219	65.7	319.5		383.6	3268	0.0702	13.4%	0.8076
13:01:47	199.3	201.5	2.2	0.219	65.7	313.6		383.6	3268	0.0747	14.8%	0.8115
13:02:47	219.3	221.5	2.2	0.219	65.7	312.1		383.7	3264	0.0821	16.3%	0.7976
13:03:47	209.3	211.4	2.1	0.224	65.8	312.1		383.7	3299	0.0792	17.8%	0.7949
13:04:47	194.6	196.7	2.1	0.216	65.7	312.1		383.6	3241	0.0723	19.2%	0.7543
13:05:47	186.0	188.2	2.1	0.222	65.7	312.1		383.6	3290	0.0702	20.5%	0.7514
13:06:47	172.3	174.5	2.1	0.217	65.6	312.1		383.6	3247	0.0642	21.7%	0.7375
13:07:47	169.6	171.7	2.1	0.219	65.6	312.1		383.6	3262	0.0635	22.8%	0.7367
13:08:47	166.1	168.3	2.1	0.218	65.6	312.1		383.6	3254	0.0620	24.0%	0.7155
13:09:47	158.6	160.8	2.2	0.216	65.7	312.1		383.6	3244	0.0590	25.1%	0.7158
13:10:47	154.7	149.5	-5.3	0.213	65.8	312.1		383.7	3217	0.0571	26.2%	0.6820
13:11:47	157.2	154.8	-2.3	0.220	65.8	312.1		383.7	3274	0.0590	27.3%	0.6812
13:12:47	138.5	140.9	2.4	0.218	65.8	312.1		383.7	3259	0.0518	28.2%	0.6733
13:13:47	118.5	120.9	2.4	0.219	65.8	312.1		383.7	3262	0.0443	29.1%	0.6733
13:14:47	113.6	116.1	2.5	0.220	65.8	312.1		383.7	3271	0.0426	29.8%	0.6535
13:15:47	106.6	109.1	2.5	0.217	65.8	312.1		383.7	3248	0.0397	30.6%	0.6567
13:16:47	111.5	114.1	2.5	0.219	65.9	312.1		383.7	3263	0.0417	31.4%	0.6249
13:17:47	109.6	112.1	2.5	0.231	65.9	312.1		383.8	3354	0.0421	32.2%	0.6222
13:18:47	103.4	105.9	2.5	0.220	65.9	312.1		383.8	3271	0.0388	32.9%	0.6215
13:19:47	98.6	101.1	2.5	0.219	65.9	312.1		383.8	3263	0.0369	33.6%	0.6290
13:20:47	97.9	100.5	2.5	0.217	65.9	312.1		383.8	3248	0.0365	34.2%	0.6109
13:21:47	99.4	101.9	2.5	0.219	66.0	312.1		383.8	3263	0.0372	34.9%	0.6170
13:22:47	92.7	95.2	2.5	0.218	66.0	312.1		383.8	3254	0.0346	35.6%	0.5832
13:23:47	87.9	90.5	2.5	0.216	66.0	312.1		383.8	3239	0.0327	36.2%	0.5801
13:24:47	85.7	88.2	2.5	0.214	66.0	312.1		383.8	3227	0.0317	36.8%	0.5827
13:25:47	82.8	85.3	2.5	0.211	65.9	312.1		383.8	3202	0.0304	37.3%	0.5921
13:26:47	80.8	83.4	2.5	0.213	65.9	312.1		383.8	3221	0.0298	37.9%	0.5744
13:27:47	85.3	87.8	2.5	0.213	65.9	311.6		383.8	3222	0.0315	38.5%	0.5799
13:28:47	89.8	92.3	2.5	0.215	66.0	312.8		383.9	3233	0.0333	39.1%	0.5486
13:29:47	76.1	78.6	2.5	0.213	65.9	311.1		383.8	3221	0.0281	39.6%	0.5474
13:30:47	90.3	92.8	2.5	0.212	65.9	305.0		383.8	3215	0.0333	40.2%	0.5510
13:31:47	112.4	114.9	2.5	0.213	66.0	300.8		383.8	3217	0.0415	41.0%	0.5617
13:32:47	114.1	116.6	2.5	0.210	65.9	299.5		383.8	3196	0.0418	41.8%	0.5445
13:33:47	126.8	129.3	2.5	0.212	66.0	295.0		383.9	3216	0.0467	42.7%	0.5483
13:34:47	125.0	127.5	2.5	0.216	66.1	293.4		383.9	3243	0.0464	43.5%	0.5153
13:35:47	125.4	127.9	2.5	0.216	66.1	289.1		384.0	3241	0.0466	44.4%	0.5193
13:36:47	140.6	143.1	2.5	0.213	66.2	284.7		384.0	3218	0.0518	45.4%	0.5177
13:37:47	129.9	132.5	2.6	0.214	66.1	284.2		384.0	3231	0.0481	46.3%	0.5202
13:38:47	151.1	153.7	2.6	0.214	66.1	282.4		383.9	3228	0.0559	47.3%	0.5028

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:39:47	143.5	146.2	2.6	0.215	66.1	280.4		383.9	3236	0.0532	48.3%	0.5016
13:40:47	145.0	147.6	2.6	0.214	66.1	275.2		383.9	3230	0.0537	49.3%	0.4689
13:41:47	164.8	167.4	2.6	0.213	66.1	271.5		383.9	3221	0.0608	50.4%	0.4727
13:42:47	166.1	168.7	2.6	0.213	66.1	268.6		383.9	3219	0.0613	51.6%	0.4659
13:43:47	174.3	176.9	2.6	0.217	66.1	268.4		383.9	3248	0.0649	52.8%	0.4721
13:44:47	158.2	160.8	2.6	0.214	66.0	268.4		383.9	3226	0.0585	53.9%	0.4469
13:45:47	165.1	167.7	2.6	0.211	66.0	268.4		383.8	3203	0.0606	55.0%	0.4484
13:46:47	155.0	157.6	2.6	0.211	66.0	268.4		383.8	3207	0.0570	56.1%	0.4152
13:47:47	145.1	147.7	2.6	0.214	66.0	268.4		383.8	3227	0.0537	57.1%	0.4119
13:48:47	136.6	139.3	2.7	0.208	66.0	268.4		383.8	3185	0.0499	58.0%	0.4046
13:49:47	136.7	139.4	2.7	0.215	66.0	268.4		383.9	3236	0.0507	58.9%	0.4072
13:50:47	124.5	127.3	2.7	0.216	66.0	268.4		383.9	3246	0.0463	59.8%	0.3884
13:51:47	120.1	122.8	2.7	0.212	66.2	268.4		384.0	3212	0.0442	60.6%	0.3878
13:52:47	116.5	119.3	2.7	0.213	66.2	268.4		384.0	3224	0.0430	61.4%	0.3582
13:53:47	113.7	116.4	2.7	0.214	66.3	268.4		384.1	3229	0.0421	62.2%	0.3582
13:54:47	109.0	111.7	2.7	0.215	66.3	268.4		384.1	3232	0.0404	63.0%	0.3547
13:55:47	101.3	103.9	2.6	0.214	66.3	268.4		384.1	3229	0.0375	63.7%	0.3565
13:56:47	96.5	99.2	2.6	0.215	66.2	268.4		384.0	3233	0.0358	64.3%	0.3420
13:57:47	91.9	94.5	2.6	0.213	66.2	268.4		384.0	3217	0.0339	65.0%	0.3436
13:58:47	88.3	90.8	2.6	0.216	66.2	268.4		384.0	3245	0.0328	65.6%	0.3151
13:59:47	85.9	88.4	2.6	0.215	66.3	268.4		384.1	3233	0.0318	66.2%	0.3162
14:00:47	78.7	81.2	2.5	0.224	66.2	268.4		384.0	3305	0.0298	66.7%	0.3144
14:01:47	79.3	81.9	2.5	0.220	66.1	268.4		383.9	3270	0.0297	67.3%	0.3190
14:02:47	76.6	79.2	2.5	0.230	66.2	268.4		384.0	3348	0.0294	67.8%	0.3063
14:03:47	73.9	76.4	2.5	0.225	66.3	268.4		384.0	3309	0.0280	68.3%	0.3097
14:04:47	66.4	68.9	2.5	0.232	66.3	267.9		384.1	3359	0.0255	68.8%	0.2823
14:05:47	68.4	70.9	2.5	0.229	66.6	268.9		384.3	3336	0.0261	69.3%	0.2843
14:06:47	61.2	63.6	2.5	0.218	66.5	269.5		384.2	3256	0.0228	69.7%	0.2846
14:07:47	58.3	60.8	2.5	0.218	66.6	269.0		384.3	3258	0.0218	70.1%	0.2893
14:08:47	57.4	59.8	2.5	0.215	66.7	268.7		384.3	3238	0.0213	70.5%	0.2769
14:09:47	55.6	58.0	2.5	0.214	66.7	268.7		384.3	3230	0.0206	70.9%	0.2817
14:10:47	51.9	54.4	2.5	0.217	66.7	268.6		384.3	3252	0.0193	71.3%	0.2568
14:11:47	54.7	57.1	2.5	0.216	66.8	265.0		384.4	3246	0.0203	71.7%	0.2582
14:12:47	79.3	81.8	2.4	0.218	66.9	258.8		384.5	3256	0.0296	72.2%	0.2618
14:13:47	106.2	108.6	2.4	0.212	66.9	256.5		384.5	3214	0.0391	72.9%	0.2676
14:14:47	111.3	113.7	2.4	0.217	67.0	251.7		384.6	3252	0.0414	73.7%	0.2556
14:15:47	132.9	135.3	2.4	0.214	67.0	245.8		384.6	3230	0.0491	74.6%	0.2611
14:16:47	140.5	142.9	2.4	0.216	67.0	240.2		384.6	3243	0.0521	75.6%	0.2375
14:17:47	143.2	145.6	2.4	0.213	67.1	237.0		384.7	3224	0.0528	76.6%	0.2379
14:18:47	167.5	169.9	2.3	0.211	67.1	231.5		384.6	3208	0.0615	77.7%	0.2322
14:19:47	185.1	187.4	2.3	0.215	67.0	226.4		384.6	3234	0.0685	79.0%	0.2285
14:20:47	185.4	187.7	2.3	0.214	67.1	222.0		384.7	3226	0.0684	80.3%	0.2142
14:21:47	180.2	182.5	2.3	0.218	67.1	221.4		384.6	3257	0.0671	81.5%	0.2120
14:22:47	171.9	174.2	2.3	0.216	67.0	220.0		384.6	3247	0.0639	82.7%	0.1853
14:23:47	161.5	163.8	2.3	0.219	67.0	220.0		384.6	3267	0.0604	83.8%	0.1851
14:24:47	150.7	153.1	2.3	0.212	67.1	220.0		384.7	3216	0.0555	84.9%	0.1707
14:25:47	147.7	150.1	2.4	0.191	67.1	220.0		384.7	3048	0.0515	85.8%	0.1600
14:26:47	138.1	140.5	2.4	0.150	67.3	220.0		384.8	2703	0.0427	86.6%	0.1458
14:27:47	128.4	130.8	2.4	0.213	67.2	220.0		384.7	3221	0.0473	87.5%	0.1449
14:28:47	120.8	123.2	2.4	0.115	67.3	220.0		384.8	2370	0.0327	88.1%	0.1215
14:29:47	117.0	119.4	2.4	0.210	67.0	220.0		384.6	3200	0.0428	88.9%	0.1247
14:30:47	105.8	108.2	2.4	0.212	66.9	219.9		384.5	3212	0.0389	89.6%	0.1153
14:31:47	99.5	101.9	2.4	0.213	66.9	220.0		384.5	3221	0.0367	90.3%	0.1085
14:32:47	96.6	99.0	2.4	0.213	67.0	220.0		384.5	3217	0.0356	91.0%	0.1031
14:33:47	92.2	94.6	2.4	0.213	67.0	220.0		384.6	3220	0.0340	91.6%	0.0976
14:34:47	85.4	87.7	2.4	0.213	67.0	220.0		384.6	3220	0.0314	92.2%	0.0887
14:35:47	78.1	80.5	2.4	0.210	67.0	219.9		384.6	3200	0.0286	92.7%	0.0819

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:36:47	74.5	76.8	2.3	0.212	67.0	219.9		384.6	3209	0.0274	93.2%	0.0764
14:37:47	70.7	73.0	2.3	0.212	66.9	219.9		384.5	3213	0.0260	93.7%	0.0719
14:38:47	67.3	69.6	2.3	0.214	66.9	219.9		384.5	3228	0.0248	94.2%	0.0676
14:39:47	64.2	66.5	2.3	0.212	67.0	219.9		384.5	3212	0.0236	94.6%	0.0636
14:40:47	60.0	62.2	2.3	0.213	66.9	219.9		384.5	3221	0.0221	95.0%	0.0573
14:41:47	57.7	60.0	2.3	0.212	66.9	219.9		384.5	3210	0.0212	95.4%	0.0533
14:42:47	54.0	56.3	2.3	0.209	66.9	219.9		384.5	3190	0.0197	95.8%	0.0490
14:43:47	52.5	54.8	2.2	0.214	66.9	219.9		384.5	3226	0.0194	96.2%	0.0459
14:44:47	48.3	50.5	2.2	0.213	66.9	219.9		384.5	3221	0.0178	96.5%	0.0427
14:45:47	46.8	49.1	2.2	0.213	66.9	219.9		384.5	3217	0.0172	96.8%	0.0400
14:46:47	43.9	46.2	2.3	0.213	66.9	219.9		384.5	3218	0.0162	97.1%	0.0352
14:47:47	41.0	43.2	2.2	0.208	66.9	219.9		384.5	3182	0.0149	97.4%	0.0321
14:48:47	37.4	39.6	2.2	0.210	66.8	219.9		384.4	3201	0.0137	97.7%	0.0293
14:49:47	33.9	36.1	2.2	0.210	66.7	219.9		384.4	3195	0.0124	97.9%	0.0265
14:50:47	32.1	34.3	2.2	0.210	66.7	219.9		384.4	3198	0.0118	98.1%	0.0249
14:51:47	29.7	31.9	2.2	0.213	66.7	219.9		384.3	3217	0.0109	98.3%	0.0228
14:52:47	27.5	29.7	2.2	0.211	66.7	219.9		384.4	3205	0.0101	98.5%	0.0190
14:53:47	25.2	27.4	2.2	0.211	66.7	219.9		384.4	3202	0.0092	98.7%	0.0172
14:54:47	23.3	25.4	2.2	0.207	66.7	219.9		384.4	3174	0.0085	98.8%	0.0156
14:55:47	20.6	22.8	2.2	0.213	66.6	219.9		384.3	3221	0.0076	99.0%	0.0141
14:56:47	19.4	21.6	2.2	0.211	66.8	219.9		384.4	3204	0.0071	99.1%	0.0132
14:57:47	17.6	19.7	2.2	0.213	66.9	219.8		384.5	3223	0.0065	99.2%	0.0119
14:58:47	16.0	18.1	2.1	0.211	66.9	219.8		384.5	3207	0.0059	99.3%	0.0089
14:59:47	13.8	16.0	2.1	0.213	66.9	219.9		384.5	3222	0.0051	99.4%	0.0079
15:00:47	12.4	14.5	2.1	0.211	66.9	219.9		384.5	3207	0.0045	99.5%	0.0072
15:01:47	11.4	13.6	2.1	0.210	66.9	219.9		384.5	3194	0.0042	99.6%	0.0065
15:02:47	10.4	12.5	2.1	0.212	66.9	219.8		384.5	3209	0.0038	99.7%	0.0060
15:03:47	9.4	11.5	2.1	0.210	66.8	219.8		384.5	3198	0.0034	99.7%	0.0054
15:04:47	8.3	10.5	2.1	0.210	66.8	219.8		384.5	3201	0.0031	99.8%	0.0031
15:05:47	7.7	9.8	2.1	0.211	66.8	219.9		384.5	3206	0.0028	99.8%	0.0028
15:06:47	7.1	9.3	2.1	0.212	66.8	219.8		384.4	3212	0.0026	99.9%	0.0026
15:07:47	6.4	8.5	2.1	0.209	66.8	219.8		384.4	3191	0.0023	99.9%	0.0023
15:08:47	6.0	8.1	2.1	0.211	66.8	219.8		384.4	3207	0.0022	100.0%	0.0022
15:09:47	5.3	7.5	2.1	0.210	66.7	219.8		384.4	3199	0.0020	100.0%	0.0020
	98.1	100.4		0.214	66.4	143.5		384.1	3227	5.37		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:45:47	2.7	5.2	2.5	0.210	64.8	211.9		383.0	3239	0.0010	0.1%	0.1650
15:46:47	22.7	25.2	2.4	0.211	65.6	209.4		383.6	3247	0.0085	0.9%	0.1600
15:47:47	79.7	82.1	2.4	0.209	66.0	206.3		383.9	3235	0.0295	3.7%	0.1703
15:48:47	183.0	185.3	2.4	0.210	66.2	203.1		384.0	3244	0.0680	10.1%	0.2007
15:49:47	179.9	182.3	2.3	0.211	66.1	202.0		384.0	3245	0.0669	16.4%	0.1894
15:50:47	154.6	156.9	2.3	0.210	66.0	202.1		383.8	3236	0.0574	21.8%	0.1751
15:51:47	139.0	141.3	2.3	0.210	66.0	202.1		383.9	3239	0.0516	26.7%	0.1640
15:52:47	123.9	126.2	2.3	0.210	66.0	202.1		383.8	3237	0.0460	31.0%	0.1515
15:53:47	113.4	115.7	2.3	0.209	66.0	202.1		383.9	3236	0.0421	35.0%	0.1407
15:54:47	103.4	105.6	2.2	0.211	65.9	202.1		383.8	3248	0.0385	38.6%	0.1327
15:55:47	96.9	99.1	2.2	0.211	65.8	202.1		383.7	3251	0.0361	42.0%	0.1225
15:56:47	81.1	83.3	2.2	0.214	65.3	202.1		383.3	3274	0.0305	44.9%	0.1178
15:57:47	78.4	80.6	2.2	0.214	64.7	202.1		382.9	3273	0.0295	47.7%	0.1124
15:58:47	80.1	82.3	2.2	0.161	65.2	202.1		383.3	2837	0.0261	50.1%	0.1056
15:59:47	74.3	76.6	2.4	0.156	65.8	202.1		383.7	2796	0.0238	52.4%	0.0987
16:00:47	70.9	73.2	2.3	0.191	65.5	202.1		383.5	3088	0.0251	54.7%	0.0942
16:01:47	62.0	64.3	2.3	0.155	66.0	202.1		383.9	2788	0.0198	56.6%	0.0863
16:02:47	61.1	63.4	2.3	0.215	65.3	202.1		383.3	3279	0.0230	58.8%	0.0873
16:03:47	57.8	60.1	2.3	0.218	65.2	202.1		383.3	3303	0.0219	60.8%	0.0829
16:04:47	55.9	58.2	2.3	0.215	65.2	202.1		383.3	3275	0.0210	62.8%	0.0795
16:05:47	51.7	53.9	2.2	0.216	65.3	202.1		383.3	3287	0.0195	64.7%	0.0748
16:06:47	46.4	48.6	2.2	0.217	65.1	202.1		383.2	3295	0.0175	66.3%	0.0691
16:07:47	44.5	46.7	2.2	0.216	65.0	202.1		383.1	3287	0.0168	67.9%	0.0665
16:08:47	42.8	45.0	2.2	0.217	64.9	202.1		383.1	3291	0.0162	69.4%	0.0643
16:09:47	40.9	43.1	2.2	0.216	64.9	202.1		383.0	3286	0.0154	70.9%	0.0610
16:10:47	39.7	41.9	2.2	0.216	64.9	202.1		383.0	3288	0.0150	72.3%	0.0585
16:11:47	37.1	39.3	2.2	0.220	64.9	202.1		383.0	3315	0.0141	73.6%	0.0553
16:12:47	34.1	36.2	2.1	0.215	64.9	202.1		383.0	3276	0.0128	74.8%	0.0516
16:13:47	33.1	35.2	2.1	0.216	64.8	202.1		383.0	3283	0.0125	76.0%	0.0497
16:14:47	30.9	33.1	2.1	0.218	64.8	202.1		383.0	3300	0.0117	77.1%	0.0481
16:15:47	29.4	31.5	2.1	0.217	64.7	202.1		382.9	3293	0.0111	78.2%	0.0456
16:16:47	28.0	30.1	2.1	0.217	64.7	202.1		382.9	3291	0.0106	79.2%	0.0435
16:17:47	27.1	29.2	2.1	0.219	64.6	202.1		382.9	3307	0.0103	80.1%	0.0412
16:18:47	26.2	28.3	2.1	0.216	64.6	202.1		382.8	3283	0.0099	81.1%	0.0387
16:19:47	24.8	26.8	2.1	0.216	64.5	202.1		382.8	3287	0.0094	82.0%	0.0372
16:20:47	23.7	25.8	2.1	0.217	64.5	202.1		382.8	3293	0.0090	82.8%	0.0364
16:21:47	23.4	25.4	2.0	0.217	64.4	202.1		382.7	3291	0.0088	83.6%	0.0344
16:22:47	22.3	24.3	2.0	0.216	64.3	202.1		382.6	3287	0.0084	84.4%	0.0329
16:23:47	22.1	24.2	2.0	0.218	64.3	202.2		382.6	3303	0.0084	85.2%	0.0309
16:24:47	20.4	22.5	2.0	0.218	64.3	202.2		382.6	3300	0.0078	86.0%	0.0289
16:25:47	19.6	21.7	2.0	0.218	64.4	202.2		382.7	3304	0.0075	86.7%	0.0279
16:26:47	19.1	21.2	2.0	0.216	64.3	202.2		382.6	3285	0.0072	87.3%	0.0274
16:27:47	18.3	20.3	2.0	0.216	64.4	202.2		382.6	3284	0.0069	88.0%	0.0256
16:28:47	18.1	20.1	2.0	0.215	64.3	202.2		382.6	3282	0.0068	88.6%	0.0245
16:29:47	17.2	19.2	2.0	0.215	64.2	202.2		382.6	3279	0.0065	89.2%	0.0225
16:30:47	16.8	18.8	2.0	0.216	64.3	202.2		382.6	3283	0.0063	89.8%	0.0211
16:31:47	15.9	17.9	2.0	0.225	64.2	202.3		382.5	3354	0.0062	90.4%	0.0204
16:32:47	15.8	17.7	2.0	0.227	64.3	202.3		382.6	3366	0.0061	91.0%	0.0202
16:33:47	14.8	16.8	2.0	0.216	64.3	202.3		382.6	3289	0.0056	91.5%	0.0187
16:34:47	14.1	16.1	2.0	0.219	64.3	202.3		382.6	3311	0.0054	92.0%	0.0176
16:35:47	13.6	15.6	2.0	0.214	64.3	202.3		382.6	3271	0.0051	92.5%	0.0160
16:36:47	12.7	14.7	2.0	0.217	64.3	202.3		382.6	3290	0.0048	93.0%	0.0148
16:37:47	12.7	14.7	2.0	0.210	64.2	202.4		382.6	3240	0.0047	93.4%	0.0143
16:38:47	12.3	14.3	2.0	0.210	64.4	202.3		382.7	3242	0.0046	93.9%	0.0141
16:39:47	12.2	14.1	2.0	0.208	64.7	202.3		382.9	3222	0.0045	94.3%	0.0131
16:40:47	11.6	13.5	2.0	0.208	64.9	202.3		383.0	3224	0.0043	94.7%	0.0123
16:41:47	10.9	12.8	1.9	0.212	65.0	202.3		383.1	3253	0.0041	95.1%	0.0109

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:42:47	10.2	12.2	1.9	0.208	65.0	202.3		383.1	3227	0.0038	95.4%	0.0099
16:43:47	9.7	11.7	1.9	0.207	65.1	202.3		383.2	3215	0.0036	95.8%	0.0095
16:44:47	10.0	11.9	1.9	0.209	65.3	202.3		383.3	3230	0.0037	96.1%	0.0095
16:45:47	9.3	11.2	1.9	0.208	65.3	199.7		383.3	3225	0.0034	96.4%	0.0086
16:46:47	8.6	10.6	1.9	0.207	65.3	202.3		383.4	3221	0.0032	96.7%	0.0080
16:47:47	8.2	10.2	1.9	0.209	65.4	201.8		383.4	3235	0.0031	97.0%	0.0068
16:48:47	7.7	9.6	1.9	0.210	65.4	201.8		383.4	3240	0.0029	97.3%	0.0061
16:49:47	7.3	9.3	1.9	0.204	65.4	201.8		383.4	3194	0.0027	97.5%	0.0059
16:50:47	7.3	9.3	1.9	0.203	65.4	201.8		383.4	3187	0.0027	97.8%	0.0058
16:51:47	6.5	8.4	1.9	0.202	65.4	201.8		383.4	3180	0.0024	98.0%	0.0051
16:52:47	6.2	8.1	1.9	0.204	65.4	201.8		383.4	3196	0.0023	98.2%	0.0048
16:53:47	6.2	8.1	1.9	0.204	65.3	201.8		383.4	3193	0.0023	98.5%	0.0038
16:54:47	5.1	7.0	1.9	0.203	65.4	201.8		383.4	3183	0.0019	98.6%	0.0033
16:55:47	5.1	7.0	1.9	0.203	65.4	201.8		383.4	3183	0.0018	98.8%	0.0032
16:56:47	5.1	7.0	1.9	0.202	65.4	201.8		383.4	3178	0.0018	99.0%	0.0031
16:57:47	4.7	6.7	1.9	0.203	65.4	201.8		383.4	3189	0.0017	99.1%	0.0028
16:58:47	4.0	6.0	1.9	0.203	65.4	201.8		383.4	3184	0.0015	99.3%	0.0025
16:59:47	4.0	6.0	1.9	0.203	65.4	201.8		383.4	3189	0.0015	99.4%	0.0015
17:00:47	3.9	6.0	2.1	0.199	65.3	201.8		383.4	3150	0.0014	99.6%	0.0014
17:01:47	3.8	6.0	2.2	0.202	65.4	201.8		383.4	3176	0.0014	99.7%	0.0014
17:02:47	3.5	5.7	2.2	0.202	65.4	201.8		383.4	3175	0.0013	99.8%	0.0013
17:03:47	2.9	5.1	2.2	0.200	65.3	201.8		383.4	3161	0.0010	99.9%	0.0010
17:03:57	2.9	5.1	2.2	0.200	65.4	201.8		383.4	3159	0.0010	100.0%	0.0010
	35.8	37.9		0.209	65.1	10.1		383.2	3233	1.06		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:06:00	0.0	3.8	4.2	0.220	67.4	270.2		384.9	3322	0.0000	0.0%	3.1556
9:07:00	20.8	24.9	4.1	0.223	67.5	268.9		384.9	3343	0.0079	0.3%	3.1556
9:08:00	55.5	59.7	4.1	0.223	67.5	267.9		385.0	3343	0.0212	0.9%	3.1477
9:09:00	55.8	59.9	4.1	0.224	67.7	267.8		385.1	3349	0.0214	1.6%	3.1265
9:10:00	57.4	61.5	4.1	0.223	67.7	267.8		385.1	3345	0.0219	2.3%	3.1051
9:11:00	54.9	59.0	4.1	0.209	67.9	267.8		385.2	3233	0.0203	2.9%	3.0832
9:12:00	67.8	71.8	4.0	0.207	68.0	267.1		385.3	3218	0.0249	3.7%	3.0629
9:13:00	93.0	97.0	4.0	0.202	68.1	266.2		385.4	3183	0.0338	4.8%	3.0379
9:14:00	109.9	113.8	3.9	0.205	68.2	265.3		385.4	3203	0.0402	6.1%	3.0042
9:15:00	141.3	145.3	4.0	0.207	68.2	264.5		385.5	3221	0.0520	7.7%	2.9640
9:16:00	142.1	146.1	4.0	0.208	68.3	263.2		385.5	3228	0.0524	9.4%	2.9120
9:17:00	152.7	156.6	3.9	0.207	68.3	262.4		385.6	3219	0.0561	11.2%	2.8597
9:18:00	166.9	170.8	3.9	0.209	68.4	261.6		385.6	3232	0.0615	13.1%	2.8036
9:19:00	160.5	164.4	3.9	0.204	68.5	261.0		385.7	3200	0.0586	15.0%	2.7420
9:20:00	177.8	181.6	3.8	0.202	68.5	260.1		385.7	3183	0.0646	17.0%	2.6834
9:21:00	203.4	207.3	3.9	0.206	68.6	258.7		385.7	3211	0.0745	19.4%	2.6189
9:22:00	227.9	231.7	3.8	0.206	68.7	257.5		385.8	3214	0.0835	22.0%	2.5444
9:23:00	236.8	240.6	3.8	0.206	68.8	256.9		385.9	3209	0.0866	24.8%	2.4608
9:24:00	213.2	217.0	3.8	0.208	68.9	256.9		386.0	3225	0.0784	27.2%	2.3742
9:25:00	188.4	192.2	3.8	0.207	69.0	256.8		386.0	3223	0.0692	29.4%	2.2958
9:26:00	183.4	187.2	3.8	0.210	69.0	256.8		386.1	3243	0.0678	31.6%	2.2266
9:27:00	174.4	178.2	3.8	0.205	69.1	256.6		386.1	3201	0.0636	33.6%	2.1588
9:28:00	180.9	184.6	3.7	0.208	69.1	255.9		386.2	3229	0.0665	35.7%	2.0952
9:29:00	205.3	209.1	3.7	0.207	69.0	254.7		386.1	3220	0.0754	38.1%	2.0286
9:30:00	227.4	231.1	3.7	0.209	69.3	253.5		386.2	3236	0.0838	40.8%	1.9533
9:31:00	250.9	254.6	3.6	0.206	69.4	252.3		386.3	3210	0.0917	43.7%	1.8694
9:32:00	259.4	263.1	3.6	0.212	69.3	251.7		386.3	3261	0.0964	46.7%	1.7777
9:33:00	241.4	245.0	3.6	0.210	69.5	251.7		386.4	3242	0.0891	49.5%	1.6813
9:34:00	219.8	223.4	3.6	0.213	69.7	251.7		386.5	3267	0.0817	52.1%	1.5922
9:35:00	203.3	206.9	3.6	0.214	69.7	251.7		386.6	3274	0.0758	54.5%	1.5105
9:36:00	185.8	189.4	3.6	0.211	69.8	251.7		386.6	3251	0.0687	56.7%	1.4347
9:37:00	177.2	180.8	3.6	0.210	69.8	251.7		386.6	3240	0.0653	58.8%	1.3660
9:38:00	155.3	158.9	3.6	0.211	69.8	251.7		386.6	3254	0.0575	60.6%	1.3006
9:39:00	157.9	161.5	3.6	0.212	69.9	251.7		386.7	3259	0.0586	62.5%	1.2431
9:40:00	143.8	147.4	3.6	0.216	69.9	251.7		386.7	3291	0.0538	64.2%	1.1846
9:41:00	133.3	136.9	3.6	0.213	70.0	251.7		386.8	3266	0.0495	65.7%	1.1307
9:42:00	125.7	129.3	3.5	0.215	70.1	251.7		386.8	3284	0.0470	67.2%	1.0812
9:43:00	120.3	123.9	3.6	0.210	70.2	251.7		386.9	3246	0.0444	68.6%	1.0343
9:44:00	111.2	114.7	3.6	0.218	70.3	251.7		387.0	3306	0.0418	70.0%	0.9898
9:45:00	106.3	109.9	3.6	0.217	70.3	251.7		387.0	3295	0.0398	71.2%	0.9480
9:46:00	107.9	111.5	3.6	0.216	70.4	251.7		387.1	3292	0.0404	72.5%	0.9082
9:47:00	97.6	101.1	3.5	0.213	70.4	251.7		387.1	3265	0.0362	73.6%	0.8678
9:48:00	93.2	96.7	3.5	0.214	70.5	251.7		387.1	3272	0.0347	74.7%	0.8316
9:49:00	91.7	95.2	3.5	0.203	70.6	251.7		387.2	3187	0.0332	75.8%	0.7969
9:50:00	85.7	89.2	3.5	0.137	70.3	251.7		387.0	2620	0.0255	76.6%	0.7637
9:51:00	87.5	90.9	3.4	0.187	70.6	251.7		387.2	3060	0.0304	77.6%	0.7382
9:52:00	83.7	87.2	3.4	0.203	70.9	251.7		387.4	3185	0.0303	78.5%	0.7078
9:53:00	79.8	83.3	3.5	0.190	70.7	251.7		387.3	3085	0.0280	79.4%	0.6775
9:54:00	78.1	81.5	3.4	0.218	71.0	251.7		387.5	3300	0.0293	80.3%	0.6495
9:55:00	75.5	78.9	3.4	0.219	71.1	251.7		387.6	3311	0.0284	81.2%	0.6203
9:56:00	69.3	72.8	3.5	0.221	71.2	251.7		387.6	3328	0.0262	82.1%	0.5919
9:57:00	70.7	74.2	3.5	0.221	71.2	251.7		387.7	3327	0.0267	82.9%	0.5657
9:58:00	63.8	67.2	3.4	0.219	71.3	251.7		387.7	3310	0.0240	83.7%	0.5390
9:59:00	60.6	63.9	3.3	0.222	71.3	251.7		387.8	3333	0.0229	84.4%	0.5150
10:00:00	56.4	59.7	3.4	0.221	71.4	251.7		387.8	3325	0.0213	85.1%	0.4921
10:01:00	54.8	58.1	3.3	0.221	71.5	251.7		387.9	3325	0.0207	85.7%	0.4708
10:02:00	52.3	55.6	3.3	0.218	71.5	251.7		387.9	3303	0.0196	86.4%	0.4501
10:03:00	53.5	56.8	3.3	0.219	71.6	251.7		387.9	3313	0.0201	87.0%	0.4305

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:04:00	54.7	58.1	3.3	0.220	71.6	251.7		388.0	3323	0.0206	87.6%	0.4104
10:05:00	49.6	53.0	3.3	0.219	71.7	251.7		388.0	3310	0.0186	88.2%	0.3898
10:06:00	46.7	50.0	3.3	0.228	71.7	251.6		388.0	3378	0.0179	88.8%	0.3712
10:07:00	39.1	42.4	3.3	0.225	71.5	251.6		387.9	3355	0.0149	89.3%	0.3533
10:08:00	34.5	37.8	3.3	0.224	71.0	251.6		387.5	3347	0.0131	89.7%	0.3384
10:09:00	37.3	40.5	3.2	0.224	71.1	251.6		387.5	3351	0.0142	90.1%	0.3253
10:10:00	37.0	40.1	3.1	0.226	71.2	251.6		387.6	3364	0.0141	90.6%	0.3111
10:11:00	36.1	39.2	3.1	0.222	71.3	251.6		387.7	3333	0.0137	91.0%	0.2970
10:12:00	35.0	38.1	3.1	0.221	71.4	251.6		387.8	3324	0.0132	91.4%	0.2833
10:13:00	32.7	35.7	3.1	0.220	71.5	251.6		387.9	3321	0.0123	91.8%	0.2701
10:14:00	29.8	32.9	3.1	0.224	71.6	251.6		388.0	3349	0.0113	92.2%	0.2578
10:15:00	32.2	35.3	3.0	0.224	71.7	251.6		388.0	3350	0.0122	92.6%	0.2465
10:16:00	26.7	29.7	3.0	0.223	71.8	251.6		388.1	3343	0.0101	92.9%	0.2342
10:17:00	26.8	29.9	3.1	0.224	72.0	251.6		388.2	3347	0.0102	93.2%	0.2241
10:18:00	25.6	28.7	3.0	0.224	72.1	251.6		388.3	3348	0.0097	93.5%	0.2139
10:19:00	23.4	26.4	3.0	0.222	72.2	251.6		388.4	3334	0.0089	93.8%	0.2042
10:20:00	22.3	25.2	3.0	0.225	72.3	251.6		388.4	3354	0.0085	94.1%	0.1954
10:21:00	22.1	25.1	3.0	0.225	72.4	251.6		388.5	3353	0.0084	94.3%	0.1869
10:22:00	20.1	23.0	3.0	0.222	72.4	251.6		388.6	3332	0.0076	94.6%	0.1785
10:23:00	18.8	21.8	2.9	0.225	72.5	251.6		388.6	3354	0.0071	94.8%	0.1709
10:24:00	16.7	19.6	3.0	0.223	72.5	251.6		388.6	3340	0.0063	95.0%	0.1638
10:25:00	17.0	20.0	2.9	0.222	72.7	251.6		388.7	3338	0.0064	95.2%	0.1575
10:26:00	16.4	19.3	2.9	0.225	72.7	251.6		388.8	3357	0.0062	95.4%	0.1510
10:27:00	14.8	17.7	2.9	0.224	72.8	251.6		388.8	3348	0.0056	95.6%	0.1448
10:28:00	14.7	17.5	2.8	0.226	72.9	251.6		388.9	3363	0.0056	95.8%	0.1392
10:29:00	14.1	16.9	2.8	0.223	73.0	251.5		389.0	3343	0.0053	95.9%	0.1336
10:30:00	14.7	17.5	2.8	0.228	73.0	251.5		389.0	3376	0.0056	96.1%	0.1283
10:31:00	13.3	16.2	2.8	0.227	72.9	251.5		388.9	3371	0.0051	96.3%	0.1226
10:32:00	13.4	16.2	2.8	0.226	72.9	251.5		388.9	3364	0.0051	96.4%	0.1176
10:33:00	12.1	14.8	2.8	0.226	72.8	251.5		388.8	3361	0.0046	96.6%	0.1125
10:34:00	12.1	14.9	2.8	0.224	72.7	251.5		388.8	3348	0.0046	96.7%	0.1079
10:35:00	12.4	15.2	2.8	0.227	72.7	251.5		388.7	3369	0.0047	96.9%	0.1033
10:36:00	12.1	15.0	2.9	0.228	72.5	251.6		388.6	3381	0.0046	97.0%	0.0986
10:37:00	10.6	13.5	2.9	0.226	72.4	251.6		388.5	3365	0.0041	97.2%	0.0939
10:38:00	11.3	14.1	2.9	0.230	72.4	251.6		388.5	3390	0.0043	97.3%	0.0899
10:39:00	10.3	13.0	2.8	0.219	72.3	251.5		388.5	3315	0.0039	97.4%	0.0856
10:40:00	9.5	12.4	2.8	0.222	72.2	251.5		388.4	3331	0.0036	97.5%	0.0817
10:41:00	10.2	13.0	2.8	0.227	72.1	251.6		388.3	3369	0.0039	97.6%	0.0781
10:42:00	10.1	12.9	2.8	0.224	72.1	251.5		388.3	3346	0.0038	97.8%	0.0742
10:43:00	9.2	12.0	2.8	0.221	72.0	251.5		388.2	3329	0.0035	97.9%	0.0704
10:44:00	8.9	11.6	2.8	0.224	71.8	251.5		388.1	3351	0.0034	98.0%	0.0669
10:45:00	8.5	11.4	2.8	0.223	71.7	251.5		388.0	3338	0.0032	98.1%	0.0636
10:46:00	8.5	11.3	2.8	0.231	71.7	251.5		388.0	3399	0.0033	98.2%	0.0603
10:47:00	7.8	10.6	2.8	0.227	71.2	251.5		387.6	3374	0.0030	98.3%	0.0570
10:48:00	6.0	8.9	2.8	0.230	70.1	251.5		386.9	3392	0.0023	98.4%	0.0541
10:49:00	5.9	8.6	2.7	0.231	69.4	251.5		386.3	3400	0.0023	98.4%	0.0517
10:50:00	7.3	9.9	2.5	0.231	68.8	251.5		385.9	3400	0.0028	98.5%	0.0494
10:51:00	7.7	10.1	2.4	0.227	68.5	251.5		385.7	3373	0.0030	98.6%	0.0466
10:52:00	7.6	9.9	2.3	0.230	68.3	251.5		385.5	3390	0.0029	98.7%	0.0436
10:53:00	8.3	10.5	2.2	0.230	67.9	251.6		385.3	3392	0.0032	98.8%	0.0407
10:54:00	7.8	9.9	2.0	0.229	67.4	251.6		384.9	3384	0.0030	98.9%	0.0375
10:55:00	8.1	10.1	2.0	0.231	67.2	251.6		384.8	3400	0.0031	99.0%	0.0344
10:56:00	7.5	9.4	2.0	0.232	66.9	251.5		384.5	3408	0.0029	99.1%	0.0313
10:57:00	7.5	9.4	1.9	0.230	66.9	251.5		384.5	3396	0.0029	99.2%	0.0284
10:58:00	7.3	9.2	1.9	0.231	66.9	251.5		384.5	3403	0.0029	99.3%	0.0255
10:59:00	7.3	9.2	1.9	0.229	67.0	251.5		384.6	3389	0.0028	99.4%	0.0226
11:00:00	6.8	8.7	1.8	0.231	66.9	251.5		384.5	3402	0.0027	99.5%	0.0198
11:01:00	6.2	8.0	1.8	0.231	66.9	251.5		384.5	3402	0.0024	99.5%	0.0171

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:02:00	6.4	8.1	1.7	0.233	66.9	251.5		384.5	3416	0.0025	99.6%	0.0147
11:03:00	6.2	7.9	1.7	0.228	67.0	251.5		384.6	3380	0.0024	99.7%	0.0122
11:04:00	5.1	6.8	1.7	0.231	66.7	251.5		384.4	3401	0.0020	99.8%	0.0098
11:05:00	4.3	5.9	1.6	0.233	66.4	251.5		384.1	3416	0.0017	99.8%	0.0078
11:06:00	4.2	5.8	1.6	0.228	66.4	251.5		384.1	3382	0.0016	99.9%	0.0062
11:07:00	4.1	5.7	1.6	0.235	66.2	251.4		384.0	3429	0.0016	99.9%	0.0045
11:08:00	4.2	5.7	1.5	0.230	66.2	251.4		384.0	3397	0.0016	100.0%	0.0029
11:09:00	3.4	4.8	1.5	0.229	66.1	251.5		383.9	3389	0.0013	100.0%	0.0013
	68.8	71.9		0.219	70.1	18.7		386.8	3309	3.16		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:58:00	7.7	9.3	1.6	0.234	66.1	375.6		384.0	3513	0.0031	0.1%	0.8260
11:59:00	25.0	26.6	1.6	0.231	66.1	370.8		383.9	3494	0.0100	0.3%	0.8270
12:00:00	60.4	62.0	1.6	0.237	66.0	364.8		383.8	3534	0.0245	0.7%	0.8503
12:01:00	72.4	74.0	1.6	0.233	66.0	361.6		383.8	3510	0.0291	1.3%	0.8500
12:02:00	89.2	90.7	1.6	0.235	66.0	357.7		383.8	3520	0.0360	2.0%	0.8430
12:03:00	95.4	97.0	1.5	0.236	65.9	353.9		383.8	3529	0.0386	2.8%	0.8266
12:04:00	113.1	114.6	1.5	0.233	65.9	352.1		383.8	3504	0.0454	3.7%	0.8229
12:05:00	129.8	131.4	1.5	0.234	65.9	348.3		383.8	3514	0.0523	4.8%	0.8170
12:06:00	164.2	165.7	1.5	0.236	65.8	343.6		383.7	3529	0.0664	6.1%	0.8258
12:07:00	177.4	178.9	1.5	0.234	65.8	340.5		383.7	3515	0.0715	7.5%	0.8209
12:08:00	172.6	174.1	1.5	0.234	65.6	340.5		383.6	3515	0.0696	8.9%	0.8070
12:09:00	172.7	174.2	1.5	0.231	65.5	337.7		383.5	3493	0.0692	10.3%	0.7880
12:10:00	187.5	189.1	1.5	0.234	65.5	335.4		383.5	3512	0.0756	11.8%	0.7775
12:11:00	172.5	174.0	1.5	0.236	65.4	335.4		383.4	3530	0.0699	13.2%	0.7647
12:12:00	168.9	170.4	1.5	0.231	65.4	335.4		383.4	3491	0.0677	14.5%	0.7593
12:13:00	157.9	159.4	1.5	0.233	65.3	335.5		383.4	3510	0.0636	15.8%	0.7494
12:14:00	155.2	156.7	1.5	0.233	65.3	335.4		383.3	3505	0.0624	17.0%	0.7374
12:15:00	147.3	148.8	1.5	0.232	65.2	335.4		383.3	3502	0.0592	18.2%	0.7188
12:16:00	142.5	143.9	1.4	0.235	65.2	335.4		383.2	3525	0.0577	19.3%	0.7020
12:17:00	130.4	131.9	1.4	0.232	65.1	335.4		383.2	3498	0.0524	20.4%	0.6948
12:18:00	122.4	123.8	1.5	0.230	65.1	335.5		383.2	3484	0.0490	21.4%	0.6917
12:19:00	124.1	125.7	1.6	0.232	65.2	335.5		383.3	3500	0.0499	22.4%	0.6858
12:20:00	121.8	123.4	1.6	0.231	65.5	335.5		383.5	3488	0.0488	23.3%	0.6750
12:21:00	114.1	115.7	1.6	0.227	65.6	335.5		383.6	3462	0.0453	24.2%	0.6595
12:22:00	107.6	109.2	1.6	0.224	65.7	335.5		383.6	3441	0.0425	25.1%	0.6443
12:23:00	104.5	106.1	1.5	0.227	65.7	335.5		383.6	3464	0.0415	25.9%	0.6425
12:24:00	98.6	100.1	1.5	0.229	65.6	335.5		383.6	3478	0.0393	26.7%	0.6427
12:25:00	92.3	93.7	1.5	0.228	65.6	335.5		383.5	3472	0.0367	27.4%	0.6359
12:26:00	92.0	93.5	1.5	0.230	65.6	335.5		383.6	3488	0.0368	28.2%	0.6262
12:27:00	85.6	87.1	1.5	0.225	65.7	335.5		383.6	3448	0.0339	28.8%	0.6142
12:28:00	81.9	83.3	1.4	0.229	65.7	335.5		383.6	3475	0.0326	29.5%	0.6018
12:29:00	82.7	84.2	1.4	0.233	65.7	335.5		383.6	3506	0.0333	30.1%	0.6009
12:30:00	77.7	79.1	1.4	0.229	65.7	335.5		383.6	3479	0.0310	30.8%	0.6034
12:31:00	75.2	76.7	1.4	0.228	65.7	335.5		383.6	3466	0.0299	31.4%	0.5992
12:32:00	73.2	74.6	1.4	0.231	65.7	335.5		383.7	3490	0.0293	31.9%	0.5894
12:33:00	73.8	75.3	1.4	0.225	65.8	335.5		383.7	3449	0.0292	32.5%	0.5803
12:34:00	70.5	71.9	1.4	0.223	65.8	335.5		383.7	3430	0.0277	33.1%	0.5692
12:35:00	68.1	69.5	1.4	0.226	65.9	335.5		383.7	3457	0.0270	33.6%	0.5676
12:36:00	65.7	67.1	1.4	0.227	65.8	335.5		383.7	3463	0.0261	34.1%	0.5724
12:37:00	63.5	64.9	1.4	0.224	65.8	335.5		383.7	3440	0.0251	34.6%	0.5693
12:38:00	61.0	62.4	1.4	0.231	65.8	335.5		383.7	3493	0.0244	35.1%	0.5601
12:39:00	59.4	60.8	1.4	0.229	65.8	335.5		383.7	3477	0.0237	35.6%	0.5511
12:40:00	59.6	61.0	1.4	0.228	65.8	335.5		383.7	3467	0.0237	36.1%	0.5415
12:41:00	58.8	60.2	1.4	0.229	65.8	335.5		383.7	3476	0.0234	36.5%	0.5407
12:42:00	55.5	56.9	1.4	0.223	65.6	335.5		383.6	3429	0.0218	37.0%	0.5463
12:43:00	52.8	54.2	1.4	0.228	65.5	335.5		383.5	3469	0.0210	37.4%	0.5442
12:44:00	53.0	54.4	1.4	0.222	65.5	335.5		383.5	3425	0.0208	37.8%	0.5357
12:45:00	51.1	52.4	1.4	0.227	65.4	335.5		383.4	3465	0.0203	38.2%	0.5274
12:46:00	50.4	51.7	1.4	0.223	65.3	335.5		383.3	3432	0.0198	38.6%	0.5178
12:47:00	49.2	50.6	1.4	0.227	65.3	335.5		383.4	3460	0.0195	39.0%	0.5172
12:48:00	49.1	50.5	1.4	0.224	65.4	335.5		383.4	3440	0.0194	39.4%	0.5245
12:49:00	47.4	48.8	1.4	0.227	65.4	335.5		383.4	3458	0.0188	39.7%	0.5232
12:50:00	43.9	45.3	1.4	0.224	65.4	335.5		383.4	3438	0.0173	40.1%	0.5149
12:51:00	42.1	43.5	1.4	0.225	65.3	335.5		383.4	3445	0.0166	40.4%	0.5071
12:52:00	41.8	43.2	1.3	0.225	65.4	335.5		383.4	3449	0.0166	40.7%	0.4979
12:53:00	41.1	42.5	1.3	0.228	65.4	335.5		383.4	3471	0.0164	41.1%	0.4977
12:54:00	38.5	39.9	1.3	0.225	65.5	335.4		383.5	3449	0.0152	41.4%	0.5051
12:55:00	35.5	36.8	1.4	0.224	65.5	335.6		383.5	3441	0.0140	41.6%	0.5044

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:56:00	41.1	42.5	1.4	0.225	65.6	333.7		383.6	3447	0.0163	42.0%	0.4975
12:57:00	53.4	54.8	1.4	0.224	65.5	328.7		383.5	3438	0.0211	42.4%	0.4905
12:58:00	72.8	74.1	1.4	0.223	65.6	323.7		383.5	3431	0.0286	43.0%	0.4814
12:59:00	87.6	89.0	1.3	0.225	65.7	319.1		383.6	3449	0.0347	43.7%	0.4813
13:00:00	110.5	111.8	1.3	0.224	65.8	313.8		383.7	3441	0.0436	44.5%	0.4899
13:01:00	129.8	131.1	1.3	0.222	65.8	308.0		383.7	3422	0.0509	45.5%	0.4903
13:02:00	136.2	137.5	1.3	0.226	65.9	304.8		383.8	3452	0.0539	46.6%	0.4813
13:03:00	160.1	161.3	1.3	0.223	66.0	300.4		383.8	3432	0.0630	47.9%	0.4694
13:04:00	147.7	148.9	1.3	0.222	65.9	296.7		383.8	3425	0.0580	49.0%	0.4527
13:05:00	160.3	161.6	1.3	0.226	66.0	291.7		383.8	3454	0.0635	50.3%	0.4466
13:06:00	179.0	180.3	1.3	0.223	66.0	286.7		383.9	3427	0.0703	51.7%	0.4463
13:07:00	159.9	161.2	1.3	0.222	65.9	285.5		383.8	3423	0.0628	52.9%	0.4394
13:08:00	179.8	181.1	1.3	0.223	66.0	285.4		383.9	3429	0.0707	54.3%	0.4274
13:09:00	176.0	177.3	1.3	0.225	66.1	284.6		383.9	3446	0.0695	55.7%	0.4064
13:10:00	181.5	182.8	1.3	0.225	66.1	280.3		383.9	3450	0.0718	57.2%	0.3947
13:11:00	197.1	198.3	1.3	0.222	66.2	275.9		384.0	3419	0.0772	58.7%	0.3831
13:12:00	226.1	227.4	1.3	0.222	66.2	270.7		384.0	3424	0.0887	60.5%	0.3759
13:13:00	244.3	245.6	1.3	0.225	66.2	265.0		384.0	3448	0.0965	62.4%	0.3766
13:14:00	251.0	252.3	1.3	0.224	66.1	261.6		383.9	3435	0.0988	64.3%	0.3567
13:15:00	225.8	227.1	1.3	0.220	65.9	261.5		383.8	3411	0.0883	66.1%	0.3369
13:16:00	216.8	218.0	1.3	0.222	65.8	261.5		383.7	3426	0.0852	67.8%	0.3230
13:17:00	209.6	210.9	1.3	0.222	65.9	261.5		383.8	3426	0.0823	69.4%	0.3059
13:18:00	193.7	195.0	1.3	0.223	65.9	261.5		383.8	3430	0.0762	71.0%	0.2872
13:19:00	190.8	192.1	1.3	0.223	65.9	261.5		383.8	3428	0.0750	72.4%	0.2801
13:20:00	177.2	178.5	1.4	0.222	65.9	261.5		383.8	3422	0.0695	73.8%	0.2579
13:21:00	171.9	173.3	1.4	0.224	65.9	261.5		383.8	3438	0.0678	75.2%	0.2486
13:22:00	162.3	163.7	1.4	0.223	65.9	261.5		383.8	3431	0.0638	76.4%	0.2378
13:23:00	160.9	162.3	1.4	0.223	66.0	261.5		383.8	3428	0.0632	77.7%	0.2236
13:24:00	144.0	145.4	1.4	0.225	66.1	261.5		383.9	3445	0.0569	78.8%	0.2110
13:25:00	144.6	146.0	1.4	0.223	66.2	261.4		384.0	3429	0.0568	80.0%	0.2052
13:26:00	134.7	136.1	1.4	0.221	66.2	261.3		384.0	3417	0.0527	81.0%	0.1884
13:27:00	127.1	128.5	1.4	0.224	66.2	261.3		384.0	3439	0.0501	82.0%	0.1808
13:28:00	118.6	120.0	1.4	0.223	66.1	261.3		383.9	3428	0.0466	82.9%	0.1740
13:29:00	113.4	114.8	1.4	0.220	66.1	261.3		383.9	3410	0.0443	83.8%	0.1604
13:30:00	110.9	112.3	1.4	0.202	66.1	261.3		383.9	3268	0.0415	84.7%	0.1542
13:31:00	104.5	105.9	1.3	0.201	66.1	261.3		383.9	3259	0.0390	85.4%	0.1484
13:32:00	100.0	101.4	1.3	0.206	66.1	261.3		383.9	3298	0.0378	86.2%	0.1356
13:33:00	94.0	95.3	1.3	0.206	65.9	261.3		383.8	3301	0.0356	86.9%	0.1308
13:34:00	92.3	93.6	1.3	0.203	65.7	261.3		383.6	3275	0.0347	87.6%	0.1274
13:35:00	91.1	92.4	1.3	0.207	65.5	261.3		383.5	3308	0.0346	88.3%	0.1161
13:36:00	88.0	89.3	1.3	0.203	65.5	261.3		383.5	3272	0.0330	88.9%	0.1127
13:37:00	87.8	89.0	1.3	0.200	65.5	261.3		383.5	3249	0.0327	89.6%	0.1093
13:38:00	84.3	85.5	1.2	0.141	65.5	261.3		383.5	2727	0.0264	90.1%	0.0978
13:39:00	79.0	80.3	1.3	0.173	65.7	261.3		383.6	3020	0.0274	90.7%	0.0952
13:40:00	78.5	79.8	1.3	0.193	65.7	261.3		383.6	3189	0.0287	91.2%	0.0927
13:41:00	73.0	74.2	1.3	0.142	65.8	261.3		383.7	2742	0.0229	91.7%	0.0815
13:42:00	70.4	71.7	1.3	0.196	65.5	261.3		383.5	3219	0.0260	92.2%	0.0796
13:43:00	67.5	68.7	1.3	0.194	65.5	261.3		383.5	3198	0.0248	92.7%	0.0766
13:44:00	64.7	65.9	1.3	0.193	65.5	261.3		383.5	3194	0.0237	93.2%	0.0714
13:45:00	62.4	63.6	1.2	0.195	65.7	261.3		383.6	3211	0.0230	93.6%	0.0678
13:46:00	61.8	63.1	1.2	0.196	65.9	261.3		383.8	3217	0.0228	94.1%	0.0640
13:47:00	57.0	58.2	1.2	0.193	65.9	261.3		383.8	3193	0.0209	94.5%	0.0585
13:48:00	52.8	54.0	1.2	0.194	65.9	261.3		383.8	3199	0.0194	94.9%	0.0536
13:49:00	51.3	52.5	1.2	0.194	65.9	261.3		383.8	3201	0.0188	95.2%	0.0518
13:50:00	49.1	50.3	1.2	0.193	66.0	261.3		383.8	3194	0.0180	95.6%	0.0477
13:51:00	45.6	46.8	1.2	0.197	66.1	261.3		383.9	3226	0.0168	95.9%	0.0448
13:52:00	41.1	42.3	1.2	0.195	66.0	261.3		383.8	3208	0.0151	96.2%	0.0412
13:53:00	37.8	39.0	1.2	0.193	65.8	261.3		383.7	3195	0.0138	96.5%	0.0377

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:54:00	36.0	37.2	1.2	0.196	65.8	261.3		383.7	3215	0.0133	96.8%	0.0342
13:55:00	35.2	36.4	1.2	0.206	66.0	261.3		383.8	3297	0.0133	97.0%	0.0330
13:56:00	31.7	32.9	1.2	0.198	66.0	261.3		383.8	3233	0.0118	97.3%	0.0298
13:57:00	29.4	30.6	1.2	0.192	66.0	261.3		383.8	3183	0.0107	97.5%	0.0280
13:58:00	27.2	28.4	1.2	0.192	65.9	261.3		383.8	3182	0.0099	97.7%	0.0260
13:59:00	25.2	26.4	1.2	0.194	65.9	261.3		383.8	3196	0.0092	97.9%	0.0238
14:00:00	23.8	24.9	1.2	0.192	65.9	261.3		383.8	3182	0.0087	98.1%	0.0210
14:01:00	22.5	23.7	1.2	0.193	65.9	261.3		383.8	3195	0.0082	98.2%	0.0197
14:02:00	20.9	22.0	1.2	0.193	66.0	261.3		383.8	3195	0.0076	98.4%	0.0180
14:03:00	19.9	21.0	1.1	0.194	66.0	261.4		383.9	3200	0.0073	98.5%	0.0172
14:04:00	18.8	19.9	1.1	0.191	66.2	261.4		384.0	3172	0.0068	98.6%	0.0161
14:05:00	17.7	18.8	1.1	0.193	66.3	261.3		384.1	3193	0.0065	98.8%	0.0146
14:06:00	16.6	17.7	1.1	0.192	66.4	261.3		384.2	3181	0.0060	98.9%	0.0123
14:07:00	14.9	16.0	1.1	0.194	66.4	261.3		384.1	3199	0.0055	99.0%	0.0115
14:08:00	13.6	14.7	1.1	0.190	66.4	261.4		384.1	3168	0.0049	99.1%	0.0104
14:09:00	12.8	13.8	1.1	0.192	66.5	261.4		384.2	3182	0.0047	99.2%	0.0099
14:10:00	12.3	13.3	1.1	0.192	66.6	261.4		384.3	3182	0.0045	99.3%	0.0093
14:11:00	11.2	12.3	1.1	0.189	66.6	261.4		384.3	3156	0.0041	99.4%	0.0081
14:12:00	10.4	11.4	1.1	0.192	66.6	261.3		384.3	3187	0.0038	99.4%	0.0063
14:13:00	9.8	10.9	1.1	0.195	66.7	261.3		384.3	3206	0.0036	99.5%	0.0060
14:14:00	9.2	10.3	1.1	0.189	66.7	261.3		384.4	3155	0.0033	99.6%	0.0054
14:15:00	8.8	9.9	1.1	0.192	66.8	261.4		384.4	3180	0.0032	99.6%	0.0053
14:16:00	7.9	9.0	1.1	0.190	66.6	261.4		384.3	3168	0.0029	99.7%	0.0048
14:17:00	6.9	8.0	1.1	0.191	66.4	261.4		384.1	3178	0.0025	99.8%	0.0041
14:18:00	6.8	7.9	1.1	0.187	66.3	261.3		384.1	3143	0.0025	99.8%	0.0025
14:19:00	6.6	7.7	1.1	0.190	66.2	261.3		384.0	3167	0.0024	99.8%	0.0024
14:20:00	5.7	6.8	1.0	0.190	66.2	261.3		384.0	3166	0.0021	99.9%	0.0021
14:21:00	5.7	6.8	1.1	0.190	66.2	261.3		384.0	3170	0.0021	99.9%	0.0021
14:22:00	5.3	6.3	1.1	0.192	66.1	261.4		383.9	3179	0.0019	100.0%	0.0019
14:23:00	4.1	5.2	1.1	0.198	65.5	261.4		383.5	3232	0.0015	100.0%	0.0015
	87.9	89.2		0.214	65.8	114.2		383.7	3360	5.02		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:43:05	3.2	4.3	1.1	0.186	65.7	352.0		383.6	3137	0.0012	0.0%	0.8794
15:44:05	22.0	23.2	1.1	0.186	65.8	346.5		383.7	3133	0.0079	0.2%	0.8713
15:45:05	66.7	67.8	1.1	0.187	65.8	343.0		383.7	3141	0.0240	0.6%	0.8972
15:46:05	81.0	82.1	1.1	0.186	65.8	339.3		383.7	3129	0.0291	1.2%	0.8927
15:47:05	111.5	112.6	1.1	0.187	65.8	334.7		383.7	3143	0.0402	1.9%	0.8781
15:48:05	115.5	116.6	1.1	0.185	65.8	331.8		383.7	3125	0.0414	2.7%	0.8782
15:49:05	116.7	117.8	1.1	0.188	65.8	331.7		383.7	3151	0.0422	3.5%	0.8782
15:50:05	110.5	111.6	1.1	0.185	65.9	331.7		383.8	3127	0.0396	4.3%	0.8634
15:51:05	110.0	111.1	1.0	0.186	65.9	331.4		383.7	3131	0.0395	5.0%	0.8731
15:52:05	121.1	122.1	1.0	0.190	65.9	332.5		383.8	3163	0.0439	5.8%	0.8637
15:53:05	113.1	114.1	1.0	0.187	66.0	330.6		383.8	3145	0.0408	6.6%	0.8379
15:54:05	150.4	151.4	1.0	0.186	66.0	324.6		383.8	3135	0.0540	7.6%	0.8368
15:55:05	173.8	174.8	1.0	0.182	66.0	318.6		383.8	3101	0.0618	8.8%	0.8361
15:56:05	192.7	193.7	1.0	0.184	65.9	313.2		383.8	3118	0.0689	10.1%	0.8238
15:57:05	239.7	240.7	1.0	0.188	65.9	308.2		383.8	3152	0.0866	11.7%	0.8336
15:58:05	250.3	251.3	1.0	0.185	65.9	304.9		383.8	3126	0.0897	13.4%	0.8198
15:59:05	229.9	230.9	1.0	0.185	65.9	304.8		383.8	3123	0.0823	15.0%	0.7971
16:00:05	230.0	231.0	1.0	0.185	66.0	304.9		383.8	3124	0.0824	16.5%	0.7827
16:01:05	200.8	201.8	1.0	0.188	65.9	304.9		383.8	3148	0.0725	17.9%	0.7743
16:02:05	196.7	197.7	1.0	0.185	65.9	304.9		383.8	3129	0.0706	19.2%	0.7549
16:03:05	188.0	189.0	1.0	0.188	65.9	304.9		383.8	3154	0.0680	20.5%	0.7470
16:04:05	184.6	185.6	1.0	0.186	65.8	304.9		383.7	3136	0.0664	21.8%	0.7301
16:05:05	171.6	172.7	1.1	0.186	65.8	304.9		383.7	3130	0.0616	22.9%	0.7148
16:06:05	157.4	158.5	1.1	0.186	65.7	304.9		383.6	3131	0.0565	24.0%	0.7004
16:07:05	156.2	157.4	1.1	0.187	65.7	304.9		383.6	3142	0.0563	25.1%	0.7018
16:08:05	145.3	146.5	1.1	0.185	65.7	304.9		383.6	3122	0.0520	26.0%	0.6843
16:09:05	139.3	140.5	1.1	0.185	65.7	304.9		383.6	3124	0.0499	27.0%	0.6790
16:10:05	129.5	130.7	1.1	0.184	65.7	304.9		383.6	3115	0.0463	27.9%	0.6637
16:11:05	129.9	131.0	1.1	0.184	65.7	305.0		383.6	3120	0.0465	28.7%	0.6532
16:12:05	116.6	117.7	1.1	0.186	65.7	305.0		383.6	3133	0.0419	29.5%	0.6439
16:13:05	110.4	111.4	1.1	0.187	65.7	305.0		383.6	3143	0.0398	30.3%	0.6455
16:14:05	112.3	113.3	1.0	0.184	65.7	305.0		383.6	3119	0.0402	31.0%	0.6323
16:15:05	108.2	109.2	1.0	0.184	65.7	305.0		383.6	3114	0.0386	31.8%	0.6291
16:16:05	102.9	103.9	1.0	0.183	65.7	305.0		383.6	3109	0.0367	32.5%	0.6174
16:17:05	99.5	100.5	1.0	0.182	65.7	305.0		383.6	3096	0.0353	33.1%	0.6067
16:18:05	97.9	98.9	1.0	0.181	65.7	305.0		383.6	3088	0.0347	33.8%	0.6020
16:19:05	94.9	95.9	1.0	0.185	65.7	305.0		383.7	3127	0.0340	34.4%	0.6057
16:20:05	91.1	92.1	1.0	0.184	65.8	305.0		383.7	3115	0.0325	35.0%	0.5922
16:21:05	87.0	88.0	1.0	0.184	65.7	305.0		383.7	3116	0.0311	35.6%	0.5905
16:22:05	82.0	83.0	1.0	0.185	65.7	305.0		383.7	3123	0.0294	36.2%	0.5807
16:23:05	81.9	82.8	1.0	0.195	65.7	305.0		383.7	3205	0.0301	36.7%	0.5714
16:24:05	74.1	75.0	1.0	0.189	65.8	305.2		383.7	3160	0.0268	37.3%	0.5673
16:25:05	79.6	80.5	1.0	0.185	65.9	305.5		383.8	3122	0.0285	37.8%	0.5717
16:26:05	90.4	91.4	1.0	0.184	65.9	301.0		383.8	3117	0.0323	38.4%	0.5596
16:27:05	125.5	126.5	1.0	0.183	65.9	295.0		383.8	3110	0.0447	39.2%	0.5594
16:28:05	134.6	135.6	1.0	0.184	65.9	289.6		383.7	3117	0.0481	40.2%	0.5513
16:29:05	148.6	149.5	0.9	0.180	65.8	283.4		383.7	3084	0.0525	41.1%	0.5413
16:30:05	163.0	163.9	0.9	0.181	65.9	279.8		383.7	3090	0.0577	42.2%	0.5404
16:31:05	158.3	159.2	0.9	0.179	65.9	277.5		383.8	3070	0.0557	43.3%	0.5432
16:32:05	162.8	163.7	0.9	0.180	65.9	275.9		383.8	3082	0.0575	44.4%	0.5273
16:33:05	164.7	165.6	0.9	0.181	65.8	275.1		383.7	3093	0.0584	45.5%	0.5146
16:34:05	181.6	182.5	0.9	0.182	65.9	270.6		383.8	3099	0.0645	46.7%	0.5032
16:35:05	203.9	204.8	0.9	0.181	65.9	264.6		383.8	3090	0.0722	48.1%	0.4887
16:36:05	229.2	230.2	0.9	0.180	65.9	259.6		383.8	3083	0.0810	49.6%	0.4827
16:37:05	222.4	223.3	0.9	0.178	65.9	259.1		383.8	3069	0.0782	51.1%	0.4875
16:38:05	208.7	209.7	0.9	0.182	65.9	259.1		383.8	3095	0.0741	52.5%	0.4698
16:39:05	206.8	207.7	0.9	0.183	65.9	259.1		383.7	3105	0.0736	53.9%	0.4562
16:40:05	199.8	200.8	1.0	0.180	65.8	259.1		383.7	3081	0.0706	55.2%	0.4387

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:41:05	184.0	185.0	1.0	0.177	65.8	259.1		383.7	3053	0.0644	56.4%	0.4165
16:42:05	169.4	170.5	1.1	0.177	65.8	259.1		383.7	3054	0.0593	57.5%	0.4017
16:43:05	163.9	165.0	1.1	0.180	65.7	259.1		383.6	3078	0.0579	58.6%	0.4093
16:44:05	155.3	156.5	1.2	0.178	65.7	259.1		383.6	3064	0.0546	59.6%	0.3957
16:45:05	146.7	147.9	1.2	0.178	65.8	259.1		383.7	3066	0.0516	60.6%	0.3826
16:46:05	133.8	134.9	1.2	0.178	65.8	259.1		383.7	3068	0.0471	61.5%	0.3681
16:47:05	123.0	124.2	1.2	0.179	65.8	259.1		383.7	3070	0.0433	62.3%	0.3521
16:48:05	112.8	114.0	1.2	0.179	65.8	259.1		383.7	3074	0.0398	63.1%	0.3424
16:49:05	108.2	109.4	1.2	0.179	65.8	259.1		383.7	3070	0.0381	63.8%	0.3514
16:50:05	103.3	104.5	1.2	0.180	65.8	259.1		383.7	3081	0.0365	64.5%	0.3411
16:51:05	92.5	93.6	1.2	0.180	65.7	258.6		383.7	3085	0.0327	65.1%	0.3310
16:52:05	92.1	93.2	1.2	0.177	65.9	258.8		383.7	3058	0.0323	65.7%	0.3210
16:53:05	88.7	89.9	1.1	0.176	65.9	258.5		383.8	3048	0.0310	66.3%	0.3088
16:54:05	88.3	89.4	1.1	0.178	65.9	255.0		383.8	3069	0.0311	66.9%	0.3026
16:55:05	119.9	121.1	1.1	0.175	65.9	249.5		383.8	3038	0.0418	67.7%	0.3133
16:56:05	125.9	127.0	1.1	0.178	65.9	246.3		383.8	3065	0.0442	68.5%	0.3046
16:57:05	144.2	145.3	1.1	0.176	66.0	240.2		383.8	3049	0.0504	69.5%	0.2983
16:58:05	156.1	157.2	1.1	0.178	66.0	234.6		383.8	3066	0.0549	70.5%	0.2887
16:59:05	162.9	164.0	1.1	0.177	66.0	230.4		383.8	3056	0.0571	71.6%	0.2778
17:00:05	173.5	174.5	1.1	0.180	66.0	228.2		383.9	3079	0.0612	72.7%	0.2715
17:01:05	198.8	199.8	1.1	0.178	66.0	223.5		383.9	3066	0.0699	74.0%	0.2715
17:02:05	201.3	202.4	1.1	0.178	66.1	218.5		383.9	3066	0.0707	75.4%	0.2604
17:03:05	204.4	205.5	1.1	0.178	66.0	214.6		383.9	3064	0.0718	76.7%	0.2479
17:04:05	194.3	195.4	1.1	0.177	66.0	213.5		383.8	3058	0.0681	78.0%	0.2339
17:05:05	192.0	193.1	1.1	0.178	66.0	213.3		383.8	3062	0.0674	79.3%	0.2207
17:06:05	187.7	188.8	1.1	0.177	66.0	212.1		383.8	3059	0.0658	80.5%	0.2103
17:07:05	168.8	169.9	1.1	0.177	65.9	212.1		383.8	3058	0.0592	81.7%	0.2017
17:08:05	157.0	158.1	1.1	0.177	65.9	212.1		383.8	3056	0.0550	82.7%	0.1897
17:09:05	148.2	149.4	1.2	0.175	65.9	212.1		383.7	3040	0.0517	83.7%	0.1761
17:10:05	140.3	141.5	1.2	0.176	65.9	212.1		383.8	3051	0.0491	84.6%	0.1657
17:11:05	132.6	133.8	1.2	0.175	65.9	212.1		383.8	3037	0.0462	85.5%	0.1533
17:12:05	118.4	119.6	1.2	0.176	65.8	212.1		383.7	3046	0.0414	86.2%	0.1445
17:13:05	122.5	123.6	1.2	0.174	65.8	212.1		383.7	3034	0.0426	87.1%	0.1425
17:14:05	115.4	116.5	1.2	0.179	65.9	212.1		383.8	3075	0.0407	87.8%	0.1346
17:15:05	107.8	109.0	1.2	0.174	65.9	212.1		383.8	3026	0.0374	88.5%	0.1244
17:16:05	101.5	102.7	1.2	0.175	65.9	212.1		383.8	3042	0.0354	89.2%	0.1167
17:17:05	87.6	88.8	1.1	0.179	65.7	212.1		383.7	3077	0.0309	89.8%	0.1071
17:18:05	94.5	95.6	1.1	0.175	65.7	212.1		383.7	3039	0.0329	90.4%	0.1031
17:19:05	89.1	90.2	1.1	0.172	65.8	212.1		383.7	3014	0.0308	91.0%	0.0999
17:20:05	84.1	85.1	1.1	0.172	65.9	212.1		383.8	3013	0.0290	91.5%	0.0940
17:21:05	81.7	82.8	1.1	0.171	66.0	212.1		383.9	3008	0.0282	92.1%	0.0870
17:22:05	79.9	81.0	1.1	0.173	66.2	212.1		384.0	3017	0.0276	92.6%	0.0813
17:23:05	74.6	75.7	1.1	0.170	66.3	212.1		384.0	2992	0.0256	93.1%	0.0762
17:24:05	70.6	71.7	1.1	0.172	66.4	212.1		384.1	3009	0.0243	93.5%	0.0702
17:25:05	67.4	68.5	1.1	0.172	66.5	212.1		384.2	3015	0.0233	94.0%	0.0691
17:26:05	64.4	65.5	1.1	0.170	66.7	212.1		384.4	2995	0.0221	94.4%	0.0649
17:27:05	61.1	62.2	1.1	0.126	66.7	212.1		384.4	2576	0.0180	94.7%	0.0589
17:28:05	55.0	56.1	1.2	0.113	66.9	212.1		384.5	2439	0.0153	95.0%	0.0536
17:29:05	53.4	54.6	1.2	0.113	67.0	212.1		384.6	2444	0.0149	95.3%	0.0507
17:30:05	51.4	52.6	1.2	0.119	67.0	212.1		384.6	2502	0.0147	95.6%	0.0459
17:31:05	49.2	50.4	1.2	0.170	67.2	212.1		384.7	2991	0.0168	95.9%	0.0459
17:32:05	46.6	47.9	1.2	0.168	67.2	212.1		384.7	2974	0.0159	96.2%	0.0429
17:33:05	44.6	45.9	1.2	0.169	67.3	212.1		384.8	2988	0.0153	96.5%	0.0408
17:34:05	42.1	43.3	1.2	0.168	67.4	212.1		384.8	2974	0.0143	96.7%	0.0383
17:35:05	39.0	40.3	1.3	0.169	67.4	212.1		384.9	2985	0.0133	97.0%	0.0357
17:36:05	36.9	38.1	1.3	0.169	67.4	212.1		384.9	2989	0.0126	97.2%	0.0311
17:37:05	35.4	36.6	1.3	0.167	67.5	212.1		384.9	2965	0.0120	97.5%	0.0290
17:38:05	32.7	34.0	1.3	0.169	67.6	212.1		385.0	2984	0.0112	97.7%	0.0270

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
17:39:05	31.0	32.3	1.3	0.170	67.6	212.1		385.0	2992	0.0106	97.9%	0.0256
17:40:05	29.3	30.6	1.3	0.170	67.7	212.1		385.1	2999	0.0100	98.1%	0.0240
17:41:05	27.3	28.6	1.3	0.168	67.7	212.1		385.1	2976	0.0093	98.2%	0.0224
17:42:05	25.8	27.1	1.3	0.169	67.7	212.1		385.1	2984	0.0088	98.4%	0.0185
17:43:05	23.8	25.1	1.3	0.169	67.8	212.1		385.1	2985	0.0081	98.6%	0.0171
17:44:05	22.3	23.7	1.3	0.168	67.8	212.1		385.2	2979	0.0076	98.7%	0.0159
17:45:05	20.8	22.1	1.3	0.167	67.9	212.1		385.2	2973	0.0071	98.8%	0.0150
17:46:05	19.5	20.8	1.3	0.170	67.9	212.1		385.2	2999	0.0067	99.0%	0.0139
17:47:05	18.3	19.7	1.4	0.170	67.9	212.1		385.3	2997	0.0063	99.1%	0.0131
17:48:05	17.0	18.4	1.4	0.172	67.9	212.1		385.3	3009	0.0059	99.2%	0.0098
17:49:05	15.7	17.0	1.4	0.167	68.0	212.1		385.3	2967	0.0053	99.3%	0.0089
17:50:05	14.6	16.0	1.4	0.168	68.0	212.1		385.3	2977	0.0050	99.4%	0.0082
17:51:05	13.8	15.1	1.4	0.171	68.0	212.1		385.3	3005	0.0047	99.5%	0.0079
17:52:05	12.7	14.1	1.4	0.170	68.0	212.1		385.3	2992	0.0043	99.6%	0.0073
17:53:05	11.8	13.2	1.4	0.166	68.0	212.1		385.3	2958	0.0040	99.6%	0.0069
17:54:05	11.5	12.9	1.4	0.169	68.1	212.1		385.4	2986	0.0039	99.7%	0.0039
17:55:05	10.7	12.1	1.4	0.167	68.1	212.1		385.4	2965	0.0036	99.8%	0.0036
17:56:05	9.6	11.0	1.4	0.168	68.2	212.1		385.4	2980	0.0033	99.8%	0.0033
17:57:05	9.4	10.8	1.4	0.168	68.1	212.1		385.4	2980	0.0032	99.9%	0.0032
17:58:05	8.6	10.0	1.4	0.168	68.1	212.1		385.4	2980	0.0029	99.9%	0.0029
17:59:05	8.4	9.8	1.4	0.170	68.1	212.1		385.4	2994	0.0029	100.0%	0.0029
	109.6	110.7		0.176	66.3	139.9		384.1	3050	5.30		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
8:15:05	17.9	20.4	2.5	0.168	70.1	200.8		386.9	3316	0.0067	0.6%	0.1670
8:16:05	88.2	90.7	2.5	0.170	70.3	198.5		387.0	3330	0.0334	3.5%	0.1862
8:17:05	226.6	229.1	2.5	0.169	70.4	195.4		387.1	3321	0.0855	11.0%	0.2255
8:18:05	205.4	208.0	2.6	0.165	70.4	194.9		387.1	3282	0.0766	17.7%	0.2061
8:19:05	168.1	170.8	2.7	0.167	70.4	194.9		387.1	3305	0.0631	23.2%	0.1851
8:20:05	146.0	148.5	2.5	0.166	70.1	194.9		386.9	3297	0.0547	28.0%	0.1727
8:21:05	155.2	157.6	2.4	0.167	70.3	195.1		387.0	3298	0.0582	33.1%	0.1603
8:22:05	145.1	147.4	2.4	0.171	70.5	195.1		387.1	3339	0.0550	37.9%	0.1528
8:23:05	127.8	130.2	2.4	0.167	70.7	195.1		387.3	3307	0.0480	42.1%	0.1399
8:24:05	115.6	118.1	2.5	0.168	70.8	195.1		387.3	3311	0.0435	45.9%	0.1294
8:25:05	101.6	104.0	2.5	0.162	70.8	195.1		387.4	3253	0.0375	49.2%	0.1220
8:26:05	98.9	101.4	2.5	0.176	71.0	195.1		387.5	3387	0.0381	52.6%	0.1180
8:27:05	90.9	93.3	2.4	0.105	70.7	195.0		387.3	2612	0.0270	54.9%	0.1021
8:28:05	83.7	86.2	2.5	0.138	70.5	195.0		387.2	3002	0.0286	57.4%	0.0978
8:29:05	77.1	79.6	2.5	0.146	71.0	195.0		387.5	3091	0.0271	59.8%	0.0919
8:30:05	71.6	74.0	2.4	0.136	70.8	195.0		387.4	2985	0.0243	61.9%	0.0859
8:31:05	68.5	70.9	2.4	0.174	71.1	195.0		387.6	3371	0.0262	64.2%	0.0845
8:32:05	64.7	67.0	2.4	0.173	71.2	195.0		387.7	3365	0.0247	66.4%	0.0799
8:33:05	59.0	61.3	2.3	0.173	71.3	195.0		387.7	3360	0.0225	68.3%	0.0751
8:34:05	54.7	57.0	2.3	0.172	71.3	195.0		387.7	3356	0.0208	70.2%	0.0692
8:35:05	50.3	52.7	2.3	0.173	71.3	195.0		387.7	3357	0.0192	71.8%	0.0648
8:36:05	47.8	50.1	2.3	0.174	71.4	195.0		387.8	3373	0.0183	73.4%	0.0617
8:37:05	45.4	47.7	2.3	0.177	71.5	195.0		387.9	3402	0.0175	75.0%	0.0582
8:38:05	42.7	45.0	2.3	0.173	71.5	195.0		387.9	3366	0.0163	76.4%	0.0552
8:39:05	40.3	42.6	2.3	0.175	71.6	194.9		387.9	3380	0.0154	77.7%	0.0526
8:40:05	37.7	40.0	2.3	0.174	71.5	194.9		387.9	3372	0.0144	79.0%	0.0484
8:41:05	36.3	38.6	2.3	0.173	71.6	194.9		387.9	3364	0.0138	80.2%	0.0457
8:42:05	34.4	36.8	2.3	0.173	71.6	194.9		387.9	3363	0.0131	81.4%	0.0434
8:43:05	32.0	34.4	2.4	0.175	71.6	194.9		388.0	3379	0.0123	82.4%	0.0407
8:44:05	31.2	33.5	2.3	0.174	71.7	194.9		388.0	3371	0.0119	83.5%	0.0389
8:45:05	28.6	31.0	2.3	0.172	71.7	194.9		388.0	3356	0.0109	84.4%	0.0372
8:46:05	28.1	30.5	2.4	0.171	71.8	194.9		388.1	3345	0.0107	85.4%	0.0340
8:47:05	25.8	28.2	2.4	0.174	71.9	194.9		388.2	3375	0.0099	86.2%	0.0318
8:48:05	24.8	27.2	2.4	0.173	72.0	194.9		388.2	3360	0.0094	87.1%	0.0303
8:49:05	23.6	26.0	2.4	0.173	72.0	194.9		388.3	3360	0.0090	87.9%	0.0285
8:50:05	23.0	25.3	2.3	0.171	72.1	194.9		388.3	3344	0.0087	88.6%	0.0270
8:51:05	22.7	25.0	2.3	0.172	72.2	194.9		388.4	3354	0.0086	89.4%	0.0263
8:52:05	20.9	23.2	2.3	0.173	72.2	194.9		388.4	3361	0.0080	90.1%	0.0233
8:53:05	20.1	22.4	2.3	0.174	72.2	194.9		388.4	3368	0.0077	90.7%	0.0219
8:54:05	18.6	20.9	2.3	0.173	72.2	194.9		388.4	3366	0.0071	91.4%	0.0208
8:55:05	18.1	20.4	2.3	0.172	72.2	194.9		388.4	3347	0.0069	92.0%	0.0195
8:56:05	17.7	20.1	2.4	0.170	72.3	194.9		388.4	3330	0.0067	92.5%	0.0183
8:57:05	16.6	18.9	2.3	0.171	72.2	194.9		388.4	3337	0.0063	93.1%	0.0177
8:58:05	15.9	18.2	2.3	0.174	72.3	194.9		388.4	3372	0.0061	93.6%	0.0154
8:59:05	15.0	17.3	2.3	0.171	72.4	194.9		388.5	3339	0.0057	94.1%	0.0143
9:00:05	14.2	16.5	2.3	0.169	72.4	194.9		388.5	3318	0.0053	94.6%	0.0137
9:01:05	13.3	15.6	2.3	0.173	72.5	194.9		388.6	3365	0.0051	95.0%	0.0126
9:02:05	11.9	14.2	2.3	0.174	72.5	194.8		388.6	3368	0.0045	95.4%	0.0116
9:03:05	11.6	13.8	2.3	0.185	72.6	194.8		388.7	3479	0.0046	95.8%	0.0114
9:04:05	11.0	13.3	2.2	0.188	72.6	194.8		388.7	3508	0.0044	96.2%	0.0093
9:05:05	10.1	12.4	2.2	0.187	72.7	194.8		388.8	3498	0.0040	96.6%	0.0086
9:06:05	9.9	12.2	2.3	0.187	72.8	194.8		388.8	3497	0.0039	96.9%	0.0084
9:07:05	8.9	11.2	2.3	0.184	72.9	194.8		388.9	3467	0.0035	97.2%	0.0075
9:08:05	8.5	10.8	2.3	0.188	73.0	194.8		388.9	3499	0.0034	97.5%	0.0071
9:09:05	7.9	10.2	2.3	0.189	73.0	194.8		388.9	3516	0.0031	97.8%	0.0068
9:10:05	7.6	9.9	2.3	0.187	73.0	194.8		389.0	3496	0.0030	98.0%	0.0049
9:11:05	6.9	9.2	2.3	0.191	73.1	194.8		389.0	3530	0.0027	98.3%	0.0046

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:12:05	6.6	8.9	2.3	0.189	73.1	194.8		389.0	3517	0.0026	98.5%	0.0045
9:13:05	5.9	8.2	2.3	0.189	73.2	194.8		389.1	3509	0.0023	98.7%	0.0040
9:14:05	5.8	8.1	2.3	0.192	73.4	194.7		389.2	3538	0.0023	98.9%	0.0037
9:15:05	5.8	8.1	2.3	0.189	73.4	194.7		389.3	3514	0.0023	99.1%	0.0037
9:16:05	4.7	7.1	2.4	0.192	73.5	194.7		389.3	3540	0.0019	99.3%	0.0019
9:17:05	4.6	7.0	2.4	0.190	73.4	194.7		389.3	3519	0.0018	99.4%	0.0018
9:18:05	4.6	7.0	2.4	0.194	73.4	194.7		389.2	3558	0.0018	99.6%	0.0018
9:19:05	4.2	6.6	2.4	0.193	73.3	194.7		389.2	3551	0.0017	99.8%	0.0017
9:20:05	3.5	6.0	2.5	0.190	73.2	194.7		389.1	3525	0.0014	99.9%	0.0014
9:21:05	3.5	6.0	2.5	0.191	73.2	194.7		389.1	3534	0.0014	100.0%	0.0014
	45.6	48.0		0.174	71.9	6.1		388.2	3370	1.14		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:03:52	46.7	48.6	1.8	0.164	69.2	236.0		386.2	3279	0.0174	0.2%	1.5900
11:04:52	122.1	125.8	3.8	0.168	69.3	236.1		386.2	3313	0.0461	0.7%	1.5884
11:05:52	97.2	100.9	3.7	0.164	69.2	235.3		386.2	3277	0.0363	1.0%	1.5956
11:06:52	262.1	265.8	3.7	0.163	69.2	229.6		386.2	3263	0.0974	2.0%	1.6582
11:07:52	338.9	342.7	3.7	0.164	69.2	225.1		386.2	3277	0.1266	3.3%	1.6991
11:08:52	365.1	368.8	3.7	0.165	69.1	220.1		386.1	3288	0.1368	4.7%	1.6019
11:09:52	365.7	369.4	3.7	0.161	69.1	215.8		386.1	3248	0.1354	6.1%	1.5726
11:10:52	421.3	425.0	3.7	0.164	69.1	212.3		386.1	3280	0.1575	7.7%	1.5423
11:11:52	476.5	480.1	3.7	0.162	69.1	206.1		386.1	3259	0.1770	9.6%	1.5593
11:12:52	559.3	563.0	3.7	0.161	69.0	200.3		386.1	3246	0.2069	11.7%	1.5608
11:13:52	531.0	534.7	3.7	0.162	69.0	199.6		386.1	3253	0.1968	13.7%	1.5726
11:14:52	447.0	450.8	3.8	0.163	69.1	199.6		386.1	3264	0.1663	15.4%	1.4651
11:15:52	380.9	384.7	3.7	0.164	69.2	199.6		386.2	3277	0.1422	16.9%	1.4372
11:16:52	345.6	349.2	3.6	0.164	69.2	199.6		386.2	3272	0.1288	18.2%	1.3848
11:17:52	307.5	311.0	3.5	0.162	69.2	199.7		386.2	3253	0.1140	19.4%	1.3824
11:18:52	276.6	280.2	3.5	0.166	69.3	199.6		386.2	3293	0.1038	20.4%	1.3539
11:19:52	245.0	248.5	3.5	0.162	69.3	199.6		386.3	3260	0.0910	21.4%	1.3757
11:20:52	218.5	222.1	3.6	0.166	69.2	199.6		386.2	3296	0.0820	22.2%	1.2989
11:21:52	202.9	206.6	3.7	0.165	69.0	199.6		386.0	3286	0.0760	23.0%	1.2950
11:22:52	190.0	193.7	3.7	0.163	69.0	199.6		386.1	3267	0.0707	23.7%	1.2560
11:23:52	178.2	181.9	3.7	0.166	69.1	199.6		386.1	3298	0.0670	24.4%	1.2684
11:24:52	169.2	172.5	3.3	0.165	69.2	199.6		386.2	3285	0.0633	25.1%	1.2501
11:25:52	164.2	167.3	3.1	0.163	69.3	199.6		386.3	3269	0.0611	25.7%	1.2848
11:26:52	153.6	156.2	2.6	0.162	69.3	199.6		386.3	3259	0.0570	26.3%	1.2168
11:27:52	151.6	155.5	3.9	0.165	69.4	199.6		386.3	3289	0.0568	26.9%	1.2190
11:28:52	144.6	148.5	3.9	0.166	69.4	199.6		386.3	3291	0.0542	27.4%	1.1852
11:29:52	138.5	142.4	3.9	0.165	69.4	199.6		386.4	3282	0.0518	27.9%	1.2014
11:30:52	132.2	136.1	3.8	0.162	69.5	199.6		386.4	3260	0.0491	28.5%	1.1868
11:31:52	127.7	131.6	3.8	0.162	69.5	199.6		386.4	3257	0.0474	28.9%	1.2236
11:32:52	124.5	128.3	3.8	0.165	69.6	199.6		386.5	3284	0.0465	29.4%	1.1598
11:33:52	119.6	123.5	3.8	0.163	69.6	199.6		386.5	3266	0.0445	29.9%	1.1622
11:34:52	114.4	118.2	3.8	0.166	69.6	199.6		386.5	3292	0.0429	30.3%	1.1310
11:35:52	109.1	112.9	3.8	0.163	69.6	199.6		386.5	3262	0.0405	30.7%	1.1497
11:36:52	111.1	114.9	3.8	0.160	69.6	199.6		386.5	3238	0.0409	31.2%	1.1377
11:37:52	107.4	111.1	3.8	0.163	69.7	199.6		386.5	3265	0.0399	31.6%	1.1763
11:38:52	108.4	112.1	3.7	0.163	69.7	199.6		386.5	3271	0.0404	32.0%	1.1133
11:39:52	107.7	111.5	3.7	0.163	69.7	199.6		386.6	3270	0.0401	32.4%	1.1177
11:40:52	104.9	108.7	3.7	0.164	69.7	199.6		386.6	3280	0.0392	32.8%	1.0881
11:41:52	99.9	103.6	3.7	0.166	69.8	199.6		386.6	3300	0.0375	33.2%	1.1092
11:42:52	100.2	103.9	3.7	0.164	69.8	199.5		386.6	3280	0.0374	33.6%	1.0967
11:43:52	100.6	104.3	3.7	0.165	69.8	199.5		386.7	3289	0.0377	33.9%	1.1363
11:44:52	95.3	99.0	3.7	0.162	69.9	199.6		386.7	3259	0.0354	34.3%	1.0729
11:45:52	93.0	96.7	3.7	0.163	69.9	199.5		386.7	3271	0.0346	34.7%	1.0776
11:46:52	93.2	96.8	3.6	0.167	70.0	199.5		386.8	3305	0.0350	35.0%	1.0490
11:47:52	91.0	94.6	3.7	0.163	70.0	199.5		386.8	3269	0.0338	35.4%	1.0717
11:48:52	87.2	90.8	3.6	0.165	70.0	199.5		386.8	3285	0.0326	35.7%	1.0593
11:49:52	89.8	93.4	3.6	0.162	70.1	199.5		386.8	3256	0.0333	36.1%	1.0987
11:50:52	86.0	89.7	3.6	0.165	70.1	199.5		386.8	3291	0.0322	36.4%	1.0376
11:51:52	83.8	87.5	3.7	0.163	70.1	199.5		386.9	3270	0.0312	36.7%	1.0430
11:52:52	137.3	141.0	3.7	0.169	70.2	196.6		386.9	3330	0.0520	37.2%	1.0139
11:54:08	208.3	212.0	3.7	0.174	70.2	193.4		386.9	3378	0.0800	38.1%	1.0378
11:54:52	287.3	291.0	3.6	0.167	70.2	185.8		386.9	3308	0.1081	39.2%	1.0267
11:55:52	396.2	399.8	3.7	0.164	70.2	181.9		386.9	3274	0.1475	40.7%	1.0654
11:56:52	395.2	398.9	3.6	0.163	70.2	177.4		386.9	3267	0.1468	42.2%	1.0054
11:57:52	483.9	487.5	3.6	0.163	70.3	171.0		387.0	3270	0.1799	44.0%	1.0118
11:58:52	470.9	474.5	3.6	0.164	70.3	168.5		387.0	3272	0.1752	45.8%	0.9619
11:59:52	491.9	495.5	3.6	0.167	70.3	165.0		387.0	3308	0.1850	47.7%	0.9578

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:00:52	517.2	520.8	3.6	0.162	70.3	160.3		387.0	3255	0.1914	49.7%	0.9186
12:01:52	614.4	617.9	3.6	0.161	70.3	154.0		387.0	3250	0.2271	52.0%	0.9179
12:02:52	558.2	561.8	3.6	0.163	70.3	150.2		387.0	3265	0.2072	54.2%	0.8585
12:03:52	548.2	551.8	3.5	0.160	70.4	147.0		387.0	3231	0.2014	56.2%	0.8318
12:04:52	564.7	568.2	3.5	0.164	70.3	142.1		387.0	3277	0.2104	58.4%	0.7867
12:05:52	613.2	616.7	3.5	0.162	70.3	137.4		387.0	3251	0.2267	60.7%	0.7728
12:06:52	562.9	566.4	3.6	0.162	70.4	136.5		387.1	3261	0.2087	62.9%	0.7272
12:07:52	565.2	568.7	3.5	0.161	70.4	131.0		387.1	3247	0.2086	65.0%	0.6909
12:08:52	607.6	611.2	3.5	0.159	70.3	126.4		387.0	3227	0.2229	67.3%	0.6513
12:09:52	530.7	534.2	3.5	0.162	70.4	126.3		387.0	3256	0.1964	69.3%	0.6305
12:10:52	471.4	475.0	3.5	0.162	70.4	126.3		387.1	3259	0.1746	71.1%	0.5764
12:11:52	419.5	423.0	3.5	0.160	70.5	126.3		387.1	3241	0.1545	72.7%	0.5461
12:12:52	375.3	378.9	3.6	0.162	70.5	126.3		387.2	3258	0.1390	74.1%	0.5186
12:13:52	323.9	327.5	3.6	0.160	70.5	126.3		387.2	3234	0.1190	75.4%	0.4823
12:14:52	296.4	300.0	3.6	0.163	70.6	126.3		387.2	3267	0.1100	76.5%	0.4283
12:15:52	274.1	277.7	3.6	0.160	70.6	126.3		387.2	3240	0.1009	77.5%	0.4340
12:16:52	255.5	259.1	3.7	0.161	70.6	126.3		387.2	3248	0.0943	78.5%	0.4017
12:17:52	236.6	240.2	3.7	0.161	70.5	126.3		387.1	3247	0.0873	79.4%	0.3916
12:18:52	229.2	232.9	3.7	0.162	70.5	126.3		387.2	3252	0.0847	80.3%	0.3796
12:19:52	220.7	224.4	3.7	0.162	70.6	126.3		387.2	3255	0.0816	81.1%	0.3632
12:20:52	210.9	214.6	3.6	0.162	70.7	126.4		387.3	3259	0.0781	81.9%	0.3183
12:21:52	204.3	207.9	3.7	0.156	70.8	126.3		387.3	3199	0.0742	82.7%	0.3331
12:22:52	202.3	205.9	3.6	0.156	70.8	126.3		387.4	3191	0.0733	83.4%	0.3074
12:23:52	198.0	201.6	3.7	0.154	70.8	126.3		387.4	3170	0.0713	84.2%	0.3043
12:24:52	194.7	198.3	3.6	0.160	70.9	126.3		387.4	3236	0.0715	84.9%	0.2949
12:25:52	193.9	197.5	3.6	0.144	70.9	126.3		387.4	3067	0.0676	85.6%	0.2816
12:26:52	182.6	186.2	3.6	0.051	70.7	126.3		387.3	1833	0.0380	86.0%	0.2402
12:27:52	185.9	189.5	3.6	0.149	70.9	126.3		387.4	3122	0.0659	86.6%	0.2589
12:28:52	179.8	183.4	3.6	0.100	71.1	126.3		387.6	2557	0.0522	87.2%	0.2341
12:29:52	177.4	181.0	3.6	0.156	70.9	126.2		387.4	3190	0.0643	87.8%	0.2330
12:30:52	172.7	176.3	3.6	0.159	70.9	126.2		387.4	3229	0.0633	88.5%	0.2233
12:31:52	175.1	178.6	3.6	0.156	70.9	126.2		387.5	3192	0.0634	89.1%	0.2140
12:32:52	169.0	172.6	3.6	0.157	71.0	126.2		387.5	3205	0.0615	89.8%	0.2022
12:33:52	164.6	168.2	3.6	0.155	71.0	126.2		387.5	3186	0.0595	90.4%	0.1930
12:34:52	158.8	162.4	3.6	0.155	71.0	126.2		387.5	3186	0.0574	91.0%	0.1819
12:35:52	155.5	159.0	3.6	0.156	71.1	126.2		387.6	3193	0.0564	91.6%	0.1688
12:36:52	150.3	153.8	3.6	0.155	71.1	126.2		387.6	3182	0.0543	92.1%	0.1600
12:37:52	142.0	145.5	3.6	0.158	71.2	126.2		387.6	3214	0.0518	92.6%	0.1506
12:38:52	136.7	140.3	3.6	0.156	71.2	126.2		387.7	3193	0.0495	93.2%	0.1407
12:39:52	130.1	133.6	3.6	0.159	71.3	126.2		387.7	3223	0.0476	93.6%	0.1335
12:40:52	121.4	125.0	3.6	0.163	71.4	126.2		387.8	3266	0.0450	94.1%	0.1245
12:41:52	112.8	116.3	3.6	0.155	71.4	126.2		387.8	3188	0.0408	94.5%	0.1124
12:42:52	106.4	109.9	3.5	0.157	71.5	126.2		387.8	3204	0.0387	94.9%	0.1057
12:43:52	100.9	104.4	3.5	0.158	71.5	126.2		387.9	3217	0.0368	95.3%	0.0988
12:44:52	92.8	96.3	3.5	0.154	71.6	126.2		387.9	3170	0.0334	95.6%	0.0911
12:45:52	87.9	91.4	3.5	0.159	71.6	126.2		388.0	3226	0.0322	96.0%	0.0859
12:46:52	80.4	83.8	3.5	0.161	71.6	126.2		388.0	3241	0.0295	96.3%	0.0795
12:47:52	74.1	77.6	3.5	0.156	71.7	126.2		388.0	3197	0.0269	96.6%	0.0716
12:48:52	69.3	72.8	3.5	0.156	71.7	126.2		388.0	3192	0.0251	96.8%	0.0670
12:49:52	63.2	66.6	3.5	0.159	71.7	126.2		388.0	3224	0.0231	97.1%	0.0620
12:50:52	58.9	62.4	3.5	0.158	71.7	126.2		388.0	3219	0.0215	97.3%	0.0577
12:51:52	54.1	57.6	3.5	0.157	71.8	126.2		388.1	3204	0.0197	97.5%	0.0538
12:52:52	49.8	53.3	3.4	0.156	71.8	126.2		388.1	3198	0.0181	97.7%	0.0499
12:53:52	45.9	49.4	3.4	0.158	71.8	126.2		388.1	3213	0.0167	97.8%	0.0447
12:54:52	43.0	46.4	3.4	0.158	71.8	126.2		388.1	3220	0.0157	98.0%	0.0419
12:55:52	39.5	42.9	3.4	0.161	71.8	126.2		388.1	3241	0.0145	98.1%	0.0389
12:56:52	36.8	40.2	3.4	0.156	71.8	126.2		388.1	3198	0.0133	98.3%	0.0362

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:57:52	33.9	37.4	3.5	0.157	71.8	126.2		388.1	3202	0.0123	98.4%	0.0341
12:58:52	31.5	34.9	3.4	0.160	71.9	126.2		388.2	3236	0.0115	98.5%	0.0319
12:59:52	29.1	32.4	3.4	0.158	71.9	126.2		388.2	3215	0.0106	98.6%	0.0280
13:00:52	26.7	30.1	3.4	0.161	71.9	126.2		388.2	3244	0.0098	98.7%	0.0262
13:01:52	25.1	28.4	3.4	0.158	71.9	126.2		388.2	3217	0.0091	98.8%	0.0243
13:02:52	23.3	26.7	3.4	0.158	72.0	126.2		388.2	3216	0.0085	98.9%	0.0229
13:03:52	21.9	25.2	3.4	0.157	72.0	126.2		388.2	3204	0.0079	99.0%	0.0218
13:04:52	20.0	23.4	3.4	0.157	72.0	126.2		388.2	3208	0.0073	99.1%	0.0203
13:05:52	18.9	22.3	3.3	0.159	72.0	126.1		388.2	3226	0.0069	99.1%	0.0174
13:06:52	17.6	21.0	3.4	0.159	72.0	126.2		388.3	3221	0.0064	99.2%	0.0164
13:07:52	16.4	19.8	3.3	0.157	72.0	126.2		388.3	3207	0.0060	99.3%	0.0152
13:08:52	15.2	18.6	3.3	0.157	72.0	126.1		388.3	3209	0.0055	99.3%	0.0144
13:09:52	14.4	17.7	3.3	0.159	72.0	126.1		388.3	3227	0.0053	99.4%	0.0139
13:10:52	13.7	16.9	3.3	0.156	72.0	126.1		388.3	3192	0.0049	99.4%	0.0130
13:11:52	12.9	16.2	3.3	0.156	72.1	126.1		388.3	3196	0.0047	99.5%	0.0105
13:12:52	12.2	15.4	3.2	0.157	72.1	126.1		388.3	3209	0.0044	99.5%	0.0100
13:13:52	11.4	14.6	3.2	0.157	72.1	126.1		388.3	3201	0.0041	99.6%	0.0092
13:14:52	10.7	13.8	3.0	0.158	72.1	126.1		388.3	3215	0.0039	99.6%	0.0089
13:15:52	10.4	13.2	2.8	0.158	72.1	126.1		388.3	3213	0.0038	99.6%	0.0086
13:16:52	9.8	12.9	3.1	0.158	72.1	126.1		388.3	3217	0.0036	99.7%	0.0081
13:17:52	9.2	12.3	3.1	0.159	72.1	126.1		388.3	3228	0.0034	99.7%	0.0058
13:18:52	8.8	11.9	3.1	0.158	72.2	126.1		388.4	3219	0.0032	99.8%	0.0056
13:19:52	8.0	11.1	3.1	0.160	72.2	126.1		388.3	3240	0.0029	99.8%	0.0051
13:20:52	7.7	10.9	3.1	0.156	72.2	126.1		388.4	3195	0.0028	99.8%	0.0049
13:21:52	7.3	10.4	3.1	0.157	72.1	126.1		388.3	3210	0.0027	99.8%	0.0048
13:22:52	6.7	9.9	3.1	0.158	72.2	126.1		388.4	3214	0.0025	99.9%	0.0045
13:23:52	6.7	9.9	3.1	0.158	72.2	126.1		388.4	3219	0.0025	99.9%	0.0025
13:24:52	6.5	9.6	3.1	0.158	72.2	126.1		388.4	3211	0.0024	99.9%	0.0024
13:25:52	6.0	9.1	3.1	0.157	72.2	126.1		388.4	3206	0.0022	99.9%	0.0022
13:26:52	5.9	9.0	3.1	0.156	72.2	126.1		388.4	3199	0.0021	100.0%	0.0021
13:27:52	5.9	9.0	3.1	0.159	72.2	126.1		388.4	3230	0.0022	100.0%	0.0022
13:28:52	5.6	8.7	3.1	0.160	72.2	126.1		388.4	3233	0.0021	100.0%	0.0021
	181.0	184.5		0.159	70.7	109.9		387.3	3227	9.73		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:12:12	0.0	2.6	2.7	0.159	71.9	375.2		388.1	3244	0.0000	0.0%	2.2571
15:13:12	0.3	3.0	2.7	0.163	71.9	374.9		388.2	3286	0.0001	0.0%	2.2292
15:14:43	27.2	29.9	2.7	0.162	71.9	373.2		388.2	3280	0.0101	0.1%	2.1125
15:15:12	187.8	190.5	2.7	0.161	71.9	366.2		388.2	3261	0.0694	0.6%	2.1743
15:16:12	337.3	340.0	2.7	0.159	71.8	361.2		388.1	3248	0.1242	1.5%	2.1797
15:17:12	456.1	458.8	2.7	0.158	71.8	354.4		388.1	3237	0.1674	2.8%	2.2244
15:18:12	575.3	578.0	2.7	0.163	71.8	349.6		388.1	3280	0.2140	4.4%	2.2571
15:19:12	461.8	464.5	2.7	0.160	71.8	349.8		388.1	3255	0.1704	5.7%	2.2291
15:20:12	516.0	518.8	2.7	0.159	71.8	347.0		388.1	3243	0.1897	7.2%	2.1024
15:21:12	452.2	454.9	2.7	0.159	71.8	346.4		388.1	3241	0.1661	8.4%	2.1049
15:22:12	367.2	369.9	2.7	0.160	72.0	346.5		388.2	3250	0.1353	9.5%	2.0555
15:23:12	279.5	282.2	2.7	0.161	72.0	346.5		388.3	3260	0.1033	10.2%	2.0570
15:24:12	213.5	216.3	2.7	0.162	72.0	346.7		388.3	3275	0.0793	10.8%	2.0431
15:25:12	227.1	229.8	2.7	0.162	72.1	347.3		388.3	3276	0.0843	11.5%	2.0587
15:26:12	186.3	189.0	2.7	0.159	72.1	346.1		388.3	3242	0.0684	12.0%	1.9127
15:27:12	231.1	233.8	2.7	0.162	72.0	341.0		388.3	3272	0.0857	12.7%	1.9388
15:28:12	417.8	420.5	2.7	0.158	71.9	333.9		388.2	3239	0.1534	13.8%	1.9202
15:29:12	596.4	599.1	2.7	0.162	71.8	327.4		388.1	3279	0.2217	15.5%	1.9538
15:30:12	778.5	781.2	2.7	0.160	71.8	320.4		388.1	3250	0.2869	17.7%	1.9639
15:31:12	911.1	913.8	2.7	0.158	71.7	315.9		388.0	3235	0.3342	20.2%	1.9744
15:32:12	671.3	674.0	2.7	0.163	71.8	315.9		388.1	3281	0.2497	22.1%	1.8442
15:33:12	576.3	579.0	2.7	0.162	71.8	315.9		388.1	3275	0.2140	23.7%	1.8531
15:34:12	455.6	458.3	2.7	0.161	71.9	315.9		388.2	3270	0.1688	25.0%	1.7669
15:35:12	404.6	407.3	2.7	0.160	72.0	315.9		388.2	3251	0.1491	26.1%	1.7321
15:36:12	349.3	352.0	2.7	0.160	72.0	315.9		388.2	3250	0.1287	27.1%	1.6770
15:37:12	296.2	298.9	2.8	0.161	72.0	316.0		388.2	3268	0.1097	28.0%	1.6402
15:38:12	254.8	257.6	2.7	0.161	71.9	316.0		388.2	3269	0.0944	28.7%	1.5945
15:39:12	242.7	245.5	2.8	0.160	71.9	316.0		388.2	3256	0.0896	29.4%	1.6391
15:40:12	220.9	223.7	2.8	0.160	72.0	316.0		388.2	3253	0.0814	30.0%	1.5980
15:41:12	193.0	195.8	2.8	0.159	72.0	316.0		388.2	3242	0.0709	30.5%	1.5830
15:42:12	188.3	191.1	2.8	0.159	72.0	316.0		388.2	3249	0.0694	31.0%	1.5484
15:43:12	192.1	194.9	2.8	0.160	72.0	316.0		388.2	3253	0.0708	31.6%	1.5305
15:44:12	168.8	171.6	2.8	0.161	72.0	316.0		388.3	3260	0.0624	32.0%	1.5001
15:45:12	165.1	167.9	2.8	0.158	72.0	316.0		388.3	3233	0.0605	32.5%	1.5496
15:46:12	171.6	174.4	2.7	0.161	72.0	316.0		388.3	3262	0.0634	33.0%	1.5166
15:47:12	164.9	167.7	2.8	0.158	72.1	316.0		388.3	3239	0.0605	33.4%	1.5120
15:48:12	147.7	150.5	2.7	0.159	72.1	316.0		388.3	3244	0.0543	33.9%	1.4790
15:49:12	141.0	143.8	2.7	0.162	72.1	316.0		388.3	3277	0.0524	34.3%	1.4597
15:50:12	142.5	145.2	2.7	0.160	72.1	316.0		388.3	3259	0.0526	34.7%	1.4377
15:51:12	136.6	139.3	2.7	0.161	72.1	316.0		388.3	3264	0.0505	35.0%	1.4891
15:52:12	144.8	147.6	2.7	0.160	72.1	316.0		388.3	3254	0.0534	35.4%	1.4531
15:53:12	136.4	139.1	2.7	0.161	72.2	316.0		388.3	3261	0.0504	35.8%	1.4515
15:54:12	127.7	130.5	2.7	0.159	72.2	316.0		388.4	3246	0.0470	36.2%	1.4247
15:55:12	122.4	125.1	2.7	0.163	72.2	316.0		388.4	3280	0.0455	36.5%	1.4073
15:56:12	120.0	122.7	2.7	0.160	72.2	316.0		388.4	3257	0.0443	36.9%	1.3850
15:57:12	117.7	120.4	2.7	0.161	72.2	316.0		388.4	3263	0.0435	37.2%	1.4386
15:58:12	113.1	115.8	2.7	0.161	72.2	316.0		388.4	3267	0.0419	37.5%	1.3997
15:59:12	104.8	107.5	2.7	0.162	72.2	316.0		388.4	3272	0.0389	37.8%	1.4011
16:00:12	100.8	103.5	2.7	0.160	72.2	316.1		388.4	3256	0.0372	38.1%	1.3777
16:01:12	113.7	116.4	2.7	0.162	72.3	316.6		388.4	3275	0.0422	38.4%	1.3618
16:02:12	113.4	116.1	2.7	0.160	72.3	315.5		388.4	3256	0.0418	38.7%	1.3408
16:03:12	228.1	230.7	2.7	0.162	72.2	310.4		388.4	3279	0.0847	39.4%	1.3950
16:04:12	421.8	424.5	2.7	0.162	72.2	306.6		388.4	3274	0.1565	40.6%	1.3579
16:05:12	409.4	412.1	2.7	0.161	72.2	303.6		388.4	3268	0.1515	41.7%	1.3623
16:06:12	530.2	532.9	2.7	0.159	72.2	297.9		388.4	3243	0.1948	43.2%	1.3405
16:07:12	515.5	518.2	2.7	0.159	72.2	295.2		388.4	3249	0.1897	44.6%	1.3197
16:08:12	549.7	552.4	2.7	0.159	72.2	292.7		388.4	3244	0.2020	46.2%	1.2990

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:09:12	569.5	572.2	2.7	0.158	72.1	290.6		388.3	3238	0.2089	47.7%	1.3103
16:10:12	468.7	471.3	2.7	0.157	72.2	290.3		388.4	3226	0.1713	49.0%	1.2014
16:11:12	522.9	525.5	2.7	0.160	72.2	285.3		388.4	3260	0.1931	50.5%	1.2107
16:12:12	609.8	612.5	2.7	0.158	72.2	282.5		388.4	3232	0.2233	52.2%	1.1457
16:13:12	478.4	481.1	2.7	0.159	72.2	282.5		388.4	3243	0.1757	53.5%	1.1299
16:14:12	388.5	391.1	2.7	0.158	72.2	282.0		388.4	3237	0.1425	54.6%	1.0969
16:15:12	460.1	462.7	2.6	0.159	72.2	279.9		388.4	3244	0.1691	55.9%	1.1014
16:16:12	415.9	418.5	2.6	0.156	72.2	279.9		388.4	3218	0.1516	57.1%	1.0301
16:17:12	388.2	390.8	2.6	0.168	72.2	279.9		388.4	3334	0.1466	58.2%	1.0176
16:18:12	335.2	337.8	2.6	0.173	72.3	279.9		388.4	3384	0.1285	59.1%	0.9224
16:19:12	290.8	293.4	2.6	0.172	72.3	279.9		388.4	3373	0.1111	60.0%	0.9542
16:20:12	279.8	282.4	2.6	0.170	72.3	279.9		388.4	3353	0.1063	60.8%	0.9545
16:21:12	261.7	264.3	2.6	0.167	72.3	279.9		388.4	3323	0.0985	61.5%	0.9323
16:22:12	229.7	232.4	2.6	0.169	72.3	279.9		388.4	3347	0.0871	62.2%	0.8785
16:23:12	210.3	213.0	2.7	0.170	72.3	279.9		388.5	3356	0.0799	62.8%	0.8710
16:24:12	188.2	191.0	2.8	0.173	72.3	279.9		388.5	3384	0.0721	63.4%	0.7939
16:25:12	169.9	172.7	2.8	0.171	72.3	279.9		388.5	3368	0.0648	63.8%	0.8431
16:26:12	172.1	174.9	2.8	0.172	72.3	280.5		388.5	3379	0.0659	64.3%	0.8482
16:27:12	151.3	154.2	2.9	0.174	72.4	280.2		388.5	3389	0.0581	64.8%	0.8338
16:28:12	138.4	141.3	2.9	0.170	72.3	280.2		388.5	3354	0.0526	65.2%	0.7914
16:29:12	124.5	127.4	2.9	0.169	72.3	280.3		388.5	3341	0.0471	65.5%	0.7911
16:30:12	116.9	119.8	2.9	0.168	72.3	280.3		388.5	3339	0.0442	65.9%	0.7218
16:31:12	115.4	118.3	2.8	0.167	72.3	280.3		388.5	3328	0.0435	66.2%	0.7783
16:32:12	104.5	107.4	2.8	0.151	72.3	280.3		388.5	3161	0.0374	66.5%	0.7824
16:33:12	102.4	105.2	2.8	0.154	72.3	280.3		388.5	3192	0.0370	66.8%	0.7757
16:34:12	97.1	100.0	2.8	0.153	72.3	280.3		388.5	3181	0.0350	67.0%	0.7388
16:35:12	96.1	99.0	2.9	0.153	72.3	280.3		388.5	3184	0.0347	67.3%	0.7440
16:36:12	132.2	135.1	2.8	0.151	72.3	276.2		388.5	3166	0.0474	67.7%	0.6776
16:37:12	308.7	311.6	2.8	0.152	72.4	271.1		388.5	3176	0.1110	68.5%	0.7348
16:38:12	348.0	350.9	2.9	0.153	72.4	268.6		388.5	3187	0.1256	69.5%	0.7449
16:39:12	434.2	437.1	2.9	0.152	72.3	262.6		388.5	3172	0.1560	70.6%	0.7387
16:40:12	461.7	464.5	2.8	0.151	72.3	261.1		388.5	3166	0.1656	71.9%	0.7038
16:41:12	499.7	502.5	2.8	0.150	72.3	257.5		388.5	3146	0.1781	73.2%	0.7093
16:42:12	417.8	420.5	2.7	0.150	72.3	257.3		388.5	3156	0.1493	74.4%	0.6302
16:43:12	500.2	503.0	2.8	0.153	72.3	252.1		388.5	3179	0.1801	75.7%	0.6237
16:44:12	613.7	616.5	2.8	0.150	72.3	246.4		388.5	3150	0.2190	77.4%	0.6193
16:45:12	573.4	576.2	2.8	0.147	72.2	244.6		388.4	3124	0.2029	78.9%	0.5827
16:46:12	555.7	558.5	2.8	0.151	72.2	242.4		388.4	3158	0.1988	80.5%	0.5382
16:47:12	569.7	572.5	2.7	0.150	72.2	241.0		388.4	3155	0.2036	82.0%	0.5312
16:48:12	482.6	485.4	2.7	0.149	72.2	241.0		388.4	3145	0.1719	83.3%	0.4809
16:49:12	436.4	439.1	2.8	0.149	72.2	240.6		388.4	3140	0.1552	84.5%	0.4436
16:50:12	385.2	388.0	2.8	0.148	72.3	240.6		388.4	3135	0.1368	85.5%	0.4003
16:51:12	345.5	348.3	2.8	0.151	72.3	240.3		388.4	3164	0.1238	86.5%	0.3798
16:52:12	304.3	307.2	2.9	0.149	72.2	238.8		388.4	3144	0.1084	87.3%	0.3395
16:53:12	253.6	256.5	2.9	0.149	72.2	238.8		388.4	3146	0.0904	88.0%	0.3276
16:54:12	220.5	223.5	3.0	0.152	72.2	238.8		388.4	3173	0.0793	88.6%	0.3089
16:55:12	205.9	208.9	3.0	0.152	72.2	238.8		388.3	3168	0.0739	89.1%	0.2884
16:56:12	191.0	193.9	3.0	0.152	72.1	238.8		388.3	3174	0.0687	89.7%	0.2635
16:57:12	184.1	187.1	3.0	0.153	72.2	238.8		388.4	3182	0.0664	90.2%	0.2559
16:58:12	169.5	172.5	3.0	0.151	72.2	238.8		388.3	3159	0.0607	90.6%	0.2311
16:59:12	149.7	152.7	3.0	0.150	72.1	238.8		388.3	3148	0.0534	91.0%	0.2373
17:00:12	137.2	140.2	2.9	0.150	72.1	238.8		388.3	3148	0.0490	91.4%	0.2296
17:01:12	137.3	140.2	2.9	0.150	72.1	238.9		388.3	3150	0.0490	91.8%	0.2145
17:02:12	118.0	120.9	2.9	0.153	72.0	238.9		388.2	3181	0.0425	92.1%	0.1949
17:03:12	113.9	116.9	2.9	0.151	72.0	238.9		388.2	3166	0.0409	92.4%	0.1896
17:04:12	110.5	113.5	2.9	0.152	72.0	238.9		388.3	3168	0.0397	92.7%	0.1704
17:05:12	130.6	133.5	2.9	0.146	72.1	238.9		388.3	3110	0.0460	93.1%	0.1839

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
17:06:12	144.3	147.2	2.9	0.152	72.2	238.9		388.4	3177	0.0519	93.4%	0.1807
17:07:12	136.7	139.6	2.9	0.127	72.2	238.9		388.4	2902	0.0450	93.8%	0.1655
17:08:12	129.8	132.6	2.8	0.102	72.2	238.9		388.4	2599	0.0382	94.1%	0.1523
17:09:12	120.5	123.3	2.8	0.139	72.3	238.9		388.4	3033	0.0414	94.4%	0.1487
17:10:12	113.4	116.2	2.8	0.077	72.1	238.9		388.3	2251	0.0289	94.6%	0.1307
17:11:12	113.5	116.3	2.8	0.153	72.3	238.9		388.5	3178	0.0409	94.9%	0.1378
17:12:12	109.7	112.5	2.8	0.150	72.3	238.9		388.5	3156	0.0392	95.2%	0.1288
17:13:12	101.0	103.8	2.7	0.150	72.3	238.9		388.5	3152	0.0361	95.5%	0.1206
17:14:12	93.5	96.3	2.8	0.150	72.3	238.9		388.5	3155	0.0334	95.7%	0.1141
17:15:12	87.1	89.9	2.7	0.151	72.3	238.9		388.4	3160	0.0312	96.0%	0.1073
17:16:12	83.4	86.1	2.7	0.152	72.3	238.9		388.5	3170	0.0300	96.2%	0.1018
17:17:12	78.2	81.0	2.7	0.153	72.3	238.9		388.5	3179	0.0282	96.4%	0.0969
17:18:12	71.3	74.0	2.7	0.153	72.3	239.0		388.4	3180	0.0257	96.6%	0.0895
17:19:12	68.1	70.7	2.7	0.153	72.3	238.9		388.5	3185	0.0246	96.8%	0.0845
17:20:12	63.7	66.3	2.7	0.151	72.3	238.9		388.5	3163	0.0228	97.0%	0.0807
17:21:12	59.3	62.0	2.7	0.149	72.3	239.0		388.5	3143	0.0211	97.1%	0.0761
17:22:12	54.6	57.3	2.7	0.149	72.3	238.9		388.5	3144	0.0194	97.3%	0.0718
17:23:12	50.6	53.3	2.7	0.151	72.3	239.0		388.5	3161	0.0181	97.4%	0.0688
17:24:12	46.3	49.0	2.7	0.151	72.2	238.9		388.4	3163	0.0166	97.5%	0.0639
17:25:12	42.1	44.8	2.7	0.149	72.2	238.9		388.4	3143	0.0150	97.7%	0.0599
17:26:12	41.0	43.7	2.7	0.150	72.2	238.9		388.4	3154	0.0147	97.8%	0.0578
17:27:12	37.7	40.4	2.7	0.148	72.2	238.9		388.4	3133	0.0134	97.9%	0.0550
17:28:12	35.1	37.8	2.7	0.150	72.2	238.9		388.4	3156	0.0125	98.0%	0.0524
17:29:12	33.4	36.1	2.7	0.148	72.2	238.9		388.4	3135	0.0119	98.1%	0.0506
17:30:12	31.2	33.9	2.7	0.154	72.2	238.9		388.4	3191	0.0113	98.1%	0.0473
17:31:12	29.3	32.0	2.7	0.150	72.2	238.9		388.4	3151	0.0105	98.2%	0.0450
17:32:12	27.6	30.2	2.7	0.151	72.2	238.9		388.4	3160	0.0099	98.3%	0.0432
17:33:12	25.6	28.3	2.7	0.147	72.2	238.9		388.4	3123	0.0091	98.4%	0.0416
17:34:12	24.4	27.0	2.7	0.150	72.2	238.9		388.4	3156	0.0087	98.4%	0.0399
17:35:12	23.8	26.5	2.7	0.150	72.2	238.9		388.4	3150	0.0085	98.5%	0.0388
17:36:12	22.3	25.0	2.7	0.151	72.2	238.9		388.4	3160	0.0080	98.6%	0.0360
17:37:12	21.2	23.9	2.7	0.149	72.2	238.9		388.4	3138	0.0075	98.6%	0.0345
17:38:12	20.6	23.3	2.7	0.148	72.2	239.0		388.4	3131	0.0073	98.7%	0.0333
17:39:12	19.6	22.3	2.7	0.150	72.2	239.0		388.4	3148	0.0070	98.7%	0.0325
17:40:12	18.1	20.8	2.6	0.148	72.1	239.0		388.3	3129	0.0064	98.8%	0.0312
17:41:12	17.4	20.0	2.6	0.150	72.1	239.0		388.3	3148	0.0062	98.8%	0.0303
17:42:12	16.8	19.4	2.6	0.150	72.1	239.0		388.3	3147	0.0060	98.9%	0.0280
17:43:12	16.2	18.8	2.6	0.151	72.1	238.9		388.3	3161	0.0058	98.9%	0.0269
17:44:12	16.2	18.8	2.6	0.149	72.1	239.0		388.3	3139	0.0058	99.0%	0.0260
17:45:12	15.5	18.1	2.6	0.148	72.0	239.0		388.3	3134	0.0055	99.0%	0.0255
17:46:12	14.6	17.1	2.6	0.148	71.9	239.0		388.2	3129	0.0052	99.0%	0.0247
17:47:12	14.1	16.7	2.6	0.150	71.9	238.9		388.2	3155	0.0051	99.1%	0.0241
17:48:12	13.4	16.0	2.6	0.150	71.9	239.0		388.2	3148	0.0048	99.1%	0.0220
17:49:12	13.3	15.9	2.6	0.148	71.9	238.9		388.1	3135	0.0047	99.1%	0.0211
17:50:12	12.5	15.0	2.5	0.149	71.8	239.0		388.1	3136	0.0044	99.2%	0.0203
17:51:12	12.2	14.7	2.5	0.148	71.7	239.0		388.1	3130	0.0043	99.2%	0.0200
17:52:12	12.2	14.7	2.6	0.146	71.7	239.0		388.0	3105	0.0043	99.2%	0.0196
17:53:12	11.4	14.0	2.5	0.149	71.7	239.0		388.0	3141	0.0041	99.3%	0.0190
17:54:12	11.2	13.8	2.5	0.150	71.7	239.0		388.0	3153	0.0040	99.3%	0.0172
17:55:12	10.9	13.4	2.5	0.149	71.7	239.0		388.0	3146	0.0039	99.3%	0.0164
17:56:12	10.5	13.0	2.5	0.146	71.7	239.0		388.0	3112	0.0037	99.4%	0.0158
17:57:12	10.5	13.0	2.5	0.149	71.7	239.0		388.0	3138	0.0037	99.4%	0.0157
17:58:12	10.4	12.9	2.5	0.147	71.6	239.0		388.0	3123	0.0037	99.4%	0.0153
17:59:12	9.7	12.1	2.5	0.151	71.6	239.0		387.9	3157	0.0035	99.4%	0.0150
18:00:12	9.5	11.9	2.4	0.148	71.5	239.0		387.9	3130	0.0034	99.5%	0.0132
18:01:12	9.5	11.9	2.4	0.148	71.5	239.0		387.9	3128	0.0034	99.5%	0.0125
18:02:12	9.3	11.8	2.5	0.148	71.5	239.0		387.9	3131	0.0033	99.5%	0.0121

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
18:03:12	9.1	11.5	2.4	0.147	71.4	239.0		387.8	3115	0.0032	99.5%	0.0120
18:04:12	8.4	10.9	2.4	0.149	71.4	239.0		387.8	3136	0.0030	99.6%	0.0116
18:05:12	8.4	10.9	2.4	0.147	71.4	239.0		387.8	3116	0.0030	99.6%	0.0115
18:06:12	8.3	10.7	2.4	0.148	71.4	239.0		387.8	3135	0.0029	99.6%	0.0098
18:07:12	7.7	10.1	2.4	0.150	71.4	239.0		387.8	3149	0.0028	99.6%	0.0091
18:08:12	7.5	9.9	2.4	0.146	71.4	239.0		387.8	3114	0.0026	99.7%	0.0088
18:09:12	7.5	9.9	2.4	0.152	71.4	239.0		387.8	3168	0.0027	99.7%	0.0088
18:10:12	7.5	9.9	2.4	0.148	71.4	239.0		387.8	3134	0.0027	99.7%	0.0086
18:11:12	7.5	9.9	2.4	0.146	71.3	239.0		387.7	3108	0.0026	99.7%	0.0085
18:12:12	7.3	9.7	2.4	0.147	71.3	239.0		387.8	3116	0.0026	99.7%	0.0069
18:13:12	6.7	9.1	2.4	0.148	71.3	239.0		387.8	3128	0.0024	99.8%	0.0064
18:14:12	6.6	9.0	2.4	0.147	71.3	239.0		387.7	3116	0.0023	99.8%	0.0062
18:15:12	6.6	9.0	2.4	0.146	71.3	239.0		387.7	3111	0.0023	99.8%	0.0061
18:16:12	6.6	9.0	2.4	0.147	71.2	239.0		387.7	3115	0.0023	99.8%	0.0059
18:17:12	6.6	9.0	2.4	0.147	71.2	239.0		387.7	3124	0.0023	99.8%	0.0059
18:18:12	6.6	9.0	2.4	0.146	71.2	239.0		387.6	3106	0.0023	99.8%	0.0043
18:19:12	5.8	8.1	2.4	0.147	71.1	239.0		387.6	3120	0.0020	99.9%	0.0040
18:20:12	5.5	7.9	2.3	0.147	71.1	239.0		387.6	3117	0.0020	99.9%	0.0038
18:21:12	5.6	7.9	2.3	0.147	71.1	239.0		387.6	3121	0.0020	99.9%	0.0037
18:22:12	5.6	7.9	2.3	0.147	71.1	239.0		387.6	3119	0.0020	99.9%	0.0036
18:23:12	5.6	7.9	2.3	0.147	71.0	239.0		387.5	3121	0.0020	99.9%	0.0035
18:24:12	5.5	7.9	2.4	0.147	71.0	239.0		387.5	3116	0.0020	99.9%	0.0020
18:25:12	5.5	7.9	2.4	0.146	71.0	239.0		387.5	3107	0.0019	99.9%	0.0019
18:26:12	5.2	7.6	2.4	0.148	71.0	239.0		387.5	3134	0.0019	100.0%	0.0019
18:27:12	5.0	7.4	2.4	0.145	71.0	239.0		387.5	3095	0.0018	100.0%	0.0018
18:28:12	4.6	7.0	2.3	0.146	70.9	239.0		387.5	3106	0.0016	100.0%	0.0016
18:29:12	4.4	6.8	2.3	0.146	70.9	239.0		387.4	3106	0.0016	100.0%	0.0016
	182.2	184.9		0.154	72.0	136.2		388.2	3189	13.18		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:39:52	0.0	0.8	1.2	0.212	62.2	345.2		381.1	3247	0.0000	0.0%	1.6307
9:40:52	77.6	78.8	1.2	0.214	60.8	339.8		380.0	3256	0.0293	0.3%	1.6308
9:41:52	151.4	152.6	1.1	0.210	61.2	335.1		380.3	3230	0.0566	0.8%	1.7232
9:42:52	235.8	236.9	1.1	0.210	62.1	329.3		381.0	3225	0.0878	1.7%	1.7697
9:43:52	222.1	223.3	1.1	0.211	62.7	326.8		381.5	3237	0.0830	2.5%	1.7158
9:44:52	252.0	253.2	1.1	0.207	63.5	324.0		382.0	3202	0.0930	3.5%	1.6509
9:45:52	247.6	248.7	1.1	0.206	64.1	322.3		382.5	3195	0.0910	4.4%	1.6307
9:46:52	245.4	246.6	1.1	0.201	64.8	321.1		383.0	3162	0.0892	5.2%	1.6015
9:47:52	286.6	287.7	1.1	0.204	65.4	317.4		383.4	3180	0.1046	6.3%	1.6666
9:48:52	325.7	326.8	1.1	0.205	65.2	314.4		383.3	3187	0.1192	7.4%	1.6819
9:49:52	358.0	359.1	1.1	0.205	65.1	310.6		383.2	3192	0.1312	8.7%	1.6328
9:50:52	338.7	339.9	1.2	0.202	65.1	309.8		383.2	3168	0.1232	10.0%	1.5579
9:51:52	420.0	421.1	1.2	0.201	65.4	304.5		383.4	3156	0.1521	11.5%	1.5397
9:52:52	468.1	469.3	1.2	0.199	65.6	300.6		383.6	3144	0.1688	13.1%	1.5124
9:53:52	419.8	420.9	1.2	0.200	65.8	300.6		383.7	3150	0.1516	14.6%	1.5620
9:54:52	391.1	392.2	1.2	0.206	66.1	300.6		383.9	3196	0.1432	16.0%	1.5627
9:55:52	334.2	335.3	1.2	0.203	66.0	300.6		383.9	3171	0.1214	17.2%	1.5016
9:56:52	295.3	296.5	1.2	0.203	66.0	300.6		383.9	3172	0.1073	18.3%	1.4347
9:57:52	274.9	276.2	1.2	0.201	65.9	300.6		383.8	3158	0.0995	19.3%	1.3876
9:58:52	248.4	249.6	1.2	0.203	66.0	300.6		383.8	3178	0.0905	20.2%	1.3435
9:59:52	224.1	225.3	1.2	0.205	65.5	300.6		383.5	3191	0.0820	21.0%	1.4104
10:00:52	208.4	209.8	1.3	0.202	65.0	300.6		383.1	3170	0.0759	21.7%	1.4195
10:01:52	205.6	207.0	1.5	0.195	65.2	300.6		383.2	3111	0.0734	22.5%	1.3802
10:02:52	205.3	206.8	1.5	0.203	65.7	300.6		383.6	3173	0.0747	23.2%	1.3273
10:03:52	193.1	194.6	1.5	0.199	66.0	300.6		383.9	3147	0.0697	23.9%	1.2881
10:04:52	189.0	190.5	1.5	0.202	66.2	300.6		384.0	3165	0.0685	24.6%	1.2531
10:05:52	184.9	186.3	1.4	0.202	66.3	300.6		384.1	3170	0.0672	25.2%	1.3284
10:06:52	179.3	180.7	1.4	0.198	66.4	300.6		384.1	3138	0.0645	25.9%	1.3436
10:07:52	169.3	170.6	1.3	0.208	66.5	300.6		384.2	3213	0.0623	26.5%	1.3068
10:08:52	162.0	163.3	1.3	0.215	66.7	300.6		384.3	3263	0.0605	27.1%	1.2526
10:09:52	157.9	159.1	1.2	0.207	66.6	300.6		384.3	3205	0.0579	27.7%	1.2184
10:10:52	149.9	151.1	1.2	0.204	66.6	300.6		384.3	3179	0.0545	28.2%	1.1845
10:11:52	149.7	150.9	1.2	0.199	66.6	300.6		384.3	3145	0.0539	28.7%	1.2612
10:12:52	143.6	144.8	1.2	0.200	66.7	300.6		384.4	3154	0.0519	29.2%	1.2791
10:13:52	141.5	142.7	1.2	0.198	66.8	300.5		384.4	3136	0.0508	29.7%	1.2445
10:14:52	133.5	134.7	1.2	0.203	66.8	300.6		384.4	3177	0.0485	30.2%	1.1921
10:15:52	130.8	132.0	1.2	0.201	66.9	300.5		384.5	3158	0.0473	30.7%	1.1605
10:16:52	125.6	126.8	1.2	0.202	66.9	300.5		384.5	3165	0.0455	31.1%	1.1300
10:17:52	124.4	125.6	1.2	0.202	66.9	300.5		384.5	3163	0.0450	31.6%	1.2073
10:18:52	120.4	121.5	1.2	0.202	67.0	300.6		384.6	3169	0.0436	32.0%	1.2273
10:19:52	117.2	118.4	1.1	0.203	67.0	300.5		384.6	3177	0.0426	32.4%	1.1937
10:20:52	114.4	115.6	1.1	0.200	67.0	300.5		384.6	3147	0.0412	32.8%	1.1435
10:21:52	112.3	113.5	1.1	0.196	67.0	300.5		384.6	3117	0.0401	33.2%	1.1132
10:22:52	110.4	111.5	1.1	0.199	67.0	300.5		384.6	3144	0.0397	33.6%	1.0845
10:23:52	108.5	109.6	1.1	0.196	67.0	300.5		384.6	3117	0.0387	34.0%	1.1623
10:24:52	103.3	104.4	1.1	0.197	66.9	300.5		384.5	3129	0.0370	34.4%	1.1836
10:25:52	101.6	102.7	1.1	0.194	66.9	300.5		384.5	3105	0.0361	34.7%	1.1511
10:26:52	98.5	99.6	1.1	0.195	66.8	300.5		384.4	3110	0.0351	35.1%	1.1023
10:27:52	95.7	96.8	1.1	0.195	66.8	300.5		384.4	3108	0.0340	35.4%	1.0732
10:28:52	88.4	89.5	1.1	0.201	66.1	300.5		383.9	3161	0.0320	35.7%	1.0448
10:29:52	91.2	92.3	1.1	0.197	65.8	300.5		383.7	3130	0.0327	36.1%	1.1236
10:30:52	91.7	92.7	1.1	0.197	66.2	300.5		384.0	3128	0.0329	36.4%	1.1467
10:31:52	89.4	90.5	1.1	0.195	66.1	300.5		383.9	3111	0.0319	36.7%	1.1150
10:32:52	88.6	89.6	1.1	0.197	66.4	300.5		384.1	3131	0.0318	37.0%	1.0673
10:33:52	82.2	83.2	1.0	0.198	66.2	300.6		384.0	3137	0.0295	37.3%	1.0391
10:34:52	119.7	120.8	1.1	0.194	66.2	298.4		384.0	3101	0.0425	37.7%	1.0127
10:35:52	202.6	203.7	1.1	0.194	66.4	291.4		384.1	3106	0.0721	38.4%	1.0909

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:36:52	321.7	322.9	1.2	0.197	66.5	285.2		384.2	3128	0.1152	39.6%	1.1138
10:37:52	380.3	381.5	1.2	0.196	66.5	279.4		384.2	3119	0.1358	40.9%	1.0831
10:38:52	434.9	436.1	1.2	0.195	66.3	273.0		384.1	3115	0.1552	42.4%	1.0355
10:39:52	402.9	404.2	1.2	0.197	66.4	270.3		384.2	3126	0.1443	43.9%	1.0096
10:40:52	404.8	406.1	1.2	0.194	66.6	268.0		384.3	3104	0.1439	45.3%	0.9702
10:41:52	538.9	540.1	1.2	0.197	66.7	263.5		384.3	3127	0.1929	47.2%	1.0188
10:42:52	514.1	515.3	1.2	0.193	66.8	259.1		384.4	3097	0.1822	49.0%	0.9986
10:43:52	570.4	571.6	1.2	0.196	66.7	253.4		384.4	3123	0.2039	51.0%	0.9473
10:44:52	588.0	589.1	1.2	0.194	66.2	249.0		384.0	3106	0.2093	53.1%	0.8803
10:45:52	664.4	665.6	1.2	0.194	66.4	244.0		384.1	3101	0.2360	55.4%	0.8653
10:46:52	693.5	694.7	1.2	0.194	66.4	238.7		384.1	3102	0.2464	57.9%	0.8263
10:47:52	765.6	766.8	1.2	0.190	66.7	232.9		384.3	3075	0.2695	60.5%	0.8259
10:48:52	807.6	808.8	1.2	0.193	66.8	227.1		384.5	3094	0.2859	63.3%	0.8164
10:49:52	708.1	709.3	1.2	0.193	66.9	226.1		384.5	3093	0.2506	65.8%	0.7433
10:50:52	615.7	616.9	1.2	0.191	66.9	226.1		384.5	3076	0.2167	68.0%	0.6711
10:51:52	550.6	551.8	1.2	0.193	66.9	226.1		384.5	3092	0.1948	69.9%	0.6294
10:52:52	499.3	500.5	1.2	0.194	66.9	226.1		384.5	3100	0.1771	71.6%	0.5799
10:53:52	442.3	443.5	1.2	0.193	66.7	226.1		384.4	3093	0.1566	73.2%	0.5563
10:54:52	412.6	413.8	1.2	0.194	66.8	226.1		384.5	3100	0.1464	74.6%	0.5304
10:55:52	374.9	376.1	1.2	0.195	66.9	226.1		384.5	3113	0.1336	75.9%	0.4927
10:56:52	341.7	342.9	1.2	0.194	67.0	226.1		384.6	3104	0.1213	77.1%	0.4543
10:57:52	282.0	283.4	1.4	0.194	66.3	226.1		384.0	3104	0.1003	78.1%	0.4345
10:58:52	301.5	302.9	1.4	0.193	66.7	226.1		384.4	3093	0.1068	79.2%	0.4028
10:59:52	278.2	279.6	1.5	0.192	66.8	226.1		384.5	3088	0.0983	80.2%	0.3997
11:00:52	263.7	265.2	1.5	0.193	66.9	226.1		384.5	3094	0.0934	81.1%	0.3840
11:01:52	253.9	255.4	1.5	0.192	66.9	226.1		384.5	3090	0.0898	82.0%	0.3592
11:02:52	241.0	242.5	1.5	0.192	66.9	226.1		384.5	3088	0.0852	82.8%	0.3330
11:03:52	231.5	232.9	1.5	0.193	66.8	226.1		384.4	3099	0.0821	83.6%	0.3342
11:04:52	219.3	220.8	1.4	0.191	66.8	226.1		384.4	3078	0.0773	84.4%	0.2960
11:05:52	213.2	214.6	1.4	0.192	66.8	226.1		384.4	3087	0.0753	85.1%	0.3014
11:06:52	205.4	206.8	1.3	0.209	66.8	226.1		384.5	3222	0.0757	85.9%	0.2906
11:07:52	199.9	201.3	1.3	0.163	66.8	226.1		384.4	2845	0.0651	86.5%	0.2694
11:08:52	186.3	187.6	1.3	0.123	66.8	226.1		384.4	2473	0.0527	87.0%	0.2478
11:09:52	186.2	187.5	1.3	0.197	66.9	226.1		384.5	3129	0.0667	87.7%	0.2521
11:10:52	175.5	176.8	1.3	0.103	66.9	226.1		384.5	2259	0.0454	88.2%	0.2187
11:11:52	171.3	172.6	1.3	0.202	66.7	226.1		384.4	3167	0.0621	88.8%	0.2261
11:12:52	168.7	170.0	1.3	0.198	66.6	226.1		384.3	3137	0.0606	89.4%	0.2149
11:13:52	163.0	164.3	1.3	0.198	66.6	226.1		384.3	3135	0.0585	89.9%	0.2043
11:14:52	158.0	159.3	1.3	0.201	66.5	226.1		384.2	3159	0.0571	90.5%	0.1951
11:15:52	151.8	153.2	1.3	0.198	66.5	226.1		384.2	3134	0.0545	91.0%	0.1855
11:16:52	147.3	148.7	1.4	0.201	66.4	226.1		384.1	3159	0.0533	91.6%	0.1734
11:17:52	144.3	145.8	1.5	0.201	66.3	226.1		384.1	3157	0.0522	92.1%	0.1640
11:18:52	137.7	139.2	1.5	0.199	66.3	226.1		384.1	3145	0.0496	92.6%	0.1543
11:19:52	132.5	133.9	1.5	0.201	66.4	226.1		384.1	3158	0.0479	93.1%	0.1458
11:20:52	127.2	128.7	1.5	0.200	66.4	226.1		384.2	3151	0.0459	93.5%	0.1380
11:21:52	122.6	124.2	1.6	0.202	66.4	226.1		384.2	3167	0.0445	93.9%	0.1310
11:22:52	114.7	116.4	1.6	0.203	66.3	226.1		384.1	3173	0.0417	94.4%	0.1201
11:23:52	108.6	110.2	1.7	0.202	66.3	226.1		384.1	3167	0.0394	94.7%	0.1118
11:24:52	102.1	103.8	1.6	0.202	66.2	226.1		384.0	3165	0.0370	95.1%	0.1047
11:25:52	96.8	98.5	1.6	0.199	66.3	226.1		384.0	3144	0.0349	95.5%	0.0978
11:26:52	90.7	92.4	1.6	0.201	66.3	226.1		384.0	3155	0.0328	95.8%	0.0921
11:27:52	86.3	88.0	1.6	0.201	66.2	226.1		384.0	3159	0.0312	96.1%	0.0865
11:28:52	80.5	82.1	1.6	0.203	66.3	226.1		384.1	3175	0.0293	96.4%	0.0784
11:29:52	74.5	76.1	1.6	0.201	66.3	226.1		384.1	3162	0.0270	96.6%	0.0724
11:30:52	70.0	71.6	1.6	0.198	66.4	226.1		384.1	3135	0.0251	96.9%	0.0676
11:31:52	64.5	66.1	1.7	0.198	66.6	226.1		384.3	3132	0.0231	97.1%	0.0630
11:32:52	60.2	61.9	1.7	0.199	66.8	226.1		384.4	3146	0.0217	97.3%	0.0593

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:33:52	56.0	57.9	1.9	0.201	66.9	226.1		384.5	3162	0.0202	97.5%	0.0552
11:34:52	50.5	52.8	2.3	0.203	66.9	226.2		384.5	3173	0.0183	97.7%	0.0491
11:35:52	46.6	49.3	2.8	0.202	66.9	226.1		384.5	3166	0.0169	97.9%	0.0454
11:36:52	43.2	45.7	2.6	0.199	66.9	226.1		384.5	3143	0.0155	98.0%	0.0425
11:37:52	40.0	42.3	2.4	0.200	66.8	226.1		384.5	3148	0.0144	98.2%	0.0398
11:38:52	37.3	39.5	2.2	0.200	66.8	226.1		384.5	3153	0.0134	98.3%	0.0376
11:39:52	34.3	36.5	2.1	0.201	66.9	226.1		384.5	3157	0.0124	98.4%	0.0350
11:40:52	31.3	33.4	2.1	0.199	66.8	226.1		384.5	3141	0.0113	98.5%	0.0307
11:41:52	29.1	31.1	2.0	0.200	66.9	226.1		384.5	3148	0.0105	98.6%	0.0285
11:42:52	27.0	28.9	1.9	0.198	66.7	226.1		384.3	3137	0.0097	98.7%	0.0270
11:43:52	25.1	27.0	1.8	0.201	66.6	226.1		384.3	3160	0.0091	98.8%	0.0255
11:44:52	23.7	25.4	1.7	0.203	66.5	226.1		384.2	3178	0.0086	98.9%	0.0241
11:45:52	22.0	23.7	1.7	0.200	66.4	226.1		384.2	3154	0.0079	99.0%	0.0226
11:46:52	20.9	22.6	1.7	0.203	66.5	226.1		384.3	3172	0.0076	99.1%	0.0195
11:47:52	19.2	20.8	1.7	0.200	66.5	226.2		384.2	3153	0.0069	99.1%	0.0180
11:48:52	18.2	19.8	1.6	0.201	66.4	226.1		384.2	3156	0.0066	99.2%	0.0173
11:49:52	17.1	18.7	1.6	0.202	66.4	226.1		384.1	3164	0.0062	99.3%	0.0164
11:50:52	16.0	17.5	1.6	0.202	66.4	226.1		384.1	3164	0.0058	99.3%	0.0155
11:51:52	15.0	16.5	1.5	0.202	66.4	226.1		384.1	3169	0.0054	99.4%	0.0146
11:52:52	14.3	15.8	1.5	0.201	66.4	226.1		384.1	3157	0.0052	99.4%	0.0119
11:53:52	13.2	14.7	1.5	0.201	66.5	226.1		384.2	3158	0.0048	99.5%	0.0111
11:54:52	12.4	13.9	1.5	0.201	66.4	226.1		384.2	3159	0.0045	99.5%	0.0107
11:55:52	11.9	13.3	1.4	0.202	66.4	226.1		384.2	3169	0.0043	99.6%	0.0101
11:56:52	11.3	12.8	1.4	0.204	66.3	226.1		384.1	3186	0.0041	99.6%	0.0097
11:57:52	10.4	11.8	1.4	0.199	66.3	226.1		384.0	3140	0.0037	99.6%	0.0092
11:58:52	10.4	11.8	1.4	0.200	66.3	226.1		384.1	3152	0.0038	99.7%	0.0067
11:59:52	9.7	11.0	1.4	0.200	66.4	226.1		384.1	3155	0.0035	99.7%	0.0064
12:00:52	9.3	10.7	1.3	0.203	66.3	226.1		384.1	3171	0.0034	99.7%	0.0062
12:01:52	8.5	9.8	1.3	0.202	66.2	226.1		384.0	3169	0.0031	99.8%	0.0058
12:02:52	8.5	9.8	1.3	0.204	66.3	226.1		384.1	3179	0.0031	99.8%	0.0056
12:03:52	8.2	9.4	1.2	0.200	66.3	226.1		384.0	3150	0.0029	99.8%	0.0055
12:04:52	8.1	8.9	0.8	0.204	66.0	226.1		383.9	3186	0.0029	99.9%	0.0029
12:05:52	7.9	8.8	0.9	0.202	65.9	226.1		383.8	3163	0.0029	99.9%	0.0029
12:06:52	7.9	8.8	0.9	0.200	66.3	226.1		384.1	3150	0.0029	99.9%	0.0029
12:07:52	7.6	8.5	0.9	0.202	66.6	226.1		384.3	3165	0.0027	100.0%	0.0027
12:08:52	6.9	7.9	0.9	0.201	66.7	226.1		384.4	3156	0.0025	100.0%	0.0025
12:09:52	6.9	7.9	0.9	0.203	66.8	226.1		384.4	3174	0.0025	100.0%	0.0025
	187.4	188.7		0.198	66.3	119.1		384.0	3137	10.12		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:40:13	0.6	2.0	1.4	0.210	63.0	357.0		381.6	3295	0.0002	0.0%	1.9885
13:41:12	16.1	17.5	1.4	0.203	63.6	354.9		382.1	3239	0.0060	0.1%	1.9671
13:42:12	111.6	113.0	1.4	0.199	64.4	348.7		382.7	3213	0.0412	0.4%	1.9393
13:43:12	235.0	236.4	1.4	0.202	65.0	342.5		383.1	3234	0.0873	1.2%	1.9441
13:44:12	337.3	338.7	1.3	0.198	65.3	336.1		383.3	3205	0.1241	2.2%	1.8826
13:45:12	380.1	381.4	1.3	0.200	65.6	331.3		383.6	3218	0.1403	3.4%	1.9751
13:46:12	423.1	424.4	1.3	0.202	65.7	325.1		383.7	3235	0.1570	4.8%	1.9882
13:47:12	411.5	412.8	1.3	0.200	65.8	322.7		383.7	3220	0.1520	6.1%	1.9611
13:48:12	350.9	352.1	1.3	0.201	65.9	322.7		383.8	3228	0.1299	7.2%	1.8980
13:49:12	314.4	315.6	1.3	0.203	66.0	324.1		383.8	3240	0.1168	8.2%	1.8568
13:50:12	269.9	271.1	1.3	0.201	66.0	322.9		383.8	3229	0.0999	9.0%	1.7585
13:51:12	316.0	317.2	1.2	0.205	65.9	318.3		383.8	3257	0.1180	10.0%	1.8348
13:52:12	496.1	497.4	1.2	0.202	65.9	311.4		383.8	3233	0.1839	11.6%	1.8313
13:53:13	558.7	559.9	1.2	0.201	65.9	305.7		383.8	3226	0.2066	13.4%	1.8092
13:54:12	586.1	587.4	1.2	0.203	66.0	299.8		383.8	3245	0.2180	15.2%	1.7682
13:55:12	578.1	579.3	1.2	0.202	65.9	295.8		383.8	3236	0.2145	17.1%	1.7400
13:56:12	512.1	513.4	1.2	0.202	66.0	294.0		383.9	3230	0.1896	18.7%	1.6586
13:57:12	588.0	589.2	1.2	0.199	66.1	289.0		383.9	3207	0.2161	20.5%	1.7168
13:58:12	484.1	485.3	1.2	0.200	66.0	288.7		383.8	3218	0.1786	22.1%	1.6474
13:59:12	390.1	391.2	1.2	0.204	65.9	288.7		383.8	3254	0.1455	23.3%	1.6026
14:00:12	332.1	333.5	1.4	0.204	65.3	288.7		383.4	3252	0.1240	24.4%	1.5501
14:01:12	326.4	327.7	1.2	0.201	65.5	288.8		383.5	3223	0.1207	25.4%	1.5256
14:02:12	293.9	295.2	1.3	0.202	65.9	288.8		383.8	3232	0.1089	26.3%	1.4690
14:03:12	288.5	290.0	1.5	0.204	66.1	288.8		383.9	3249	0.1074	27.2%	1.5007
14:04:12	270.5	272.0	1.5	0.203	66.1	288.8		383.9	3244	0.1006	28.1%	1.4688
14:05:12	237.7	239.1	1.4	0.197	66.1	288.8		383.9	3197	0.0871	28.8%	1.4571
14:06:12	220.6	221.9	1.4	0.200	66.2	288.8		384.0	3221	0.0814	29.5%	1.4262
14:07:13	206.3	207.7	1.3	0.198	66.2	288.7		384.0	3205	0.0758	30.2%	1.4049
14:08:12	196.2	197.5	1.3	0.202	66.1	288.8		383.9	3232	0.0727	30.8%	1.3601
14:09:12	191.8	193.0	1.3	0.200	66.1	288.8		383.9	3214	0.0706	31.4%	1.3932
14:10:12	192.6	193.8	1.3	0.199	66.1	288.8		383.9	3208	0.0708	32.0%	1.3682
14:11:12	186.1	187.3	1.2	0.203	66.1	288.8		383.9	3243	0.0692	32.6%	1.3700
14:12:12	177.6	178.8	1.2	0.204	66.1	288.7		383.9	3249	0.0661	33.2%	1.3448
14:13:12	170.4	171.6	1.2	0.203	66.0	288.7		383.9	3241	0.0633	33.7%	1.3291
14:14:12	165.5	166.7	1.2	0.202	66.1	288.7		383.9	3231	0.0613	34.2%	1.2874
14:15:12	165.3	166.4	1.2	0.199	66.0	288.7		383.9	3211	0.0608	34.8%	1.3226
14:16:12	157.6	158.7	1.1	0.202	66.1	288.7		383.9	3232	0.0584	35.3%	1.2974
14:17:12	158.7	159.8	1.1	0.200	66.3	288.7		384.0	3216	0.0585	35.8%	1.3008
14:18:12	160.6	161.8	1.2	0.205	66.6	288.7		384.3	3261	0.0600	36.3%	1.2786
14:19:12	150.0	151.2	1.2	0.205	66.7	288.7		384.4	3262	0.0560	36.8%	1.2658
14:20:12	145.2	146.4	1.2	0.200	66.8	288.7		384.4	3217	0.0535	37.2%	1.2262
14:21:12	151.1	152.3	1.2	0.202	66.9	288.7		384.5	3232	0.0559	37.7%	1.2618
14:22:12	138.5	139.8	1.3	0.204	67.1	288.7		384.7	3250	0.0515	38.1%	1.2390
14:23:12	133.7	135.0	1.3	0.203	67.3	288.7		384.8	3243	0.0496	38.6%	1.2423
14:24:12	138.0	139.3	1.3	0.202	67.4	288.7		384.9	3236	0.0510	39.0%	1.2187
14:25:12	131.1	132.4	1.3	0.202	67.5	288.6		385.0	3230	0.0484	39.4%	1.2098
14:26:12	129.9	131.2	1.3	0.202	67.7	289.3		385.1	3235	0.0480	39.8%	1.1727
14:27:12	130.6	132.0	1.3	0.207	67.8	287.9		385.2	3275	0.0489	40.2%	1.2059
14:28:12	221.9	223.3	1.3	0.211	67.9	281.5		385.3	3305	0.0838	40.9%	1.1875
14:29:12	319.9	321.2	1.3	0.216	67.9	276.7		385.2	3341	0.1221	42.0%	1.1928
14:30:12	405.7	407.0	1.3	0.215	67.8	270.8		385.2	3334	0.1545	43.3%	1.1676
14:31:12	460.8	462.0	1.3	0.211	67.6	266.8		385.0	3308	0.1742	44.8%	1.1614
14:32:12	437.0	438.3	1.3	0.214	67.6	265.3		385.0	3329	0.1662	46.2%	1.1247
14:33:12	490.4	491.6	1.2	0.214	67.4	259.3		384.9	3326	0.1865	47.8%	1.1570
14:34:12	505.2	506.4	1.2	0.213	67.2	254.1		384.7	3323	0.1920	49.5%	1.1038
14:35:12	574.9	576.1	1.2	0.211	67.0	249.9		384.6	3303	0.2173	51.3%	1.0707
14:36:12	525.9	527.1	1.2	0.211	67.1	249.5		384.7	3305	0.1988	53.0%	1.0131

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:37:12	454.9	456.2	1.3	0.214	67.2	249.5		384.7	3325	0.1730	54.5%	0.9872
14:38:12	375.9	377.2	1.3	0.216	66.9	249.5		384.5	3345	0.1439	55.7%	0.9585
14:39:12	359.0	360.2	1.3	0.217	66.9	249.5		384.5	3355	0.1378	56.9%	0.9705
14:40:12	325.3	326.6	1.3	0.218	66.8	249.5		384.4	3358	0.1250	58.0%	0.9118
14:41:12	292.1	293.5	1.4	0.213	66.7	249.5		384.3	3323	0.1111	58.9%	0.8535
14:42:12	267.5	268.9	1.5	0.212	66.5	249.5		384.2	3316	0.1016	59.8%	0.8143
14:43:13	246.0	247.6	1.5	0.213	66.6	249.5		384.3	3317	0.0934	60.6%	0.8142
14:44:12	217.7	219.2	1.6	0.211	66.4	249.5		384.2	3306	0.0824	61.3%	0.8146
14:45:12	213.3	214.8	1.5	0.212	66.6	249.5		384.3	3315	0.0810	62.0%	0.8327
14:46:12	199.3	200.8	1.5	0.214	66.6	249.5		384.3	3328	0.0759	62.6%	0.7867
14:47:49	184.4	185.9	1.5	0.213	66.7	249.5		384.4	3318	0.0701	63.2%	0.7423
14:48:12	168.0	169.5	1.5	0.216	66.8	249.5		384.4	3343	0.0643	63.8%	0.7128
14:49:12	163.0	164.5	1.5	0.213	66.7	249.5		384.4	3320	0.0620	64.3%	0.7208
14:50:13	156.8	158.2	1.4	0.215	66.8	249.5		384.4	3339	0.0599	64.8%	0.7322
14:51:12	146.8	148.1	1.4	0.212	66.7	249.5		384.4	3314	0.0557	65.3%	0.7518
14:52:13	132.5	133.9	1.4	0.216	66.2	249.5		384.0	3347	0.0508	65.7%	0.7108
14:53:13	134.6	136.0	1.4	0.213	66.5	249.5		384.2	3323	0.0512	66.2%	0.6723
14:54:12	131.6	133.0	1.3	0.216	66.7	249.5		384.3	3347	0.0504	66.6%	0.6485
14:55:12	123.5	124.9	1.3	0.213	66.6	249.4		384.3	3318	0.0469	67.0%	0.6588
14:56:12	116.7	118.1	1.3	0.216	66.4	249.3		384.1	3343	0.0447	67.4%	0.6723
14:57:12	113.0	114.3	1.3	0.214	66.3	249.0		384.1	3328	0.0431	67.8%	0.6961
14:58:12	104.5	105.8	1.3	0.214	66.3	249.6		384.1	3326	0.0398	68.1%	0.6600
14:59:12	96.1	97.4	1.3	0.210	66.2	249.6		384.0	3299	0.0363	68.4%	0.6211
15:00:12	90.6	91.9	1.3	0.214	66.2	249.7		384.0	3325	0.0345	68.7%	0.5980
15:01:13	83.8	85.1	1.3	0.213	66.3	249.7		384.1	3323	0.0319	69.0%	0.6119
15:02:12	81.8	83.1	1.3	0.213	66.3	249.7		384.1	3322	0.0311	69.2%	0.6276
15:03:12	80.0	81.2	1.3	0.215	66.5	249.7		384.2	3333	0.0305	69.5%	0.6530
15:04:12	77.2	78.4	1.3	0.214	66.7	249.7		384.3	3327	0.0294	69.8%	0.6202
15:05:12	73.9	75.1	1.3	0.212	66.8	249.7		384.4	3313	0.0280	70.0%	0.5847
15:06:12	71.4	72.7	1.2	0.214	66.8	249.7		384.5	3329	0.0272	70.2%	0.5635
15:07:12	68.5	69.7	1.2	0.209	66.8	249.7		384.4	3288	0.0258	70.4%	0.5800
15:08:13	66.2	67.5	1.2	0.214	66.8	249.7		384.4	3329	0.0252	70.7%	0.5964
15:09:12	63.5	64.7	1.2	0.217	66.8	249.7		384.4	3354	0.0244	70.9%	0.6225
15:10:12	58.5	59.7	1.2	0.220	66.4	249.1		384.2	3378	0.0226	71.1%	0.5908
15:11:12	68.2	69.4	1.3	0.218	66.4	247.4		384.2	3358	0.0262	71.3%	0.5567
15:12:12	102.7	104.0	1.3	0.205	66.7	244.3		384.4	3257	0.0383	71.6%	0.5363
15:13:12	227.7	229.1	1.4	0.196	67.0	239.8		384.6	3182	0.0829	72.3%	0.5542
15:14:12	288.0	289.3	1.3	0.199	67.1	234.9		384.7	3212	0.1058	73.2%	0.5712
15:15:12	376.2	377.5	1.2	0.196	67.1	229.3		384.7	3184	0.1370	74.4%	0.5981
15:16:12	394.9	396.1	1.2	0.196	67.1	226.6		384.7	3188	0.1440	75.6%	0.5681
15:17:12	384.2	385.4	1.2	0.198	67.0	226.2		384.6	3198	0.1406	76.8%	0.5305
15:18:12	346.1	347.4	1.3	0.196	67.0	225.2		384.6	3182	0.1260	77.9%	0.4980
15:19:12	392.2	393.4	1.2	0.192	67.1	219.8		384.7	3149	0.1413	79.1%	0.4713
15:20:12	422.9	424.1	1.2	0.194	67.0	213.6		384.6	3170	0.1534	80.4%	0.4654
15:21:13	492.2	493.4	1.2	0.195	67.0	209.4		384.6	3177	0.1789	82.0%	0.4611
15:22:12	442.6	444.2	1.6	0.196	67.0	209.2		384.6	3188	0.1615	83.3%	0.4242
15:23:12	419.1	420.3	1.3	0.193	66.9	209.2		384.5	3161	0.1516	84.6%	0.3899
15:24:12	403.9	405.2	1.3	0.197	67.1	207.6		384.7	3190	0.1474	85.9%	0.3720
15:25:12	346.5	347.9	1.4	0.194	67.0	207.6		384.6	3166	0.1255	87.0%	0.3301
15:26:12	328.2	329.5	1.4	0.195	67.0	207.6		384.6	3181	0.1194	88.0%	0.3120
15:27:12	291.2	292.5	1.3	0.196	67.0	207.6		384.6	3184	0.1061	88.9%	0.2822
15:28:12	273.3	274.8	1.4	0.197	67.1	207.6		384.6	3190	0.0997	89.7%	0.2627
15:29:13	247.6	249.3	1.6	0.194	67.0	207.6		384.6	3166	0.0897	90.5%	0.2384
15:30:12	221.7	223.3	1.6	0.193	67.0	207.6		384.6	3164	0.0803	91.2%	0.2246
15:31:12	204.3	205.8	1.5	0.194	67.1	207.6		384.7	3167	0.0740	91.8%	0.2045
15:32:12	182.9	184.4	1.5	0.193	67.2	207.6		384.7	3162	0.0662	92.4%	0.1926
15:33:12	169.9	171.6	1.6	0.176	67.3	207.6		384.8	3023	0.0587	92.9%	0.1761

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:34:12	155.1	157.3	2.2	0.188	67.3	207.6		384.8	3120	0.0553	93.4%	0.1630
15:35:12	146.0	147.6	1.6	0.167	67.4	207.6		384.9	2941	0.0491	93.8%	0.1487
15:36:12	143.2	144.7	1.6	0.184	67.4	207.6		384.9	3084	0.0505	94.2%	0.1444
15:37:12	132.1	133.6	1.5	0.155	67.5	207.6		385.0	2829	0.0427	94.6%	0.1305
15:38:12	124.3	125.8	1.5	0.196	67.5	207.6		385.0	3188	0.0453	95.0%	0.1264
15:39:13	115.0	116.4	1.5	0.198	67.5	207.6		385.0	3205	0.0421	95.3%	0.1174
15:40:12	106.6	108.1	1.4	0.195	67.5	207.6		385.0	3178	0.0387	95.7%	0.1076
15:41:12	100.3	101.8	1.4	0.193	67.5	207.6		385.0	3163	0.0363	96.0%	0.0996
15:42:12	93.5	94.8	1.4	0.196	67.5	207.6		385.0	3184	0.0340	96.3%	0.0939
15:43:12	88.2	89.6	1.4	0.193	67.5	207.6		385.0	3165	0.0319	96.5%	0.0878
15:44:12	82.2	83.6	1.3	0.194	67.6	207.6		385.0	3173	0.0298	96.8%	0.0811
15:45:12	76.5	77.8	1.3	0.194	67.5	207.6		384.9	3172	0.0277	97.0%	0.0752
15:46:12	73.0	74.3	1.3	0.192	67.5	207.6		384.9	3157	0.0263	97.3%	0.0689
15:47:12	67.2	68.6	1.3	0.195	67.3	207.6		384.8	3176	0.0244	97.5%	0.0633
15:48:12	64.3	65.6	1.3	0.194	67.3	207.6		384.8	3173	0.0233	97.7%	0.0599
15:49:12	60.1	61.4	1.3	0.192	67.4	207.6		384.9	3157	0.0217	97.9%	0.0559
15:50:12	55.1	56.4	1.3	0.191	67.4	207.6		384.8	3143	0.0198	98.0%	0.0513
15:51:12	51.7	53.0	1.3	0.193	67.3	207.6		384.8	3159	0.0187	98.2%	0.0475
15:52:12	48.7	50.0	1.3	0.197	67.4	207.6		384.9	3192	0.0178	98.3%	0.0426
15:53:12	43.6	44.8	1.3	0.198	67.5	207.5		384.9	3201	0.0159	98.5%	0.0389
15:54:12	40.6	41.8	1.3	0.197	67.5	207.6		384.9	3195	0.0148	98.6%	0.0365
15:55:12	38.6	39.9	1.3	0.197	67.5	207.5		385.0	3195	0.0141	98.7%	0.0342
15:56:12	35.8	37.1	1.3	0.193	67.6	207.6		385.0	3162	0.0130	98.8%	0.0315
15:57:13	33.2	34.5	1.3	0.192	67.6	207.5		385.0	3151	0.0120	98.9%	0.0288
15:58:12	30.3	31.4	1.2	0.192	67.6	207.6		385.0	3155	0.0109	99.0%	0.0248
15:59:12	27.9	28.9	1.0	0.195	67.6	207.6		385.0	3180	0.0101	99.1%	0.0229
16:00:12	26.2	27.1	0.9	0.196	67.6	207.5		385.0	3182	0.0095	99.2%	0.0217
16:01:12	24.1	25.0	0.9	0.195	67.6	207.6		385.0	3181	0.0088	99.3%	0.0201
16:02:12	22.0	22.9	0.9	0.197	67.6	207.6		385.0	3197	0.0080	99.3%	0.0185
16:03:12	19.7	20.7	1.0	0.196	67.6	207.5		385.0	3186	0.0072	99.4%	0.0169
16:04:12	18.3	19.3	0.9	0.196	67.6	207.5		385.0	3189	0.0067	99.5%	0.0139
16:05:12	16.7	17.6	1.0	0.196	67.6	207.5		385.0	3183	0.0061	99.5%	0.0128
16:06:12	16.2	17.1	0.9	0.196	67.6	207.5		385.1	3189	0.0059	99.6%	0.0122
16:07:12	15.1	16.0	1.0	0.196	67.6	207.5		385.0	3186	0.0055	99.6%	0.0113
16:08:12	13.7	14.7	1.0	0.195	67.7	207.5		385.1	3177	0.0050	99.6%	0.0105
16:09:12	12.5	13.7	1.1	0.196	67.6	207.5		385.1	3184	0.0046	99.7%	0.0097
16:10:12	11.7	12.9	1.2	0.198	67.7	207.5		385.1	3204	0.0043	99.7%	0.0072
16:11:12	10.9	12.1	1.2	0.195	67.6	207.5		385.0	3177	0.0040	99.8%	0.0067
16:12:13	10.1	11.4	1.3	0.194	67.6	207.5		385.0	3167	0.0037	99.8%	0.0063
16:13:12	9.5	10.8	1.3	0.194	67.6	207.5		385.0	3172	0.0034	99.8%	0.0059
16:14:12	8.8	10.1	1.3	0.196	67.6	207.5		385.0	3189	0.0032	99.8%	0.0055
16:15:12	8.5	9.8	1.3	0.198	67.6	207.5		385.0	3199	0.0031	99.9%	0.0051
16:16:12	7.9	9.2	1.3	0.198	67.5	207.5		384.9	3200	0.0029	99.9%	0.0029
16:17:13	7.7	8.9	1.3	0.195	67.5	207.5		384.9	3177	0.0028	99.9%	0.0028
16:18:12	7.2	8.5	1.3	0.196	67.5	207.5		384.9	3183	0.0026	99.9%	0.0026
16:19:12	6.6	7.8	1.3	0.199	67.4	207.5		384.9	3207	0.0024	100.0%	0.0024
16:20:13	6.3	7.6	1.2	0.198	67.2	207.5		384.7	3203	0.0023	100.0%	0.0023
16:21:12	5.5	6.7	1.2	0.194	67.1	207.5		384.6	3173	0.0020	100.0%	0.0020
2:40:59	194.6	195.9		0.202	66.8	149.5		384.4	3231	11.70		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:49:18	0.0	3.9	4.8	0.233	66.3	380.4		384.1	3251	0.0000	0.0%	1.1415
9:50:18	11.7	16.6	4.9	0.227	66.4	375.8		384.1	3206	0.0043	0.1%	1.1401
9:51:18	42.5	47.4	4.9	0.231	66.4	369.5		384.2	3233	0.0158	0.3%	1.1306
9:52:18	72.7	77.6	4.9	0.228	66.5	363.6		384.2	3214	0.0268	0.7%	1.1092
9:53:18	109.7	114.6	4.8	0.228	66.6	359.9		384.3	3215	0.0404	1.3%	1.0995
9:54:18	149.0	153.8	4.8	0.229	66.7	357.2		384.4	3218	0.0549	2.1%	1.1372
9:55:18	142.6	147.5	4.9	0.229	66.8	357.2		384.4	3221	0.0526	2.9%	1.1415
9:56:18	129.0	133.8	4.8	0.228	66.8	357.2		384.4	3215	0.0475	3.6%	1.1358
9:57:18	128.8	133.6	4.8	0.229	66.8	357.2		384.5	3223	0.0475	4.3%	1.1148
9:58:18	123.9	128.7	4.8	0.227	66.8	357.3		384.5	3207	0.0455	5.0%	1.0824
9:59:18	133.0	137.8	4.8	0.231	66.8	356.0		384.5	3233	0.0492	5.7%	1.0591
10:00:18	154.3	159.2	4.9	0.229	66.6	350.0		384.3	3221	0.0569	6.5%	1.0823
10:01:18	167.9	172.8	4.9	0.230	66.3	345.8		384.1	3228	0.0621	7.4%	1.0889
10:02:18	197.2	202.0	4.9	0.231	66.1	339.1		383.9	3232	0.0730	8.5%	1.0884
10:03:18	240.1	245.0	4.9	0.228	65.9	332.6		383.8	3215	0.0885	9.8%	1.0673
10:04:18	229.5	234.2	4.7	0.227	65.9	330.6		383.8	3205	0.0843	11.1%	1.0369
10:05:18	197.0	201.6	4.7	0.223	66.1	330.6		383.9	3177	0.0717	12.1%	1.0099
10:06:18	192.7	197.3	4.6	0.227	66.2	330.6		384.0	3209	0.0709	13.2%	1.0254
10:07:18	187.1	191.6	4.5	0.224	66.3	330.6		384.1	3188	0.0683	14.2%	1.0269
10:08:18	181.2	185.7	4.5	0.223	66.4	330.6		384.1	3181	0.0660	15.2%	1.0153
10:09:18	182.5	186.9	4.4	0.223	66.4	330.6		384.2	3177	0.0664	16.2%	0.9788
10:10:18	160.8	165.1	4.3	0.224	66.5	330.6		384.2	3183	0.0586	17.0%	0.9526
10:11:18	157.4	161.7	4.3	0.227	66.6	330.6		384.3	3209	0.0578	17.9%	0.9382
10:12:18	158.0	162.4	4.4	0.230	66.6	330.5		384.3	3225	0.0583	18.8%	0.9546
10:13:18	141.6	146.0	4.4	0.245	66.6	330.5		384.3	3332	0.0540	19.6%	0.9585
10:14:18	154.2	158.8	4.6	0.244	66.6	330.6		384.3	3322	0.0587	20.4%	0.9493
10:15:18	135.5	140.4	4.9	0.243	66.6	330.6		384.3	3316	0.0514	21.2%	0.9124
10:16:18	128.4	133.3	5.0	0.244	66.6	330.5		384.3	3323	0.0488	21.9%	0.8940
10:17:18	129.9	134.9	5.0	0.240	66.6	330.6		384.3	3300	0.0491	22.6%	0.8804
10:18:18	118.8	124.0	5.2	0.241	66.6	330.6		384.3	3302	0.0449	23.3%	0.8962
10:19:18	117.5	122.7	5.2	0.243	66.6	330.6		384.3	3316	0.0446	24.0%	0.9045
10:20:18	121.4	126.6	5.2	0.240	66.6	330.5		384.3	3300	0.0459	24.6%	0.8906
10:21:18	116.5	121.7	5.2	0.238	66.6	330.5		384.3	3284	0.0438	25.3%	0.8610
10:22:18	109.9	114.9	5.0	0.238	66.5	330.6		384.2	3287	0.0413	25.9%	0.8452
10:23:18	108.0	112.9	4.9	0.236	66.6	330.5		384.3	3268	0.0404	26.5%	0.8313
10:24:18	108.5	113.2	4.8	0.236	66.6	330.6		384.3	3272	0.0406	27.1%	0.8513
10:25:18	111.2	115.9	4.7	0.239	66.6	330.5		384.3	3290	0.0419	27.7%	0.8599
10:26:18	103.6	108.3	4.7	0.234	66.6	330.5		384.3	3259	0.0386	28.3%	0.8448
10:27:18	108.1	112.8	4.7	0.237	66.6	330.5		384.3	3279	0.0406	28.9%	0.8172
10:28:18	106.4	111.0	4.6	0.238	66.6	330.5		384.3	3284	0.0400	29.5%	0.8038
10:29:18	104.2	108.8	4.6	0.237	66.5	330.5		384.2	3275	0.0391	30.1%	0.7909
10:30:18	105.8	110.4	4.6	0.237	66.6	330.5		384.3	3280	0.0397	30.6%	0.8107
10:31:18	104.1	108.6	4.5	0.241	66.6	330.5		384.3	3303	0.0393	31.2%	0.8180
10:32:18	94.3	98.8	4.5	0.237	66.4	330.5		384.2	3277	0.0354	31.7%	0.8061
10:33:18	99.1	103.5	4.4	0.242	66.4	330.5		384.1	3308	0.0375	32.3%	0.7766
10:34:18	97.9	102.3	4.4	0.236	66.4	330.5		384.1	3267	0.0366	32.8%	0.7638
10:35:18	91.4	95.7	4.4	0.234	66.4	330.5		384.2	3254	0.0340	33.4%	0.7518
10:36:18	92.3	96.7	4.4	0.239	66.4	330.5		384.2	3291	0.0348	33.9%	0.7709
10:37:18	90.1	94.5	4.3	0.238	66.5	330.5		384.2	3281	0.0339	34.4%	0.7787
10:38:18	86.6	90.8	4.3	0.239	66.4	330.5		384.2	3291	0.0326	34.8%	0.7707
10:39:18	86.7	90.9	4.2	0.244	66.4	330.5		384.2	3324	0.0330	35.3%	0.7390
10:40:18	79.9	84.0	4.2	0.242	66.5	330.5		384.2	3308	0.0303	35.8%	0.7272
10:41:18	81.8	85.9	4.2	0.239	66.5	330.6		384.2	3288	0.0308	36.2%	0.7177
10:42:18	80.2	84.4	4.2	0.237	66.6	330.6		384.3	3278	0.0301	36.7%	0.7361
10:43:18	86.6	90.7	4.1	0.239	66.6	327.4		384.3	3289	0.0326	37.2%	0.7448
10:44:18	123.2	127.4	4.2	0.241	66.6	320.6		384.3	3306	0.0466	37.9%	0.7381
10:45:18	135.9	140.0	4.1	0.241	66.6	314.5		384.3	3303	0.0514	38.6%	0.7060

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:46:18	168.5	172.5	4.0	0.240	66.6	308.4		384.3	3300	0.0637	39.6%	0.6969
10:47:18	223.3	227.3	4.0	0.243	66.6	301.6		384.3	3321	0.0849	40.8%	0.6869
10:48:18	231.9	235.9	4.0	0.240	66.7	296.9		384.3	3297	0.0875	42.1%	0.7060
10:49:18	242.2	246.2	4.0	0.242	66.7	292.1		384.3	3308	0.0917	43.5%	0.7122
10:50:18	264.7	268.7	4.0	0.242	66.7	291.3		384.4	3312	0.1004	45.0%	0.6915
10:51:18	237.0	241.0	4.0	0.244	66.7	291.4		384.4	3326	0.0902	46.3%	0.6547
10:52:18	229.4	233.3	3.9	0.244	66.7	291.3		384.4	3326	0.0873	47.6%	0.6332
10:53:18	222.5	226.4	4.0	0.242	66.8	291.0		384.4	3314	0.0844	48.8%	0.6020
10:54:18	226.5	230.7	4.1	0.241	66.9	288.7		384.5	3306	0.0857	50.1%	0.6185
10:55:18	249.4	253.7	4.3	0.241	66.9	283.1		384.5	3304	0.0943	51.5%	0.6205
10:56:18	269.8	274.2	4.5	0.239	66.9	277.5		384.5	3291	0.1016	53.0%	0.5911
10:57:18	253.0	257.4	4.4	0.245	66.9	277.1		384.5	3332	0.0965	54.4%	0.5644
10:58:18	259.8	264.2	4.4	0.243	66.9	274.0		384.5	3315	0.0986	55.9%	0.5459
10:59:18	288.1	292.5	4.4	0.242	66.9	267.1		384.5	3310	0.1091	57.5%	0.5177
11:00:18	321.9	326.4	4.5	0.238	66.9	260.4		384.5	3283	0.1210	59.3%	0.5328
11:01:18	343.3	347.7	4.5	0.243	66.9	253.7		384.5	3318	0.1304	61.2%	0.5262
11:02:18	296.1	300.5	4.4	0.240	66.9	252.0		384.5	3299	0.1118	62.9%	0.4895
11:03:18	275.4	279.8	4.4	0.242	66.9	252.0		384.5	3312	0.1044	64.4%	0.4680
11:04:18	246.4	250.7	4.3	0.242	66.9	252.0		384.5	3312	0.0934	65.8%	0.4473
11:05:18	234.0	238.3	4.3	0.244	66.9	252.0		384.5	3324	0.0890	67.1%	0.4085
11:06:18	229.0	233.3	4.3	0.243	67.0	252.0		384.5	3317	0.0869	68.4%	0.4118
11:07:18	232.6	236.8	4.2	0.242	67.0	252.0		384.6	3310	0.0881	69.7%	0.3958
11:08:18	202.4	206.6	4.2	0.237	66.9	252.0		384.5	3277	0.0759	70.8%	0.3777
11:09:18	197.6	201.8	4.2	0.226	66.9	252.0		384.5	3196	0.0723	71.9%	0.3636
11:10:18	191.8	196.0	4.1	0.234	66.9	252.0		384.5	3254	0.0714	73.0%	0.3540
11:11:18	178.5	182.6	4.1	0.120	66.7	252.0		384.3	2331	0.0476	73.7%	0.3195
11:12:18	175.4	179.5	4.1	0.225	66.8	252.0		384.4	3192	0.0641	74.6%	0.3249
11:13:18	168.0	172.1	4.1	0.191	66.7	252.0		384.4	2944	0.0566	75.4%	0.3078
11:14:18	173.2	177.3	4.1	0.232	66.8	252.0		384.4	3242	0.0643	76.4%	0.3018
11:15:18	166.1	170.2	4.2	0.234	66.7	252.0		384.4	3257	0.0619	77.3%	0.2913
11:16:18	164.9	169.0	4.1	0.234	66.7	252.0		384.3	3256	0.0615	78.2%	0.2825
11:17:18	158.5	162.4	3.8	0.232	66.6	252.0		384.3	3241	0.0588	79.1%	0.2719
11:18:18	151.9	155.7	3.8	0.228	66.5	252.0		384.2	3215	0.0559	79.9%	0.2609
11:19:18	152.6	156.2	3.6	0.216	66.3	252.0		384.1	3131	0.0547	80.7%	0.2512
11:20:18	151.1	154.6	3.5	0.214	66.3	252.0		384.1	3116	0.0539	81.5%	0.2375
11:21:18	149.2	152.6	3.4	0.214	66.3	252.0		384.1	3112	0.0532	82.3%	0.2294
11:22:18	144.1	147.6	3.4	0.215	66.3	252.0		384.0	3117	0.0515	83.1%	0.2211
11:23:18	149.0	152.3	3.3	0.215	66.3	252.0		384.0	3118	0.0532	83.9%	0.2131
11:24:18	145.0	148.3	3.3	0.215	66.3	252.0		384.0	3122	0.0519	84.6%	0.2050
11:25:18	141.5	144.7	3.2	0.220	66.3	252.0		384.0	3160	0.0512	85.4%	0.1964
11:26:18	138.4	141.6	3.2	0.217	66.2	252.0		384.0	3138	0.0498	86.1%	0.1836
11:27:18	136.9	140.1	3.1	0.215	66.2	252.0		384.0	3121	0.0490	86.8%	0.1762
11:28:18	133.0	136.0	3.0	0.218	66.2	252.0		384.0	3139	0.0479	87.6%	0.1696
11:29:18	121.7	124.5	2.8	0.218	66.1	252.0		384.0	3145	0.0439	88.2%	0.1598
11:30:18	131.7	134.6	2.9	0.213	66.2	252.0		384.0	3104	0.0468	88.9%	0.1531
11:31:18	127.0	129.8	2.8	0.217	66.3	252.0		384.0	3132	0.0456	89.6%	0.1452
11:32:18	116.5	119.2	2.7	0.220	66.3	252.0		384.1	3155	0.0421	90.2%	0.1339
11:33:18	116.8	119.5	2.7	0.216	66.3	252.0		384.1	3130	0.0419	90.8%	0.1272
11:34:18	117.6	120.3	2.7	0.216	66.3	252.0		384.1	3125	0.0421	91.4%	0.1217
11:35:18	115.0	117.6	2.6	0.217	66.4	252.0		384.1	3137	0.0413	92.1%	0.1160
11:36:18	102.7	105.0	2.3	0.214	66.4	252.0		384.1	3116	0.0366	92.6%	0.1062
11:37:38	98.7	101.0	2.2	0.218	66.3	252.0		384.1	3142	0.0355	93.1%	0.0996
11:38:18	95.3	97.6	2.3	0.214	66.3	252.0		384.1	3112	0.0340	93.6%	0.0918
11:39:18	92.6	94.9	2.3	0.215	66.3	252.0		384.0	3122	0.0331	94.1%	0.0853
11:40:18	87.6	89.9	2.3	0.216	66.2	252.0		384.0	3126	0.0314	94.6%	0.0796
11:41:18	84.3	86.6	2.3	0.217	66.3	252.0		384.1	3133	0.0303	95.0%	0.0747
11:42:18	79.2	81.5	2.3	0.222	66.3	252.0		384.1	3169	0.0288	95.4%	0.0696

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:43:18	75.3	77.6	2.3	0.217	66.4	252.0		384.2	3132	0.0270	95.8%	0.0641
11:44:18	68.9	71.3	2.3	0.213	66.5	252.0		384.3	3109	0.0245	96.2%	0.0578
11:45:18	62.2	64.4	2.2	0.216	66.5	252.0		384.2	3130	0.0223	96.5%	0.0522
11:46:18	58.9	61.2	2.3	0.212	66.6	252.0		384.3	3097	0.0209	96.9%	0.0483
11:47:18	54.3	56.6	2.2	0.214	66.6	252.0		384.3	3110	0.0193	97.1%	0.0444
11:48:18	50.5	52.7	2.2	0.218	66.6	252.0		384.3	3142	0.0182	97.4%	0.0408
11:49:18	46.1	48.4	2.2	0.212	66.6	252.0		384.3	3100	0.0164	97.6%	0.0371
11:50:18	41.9	44.0	2.1	0.217	66.7	252.0		384.3	3133	0.0150	97.9%	0.0332
11:51:18	38.5	40.6	2.1	0.214	66.7	252.0		384.3	3116	0.0137	98.1%	0.0300
11:52:18	35.0	37.0	2.0	0.214	66.7	252.0		384.3	3117	0.0125	98.3%	0.0274
11:53:18	32.3	34.3	2.0	0.214	66.7	252.0		384.3	3117	0.0115	98.4%	0.0250
11:54:18	29.4	31.4	2.0	0.216	66.7	252.0		384.3	3130	0.0105	98.6%	0.0227
11:55:18	26.4	28.4	2.0	0.213	66.7	252.0		384.4	3105	0.0094	98.7%	0.0207
11:56:18	24.5	26.4	2.0	0.215	66.7	252.0		384.4	3123	0.0087	98.9%	0.0182
11:57:18	22.0	23.9	1.9	0.216	66.7	252.0		384.4	3128	0.0079	99.0%	0.0162
11:58:18	20.0	21.9	1.9	0.212	66.7	252.0		384.4	3097	0.0071	99.1%	0.0149
11:59:18	18.2	20.0	1.9	0.212	66.7	252.0		384.4	3096	0.0064	99.2%	0.0135
12:00:18	16.3	18.2	1.9	0.217	66.7	251.9		384.3	3132	0.0058	99.3%	0.0121
12:01:18	15.0	16.9	1.8	0.214	66.7	252.0		384.4	3114	0.0054	99.3%	0.0113
12:02:18	13.6	15.4	1.8	0.218	66.7	251.9		384.4	3139	0.0049	99.4%	0.0095
12:03:18	12.1	13.9	1.8	0.216	66.8	252.0		384.4	3130	0.0043	99.5%	0.0083
12:04:18	11.3	13.1	1.8	0.214	66.8	251.9		384.4	3112	0.0040	99.5%	0.0078
12:05:18	10.2	11.9	1.7	0.217	66.8	252.0		384.4	3135	0.0037	99.6%	0.0071
12:06:18	9.4	11.2	1.7	0.227	66.8	252.0		384.5	3203	0.0035	99.6%	0.0063
12:07:18	8.8	10.5	1.7	0.222	66.9	251.9		384.5	3170	0.0032	99.7%	0.0060
12:08:18	8.1	9.8	1.8	0.217	66.9	252.0		384.5	3135	0.0029	99.7%	0.0046
12:09:18	7.1	9.0	1.9	0.221	66.9	251.9		384.5	3164	0.0026	99.8%	0.0040
12:10:18	6.7	8.6	1.9	0.222	66.9	251.9		384.5	3169	0.0024	99.8%	0.0038
12:11:18	5.9	7.9	1.9	0.217	66.9	251.9		384.5	3133	0.0021	99.8%	0.0034
12:12:18	5.0	6.9	1.9	0.219	66.9	251.9		384.5	3150	0.0018	99.9%	0.0028
12:13:18	4.8	6.8	1.9	0.222	66.9	251.9		384.5	3169	0.0017	99.9%	0.0028
12:14:18	4.6	6.5	1.9	0.226	66.9	251.9		384.5	3202	0.0017	99.9%	0.0017
12:15:18	3.9	5.8	1.9	0.219	66.9	251.9		384.5	3151	0.0014	99.9%	0.0014
12:16:18	3.8	5.8	1.9	0.224	66.9	251.9		384.5	3183	0.0014	100.0%	0.0014
12:17:18	3.6	5.6	2.0	0.221	67.0	251.9		384.6	3165	0.0013	100.0%	0.0013
12:18:18	2.9	4.9	2.0	0.217	67.0	251.9		384.6	3138	0.0010	100.0%	0.0010
12:19:18	2.9	4.9	2.0	0.221	66.9	251.9		384.5	3165	0.0010	100.0%	0.0010
	121.0	124.6		0.227	66.6	128.5		384.3	3206	6.76		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:59:25	0.0	2.9	3.7	0.247	67.7	386.1		385.1	3284	0.0000	0.0%	1.2907
14:00:25	0.0	2.9	3.6	0.250	67.8	386.1		385.2	3301	0.0000	0.0%	1.2841
14:01:25	0.0	2.9	3.6	0.250	67.8	386.1		385.2	3306	0.0000	0.0%	1.2735
14:02:25	0.0	3.3	3.6	0.246	68.0	383.7		385.3	3275	0.0000	0.0%	1.2789
14:03:25	18.9	22.5	3.6	0.251	68.0	376.6		385.3	3307	0.0071	0.1%	1.2756
14:04:25	71.5	75.1	3.6	0.244	68.1	369.6		385.4	3264	0.0266	0.4%	1.2843
14:05:25	100.0	103.7	3.7	0.244	68.1	362.5		385.4	3263	0.0373	0.9%	1.2907
14:06:25	135.2	138.9	3.7	0.246	68.2	360.2		385.4	3279	0.0506	1.6%	1.2841
14:07:25	135.1	138.8	3.7	0.243	68.2	360.0		385.5	3258	0.0503	2.2%	1.2735
14:08:25	137.2	140.9	3.7	0.249	68.2	355.5		385.5	3294	0.0516	2.9%	1.2789
14:09:25	167.1	170.8	3.7	0.249	68.3	351.2		385.5	3296	0.0629	3.7%	1.2684
14:10:25	189.9	193.6	3.7	0.247	68.3	349.7		385.5	3283	0.0711	4.7%	1.2577
14:12:23	177.3	181.0	3.8	0.246	68.3	349.7		385.5	3278	0.0663	5.5%	1.2534
14:12:25	171.1	174.9	3.8	0.243	68.3	351.5		385.6	3256	0.0636	6.3%	1.2335
14:13:25	166.6	170.5	3.8	0.250	68.4	350.1		385.6	3300	0.0628	7.2%	1.2232
14:14:25	178.1	182.0	3.9	0.244	68.4	343.3		385.6	3264	0.0664	8.0%	1.2273
14:15:25	213.3	217.2	3.9	0.246	68.4	338.3		385.6	3274	0.0797	9.1%	1.2056
14:16:25	221.2	225.1	4.0	0.247	68.4	335.0		385.6	3283	0.0829	10.1%	1.1865
14:17:25	237.5	241.5	4.0	0.251	68.4	327.8		385.6	3307	0.0896	11.3%	1.1871
14:18:25	267.1	271.1	4.0	0.250	68.4	322.3		385.6	3302	0.1006	12.6%	1.1699
14:19:25	303.3	307.4	4.1	0.245	68.4	315.4		385.6	3267	0.1131	14.1%	1.1605
14:20:25	318.9	322.9	4.1	0.247	68.4	312.2		385.6	3285	0.1195	15.6%	1.1610
14:21:25	266.9	271.0	4.1	0.248	68.4	312.1		385.6	3289	0.1002	16.9%	1.1259
14:22:25	247.2	251.4	4.2	0.252	68.5	312.1		385.6	3318	0.0936	18.2%	1.1037
14:23:25	245.7	249.9	4.2	0.249	68.5	312.1		385.6	3299	0.0925	19.4%	1.0975
14:24:25	221.2	225.4	4.2	0.249	68.4	312.1		385.6	3298	0.0833	20.4%	1.0693
14:25:25	196.3	200.5	4.3	0.251	68.4	312.1		385.6	3311	0.0742	21.4%	1.0474
14:26:25	174.6	179.0	4.3	0.251	68.3	312.1		385.6	3307	0.0659	22.3%	1.0415
14:27:25	168.6	173.0	4.4	0.245	68.3	312.1		385.5	3272	0.0630	23.1%	1.0257
14:28:25	170.8	175.2	4.4	0.248	68.3	312.1		385.5	3286	0.0640	23.9%	1.0101
14:29:25	157.5	162.0	4.4	0.244	68.3	312.1		385.5	3261	0.0586	24.7%	1.0050
14:30:25	146.3	150.7	4.4	0.246	68.3	312.1		385.5	3279	0.0548	25.4%	0.9861
14:31:25	137.9	142.3	4.4	0.247	68.2	312.1		385.5	3283	0.0517	26.1%	0.9732
14:32:25	139.8	144.1	4.3	0.247	68.2	312.1		385.5	3284	0.0524	26.7%	0.9755
14:33:25	140.4	144.7	4.3	0.247	68.2	312.1		385.5	3280	0.0526	27.4%	0.9627
14:34:25	117.8	122.1	4.3	0.248	68.2	312.1		385.5	3287	0.0442	28.0%	0.9460
14:35:25	104.2	108.4	4.2	0.247	68.1	312.1		385.4	3286	0.0391	28.5%	0.9464
14:36:25	97.8	102.0	4.2	0.245	68.0	312.1		385.3	3271	0.0365	29.0%	0.9313
14:37:25	107.4	111.5	4.1	0.245	68.0	312.1		385.3	3273	0.0401	29.5%	0.9216
14:38:25	108.1	112.2	4.0	0.245	68.0	312.1		385.3	3272	0.0404	30.0%	0.9231
14:39:25	110.3	114.3	3.9	0.246	68.0	312.1		385.3	3274	0.0413	30.6%	0.9102
14:40:25	111.0	114.9	3.9	0.246	68.0	312.1		385.3	3274	0.0415	31.1%	0.9018
14:41:25	112.4	116.3	3.8	0.246	68.0	312.1		385.3	3276	0.0421	31.7%	0.9073
14:42:25	109.9	113.8	3.8	0.244	68.0	312.1		385.3	3260	0.0409	32.2%	0.8948
14:43:25	108.7	112.4	3.8	0.248	68.0	312.1		385.3	3291	0.0408	32.7%	0.8814
14:44:25	105.1	108.8	3.7	0.248	68.0	312.1		385.3	3292	0.0395	33.2%	0.8827
14:45:25	109.8	113.5	3.7	0.243	68.1	312.1		385.4	3256	0.0408	33.8%	0.8689
14:46:25	107.5	111.2	3.7	0.246	68.1	312.1		385.4	3274	0.0402	34.3%	0.8603
14:47:25	105.1	108.8	3.6	0.244	68.1	312.1		385.4	3265	0.0392	34.8%	0.8652
14:48:25	104.7	108.3	3.6	0.258	68.1	312.1		385.4	3354	0.0401	35.3%	0.8538
14:49:25	102.6	106.2	3.6	0.260	68.1	312.1		385.4	3366	0.0394	35.8%	0.8406
14:50:25	103.5	107.1	3.6	0.261	68.1	312.1		385.4	3376	0.0399	36.4%	0.8432
14:51:25	109.8	113.3	3.5	0.261	68.2	311.4		385.4	3373	0.0423	36.9%	0.8281
14:52:25	105.1	108.6	3.5	0.260	68.2	311.9		385.5	3369	0.0404	37.4%	0.8202
14:53:25	115.3	118.8	3.5	0.258	68.3	311.9		385.5	3353	0.0441	38.0%	0.8260
14:54:25	127.5	131.0	3.5	0.259	68.3	308.4		385.5	3361	0.0489	38.6%	0.8137
14:55:25	169.1	172.5	3.5	0.259	68.3	301.3		385.5	3363	0.0649	39.5%	0.8012

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:56:25	196.3	199.8	3.4	0.261	68.3	298.8		385.6	3372	0.0755	40.5%	0.8033
14:57:25	220.0	223.4	3.4	0.258	68.4	292.7		385.6	3354	0.0842	41.6%	0.7858
14:58:25	236.6	240.0	3.4	0.256	68.4	288.5		385.6	3342	0.0902	42.7%	0.7797
14:59:25	235.1	238.5	3.4	0.261	68.4	287.0		385.6	3372	0.0905	43.9%	0.7819
15:00:25	233.1	236.4	3.4	0.263	68.4	285.3		385.6	3385	0.0900	45.1%	0.7648
15:01:25	255.5	258.8	3.3	0.259	68.4	279.2		385.6	3359	0.0979	46.4%	0.7363
15:02:25	305.8	309.2	3.3	0.259	68.4	273.9		385.6	3359	0.1172	47.9%	0.7278
15:03:25	296.2	299.6	3.4	0.258	68.4	271.4		385.6	3355	0.1134	49.4%	0.7016
15:04:25	287.7	291.1	3.4	0.261	68.4	271.0		385.6	3377	0.1109	50.8%	0.6895
15:05:25	274.8	278.2	3.4	0.257	68.4	271.0		385.6	3346	0.1049	52.2%	0.6914
15:06:25	264.0	267.3	3.3	0.253	68.4	270.9		385.6	3320	0.1000	53.5%	0.6748
15:07:25	241.7	245.0	3.3	0.250	68.4	270.9		385.6	3302	0.0911	54.7%	0.6383
15:08:25	230.2	233.4	3.3	0.249	68.4	270.9		385.6	3297	0.0866	55.8%	0.6106
15:09:25	227.0	230.2	3.2	0.249	68.3	270.9		385.6	3297	0.0854	56.9%	0.5882
15:10:25	216.8	220.1	3.3	0.249	68.3	270.9		385.5	3296	0.0816	58.0%	0.5786
15:11:25	199.2	202.5	3.3	0.257	68.2	270.9		385.5	3348	0.0761	58.9%	0.5865
15:12:25	193.9	197.2	3.3	0.256	68.2	270.9		385.5	3340	0.0739	59.9%	0.5748
15:13:25	183.9	187.2	3.3	0.237	68.2	270.9		385.5	3217	0.0675	60.8%	0.5473
15:14:25	178.0	181.2	3.2	0.230	68.2	270.9		385.5	3168	0.0644	61.6%	0.5240
15:15:25	173.2	176.3	3.2	0.230	68.2	270.9		385.5	3171	0.0627	62.4%	0.5028
15:16:25	165.7	168.8	3.1	0.228	68.2	270.9		385.4	3157	0.0597	63.2%	0.4970
15:17:25	158.3	161.4	3.0	0.230	68.1	270.9		385.4	3168	0.0573	64.0%	0.5104
15:18:25	153.3	156.3	3.0	0.229	68.1	270.9		385.4	3164	0.0554	64.7%	0.5009
15:19:25	144.0	146.9	2.9	0.233	68.1	270.9		385.4	3190	0.0524	65.4%	0.4797
15:20:25	133.4	136.3	2.9	0.234	67.9	270.9		385.3	3194	0.0487	66.0%	0.4596
15:21:25	134.8	137.6	2.8	0.235	67.9	270.9		385.3	3204	0.0493	66.6%	0.4401
15:22:25	126.4	129.2	2.8	0.232	67.9	270.9		385.3	3179	0.0459	67.2%	0.4373
15:23:25	119.3	122.0	2.7	0.238	67.9	270.9		385.2	3221	0.0439	67.8%	0.4532
15:24:25	112.8	115.5	2.7	0.245	67.9	270.9		385.2	3268	0.0421	68.3%	0.4455
15:25:25	105.4	108.0	2.6	0.248	67.8	270.9		385.2	3290	0.0396	68.9%	0.4273
15:26:25	99.8	102.4	2.5	0.248	67.8	270.9		385.2	3291	0.0375	69.4%	0.4109
15:27:25	95.8	98.3	2.5	0.250	67.8	270.9		385.2	3302	0.0361	69.8%	0.3908
15:28:25	93.1	95.6	2.5	0.247	67.8	270.9		385.2	3282	0.0349	70.3%	0.3914
15:29:25	88.4	90.9	2.4	0.246	67.8	270.9		385.2	3274	0.0331	70.7%	0.4093
15:30:25	83.4	85.8	2.4	0.244	67.8	270.9		385.2	3260	0.0311	71.1%	0.4034
15:31:25	79.1	81.5	2.4	0.244	67.8	270.9		385.1	3265	0.0295	71.5%	0.3877
15:32:25	73.5	75.8	2.3	0.247	67.7	271.0		385.1	3284	0.0276	71.9%	0.3734
15:33:25	69.4	71.7	2.3	0.247	67.7	270.9		385.1	3280	0.0260	72.2%	0.3547
15:34:25	65.8	68.1	2.3	0.245	67.7	270.9		385.1	3273	0.0246	72.5%	0.3565
15:35:25	61.5	63.8	2.3	0.233	67.7	270.9		385.1	3190	0.0224	72.8%	0.3762
15:36:25	57.2	59.5	2.2	0.233	67.7	273.2		385.1	3186	0.0208	73.1%	0.3723
15:37:25	54.1	56.3	2.2	0.229	67.7	271.5		385.1	3162	0.0195	73.3%	0.3582
15:38:25	49.4	51.6	2.2	0.235	67.6	271.5		385.0	3203	0.0181	73.6%	0.3458
15:39:25	46.9	49.0	2.2	0.232	67.6	269.8		385.0	3184	0.0171	73.8%	0.3287
15:40:25	66.3	68.4	2.1	0.230	67.6	263.4		385.0	3167	0.0240	74.1%	0.3319
15:41:25	106.2	108.3	2.1	0.229	67.7	259.1		385.1	3162	0.0384	74.6%	0.3538
15:42:25	125.6	127.7	2.1	0.231	67.7	255.7		385.1	3172	0.0455	75.2%	0.3515
15:43:25	148.0	150.1	2.0	0.228	67.7	250.3		385.1	3157	0.0534	75.9%	0.3386
15:44:25	163.1	165.1	2.0	0.231	67.7	247.8		385.1	3177	0.0592	76.7%	0.3277
15:45:25	160.9	162.9	2.0	0.229	67.6	245.4		385.0	3160	0.0581	77.4%	0.3116
15:46:25	181.4	183.4	1.9	0.231	67.6	241.7		385.0	3173	0.0658	78.3%	0.3079
15:47:25	230.8	232.7	1.9	0.228	67.6	237.1		385.0	3153	0.0832	79.3%	0.3154
15:48:25	232.8	234.6	1.9	0.229	67.6	235.4		385.0	3161	0.0841	80.4%	0.3059
15:49:25	219.4	221.4	1.9	0.228	67.4	235.4		384.9	3153	0.0791	81.5%	0.2852
15:50:25	213.7	215.6	1.8	0.230	67.4	234.0		384.9	3166	0.0774	82.5%	0.2685
15:51:25	208.5	210.3	1.8	0.228	67.3	233.5		384.8	3152	0.0751	83.5%	0.2535
15:52:25	203.3	205.1	1.8	0.224	67.3	233.5		384.8	3128	0.0727	84.4%	0.2421

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:53:25	188.5	190.4	1.9	0.226	67.2	233.5		384.8	3142	0.0677	85.3%	0.2322
15:54:25	178.2	180.0	1.8	0.225	67.2	233.5		384.7	3130	0.0638	86.1%	0.2218
15:55:25	156.3	157.3	1.0	0.229	67.1	233.6		384.6	3163	0.0565	86.8%	0.2061
15:56:25	154.2	155.1	0.9	0.225	67.0	233.5		384.6	3130	0.0552	87.6%	0.1912
15:57:25	146.6	147.5	0.9	0.224	67.0	233.5		384.6	3127	0.0525	88.2%	0.1784
15:58:25	137.6	138.6	0.9	0.226	67.0	233.5		384.6	3142	0.0495	88.9%	0.1694
15:59:25	135.0	136.0	1.0	0.231	67.1	233.5		384.6	3173	0.0490	89.5%	0.1645
16:00:25	129.9	130.5	0.7	0.226	67.1	233.5		384.6	3143	0.0467	90.1%	0.1581
16:01:25	121.2	122.0	0.7	0.228	67.0	233.5		384.6	3152	0.0437	90.7%	0.1496
16:02:25	112.0	111.6	-0.5	0.227	67.0	233.6		384.6	3147	0.0403	91.2%	0.1359
16:03:25	104.4	102.5	-1.9	0.225	66.9	233.5		384.5	3131	0.0374	91.7%	0.1259
16:04:25	99.2	97.8	-1.4	0.223	66.9	233.5		384.5	3119	0.0354	92.2%	0.1199
16:05:25	102.4	94.4	-8.0	0.237	66.9	233.5		384.5	3213	0.0376	92.7%	0.1155
16:06:25	104.1	91.7	-12.4	0.229	66.9	233.6		384.5	3164	0.0377	93.2%	0.1114
16:07:25	99.9	87.1	-12.7	0.231	66.8	233.6		384.5	3174	0.0363	93.6%	0.1059
16:08:25	94.0	83.4	-10.7	0.233	66.8	233.6		384.5	3191	0.0343	94.1%	0.0956
16:09:25	79.4	81.1	1.7	0.228	66.8	233.6		384.4	3152	0.0286	94.4%	0.0885
16:10:25	74.0	75.8	1.7	0.228	66.7	233.6		384.4	3154	0.0267	94.8%	0.0845
16:11:25	70.1	71.8	1.7	0.224	66.7	233.6		384.4	3125	0.0251	95.1%	0.0778
16:12:25	66.7	68.4	1.7	0.223	66.7	233.6		384.3	3118	0.0238	95.4%	0.0737
16:13:25	62.4	64.0	1.6	0.227	66.7	233.6		384.3	3144	0.0224	95.7%	0.0696
16:14:25	60.0	61.6	1.7	0.226	66.6	233.6		384.3	3141	0.0216	96.0%	0.0612
16:15:25	57.7	59.3	1.7	0.225	66.6	233.6		384.3	3132	0.0207	96.3%	0.0599
16:16:25	55.0	56.6	1.6	0.223	66.6	233.6		384.3	3118	0.0196	96.5%	0.0578
16:17:25	51.3	52.9	1.6	0.228	66.6	233.6		384.3	3156	0.0185	96.8%	0.0528
16:18:25	48.4	50.1	1.7	0.221	66.5	233.6		384.2	3107	0.0172	97.0%	0.0499
16:19:25	46.1	47.8	1.7	0.235	66.6	233.6		384.3	3200	0.0169	97.2%	0.0472
16:20:25	42.6	44.3	1.7	0.127	66.4	233.6		384.1	2353	0.0115	97.4%	0.0397
16:21:25	38.6	40.3	1.7	0.191	66.4	233.6		384.1	2887	0.0128	97.5%	0.0392
16:22:25	37.9	39.6	1.7	0.212	66.6	233.6		384.3	3038	0.0132	97.7%	0.0382
16:23:25	34.2	35.9	1.7	0.165	66.6	233.6		384.3	2687	0.0105	97.8%	0.0342
16:24:25	32.5	34.2	1.7	0.226	66.5	233.6		384.2	3142	0.0117	98.0%	0.0326
16:25:25	30.7	32.5	1.7	0.226	66.5	233.6		384.2	3138	0.0110	98.1%	0.0303
16:26:25	28.4	30.2	1.7	0.225	66.5	233.6		384.2	3134	0.0102	98.3%	0.0282
16:27:25	26.5	28.3	1.8	0.224	66.4	233.6		384.2	3126	0.0095	98.4%	0.0264
16:28:25	24.8	26.6	1.8	0.222	66.5	233.6		384.2	3114	0.0088	98.5%	0.0250
16:29:25	23.3	25.1	1.8	0.225	66.4	233.6		384.2	3134	0.0084	98.6%	0.0237
16:30:25	21.9	23.7	1.8	0.222	66.4	233.6		384.2	3113	0.0078	98.7%	0.0209
16:31:25	19.6	21.4	1.8	0.222	66.4	233.6		384.1	3113	0.0070	98.8%	0.0192
16:32:25	18.5	20.3	1.8	0.223	66.3	233.6		384.1	3121	0.0066	98.9%	0.0180
16:33:25	17.4	19.2	1.8	0.225	66.3	233.6		384.1	3137	0.0063	99.0%	0.0169
16:34:25	16.0	17.9	1.8	0.224	66.3	233.6		384.1	3130	0.0057	99.0%	0.0162
16:35:25	15.1	17.0	1.8	0.221	66.3	233.6		384.0	3106	0.0054	99.1%	0.0154
16:36:25	14.1	15.9	1.9	0.226	66.2	233.6		384.0	3139	0.0051	99.2%	0.0131
16:37:25	13.2	15.0	1.8	0.223	66.2	233.6		384.0	3121	0.0047	99.2%	0.0122
16:38:25	12.3	14.1	1.8	0.225	66.2	233.6		384.0	3132	0.0044	99.3%	0.0114
16:39:25	11.9	13.7	1.8	0.227	66.2	233.6		384.0	3145	0.0043	99.4%	0.0107
16:40:25	11.0	12.9	1.8	0.224	66.2	233.6		384.0	3124	0.0039	99.4%	0.0104
16:41:25	10.2	12.1	1.8	0.222	66.2	233.6		384.0	3114	0.0036	99.5%	0.0100
16:42:25	9.6	11.4	1.8	0.223	66.1	233.6		383.9	3118	0.0034	99.5%	0.0081
16:43:25	9.0	10.8	1.9	0.222	66.1	233.6		383.9	3114	0.0032	99.5%	0.0075
16:44:25	9.0	10.8	1.9	0.226	66.1	233.6		383.9	3139	0.0032	99.6%	0.0070
16:45:25	8.2	10.1	1.8	0.223	66.1	233.6		384.0	3120	0.0029	99.6%	0.0064
16:46:25	8.0	9.8	1.8	0.231	66.1	233.6		383.9	3176	0.0029	99.7%	0.0065
16:47:25	7.9	9.7	1.8	0.234	66.1	233.6		383.9	3197	0.0029	99.7%	0.0063
16:48:25	7.2	9.0	1.8	0.233	66.1	233.6		384.0	3190	0.0026	99.7%	0.0046
16:49:25	7.1	9.0	1.8	0.230	66.2	233.6		384.0	3171	0.0026	99.8%	0.0043

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:50:25	6.5	8.5	1.9	0.238	66.2	233.6		384.0	3225	0.0024	99.8%	0.0037
16:51:25	5.8	7.9	2.1	0.238	66.2	233.6		384.0	3222	0.0021	99.8%	0.0035
16:52:25	5.7	7.9	2.2	0.238	66.1	233.6		383.9	3222	0.0021	99.9%	0.0036
16:53:25	5.6	7.9	2.3	0.234	66.1	233.6		383.9	3194	0.0020	99.9%	0.0034
16:54:25	5.4	7.9	2.5	0.239	66.2	233.6		384.0	3230	0.0020	99.9%	0.0020
16:55:25	4.7	7.7	3.0	0.238	66.2	233.6		384.0	3225	0.0017	99.9%	0.0017
16:56:25	3.5	6.9	3.3	0.244	66.3	233.6		384.0	3261	0.0013	99.9%	0.0013
16:57:25	3.6	7.2	3.6	0.239	66.3	233.6		384.1	3232	0.0013	100.0%	0.0013
16:58:25	3.9	7.9	3.9	0.240	66.4	233.6		384.1	3238	0.0015	100.0%	0.0015
16:59:25	3.7	7.9	4.1	0.239	66.5	233.6		384.2	3229	0.0014	100.0%	0.0014
	114.4	116.8		0.238	67.5	152.5		384.9	3218	7.69		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:32:59	0.5	2.0	1.5	0.251	68.6	426.0		385.8	3189	0.0002	0.0%	0.6392
9:33:59	7.3	8.5	1.1	0.253	68.8	423.1		385.9	3200	0.0027	0.0%	0.6429
9:34:59	31.4	32.6	1.1	0.253	68.9	417.1		385.9	3202	0.0115	0.2%	0.6475
9:35:59	93.6	94.3	0.8	0.252	68.9	410.7		386.0	3192	0.0340	0.7%	0.6628
9:36:59	117.4	118.9	1.5	0.255	68.9	407.3		386.0	3212	0.0430	1.3%	0.6616
9:37:59	119.5	121.0	1.5	0.250	68.9	403.3		386.0	3178	0.0433	1.9%	0.6405
9:38:59	135.5	136.6	1.1	0.254	68.8	400.8		385.9	3208	0.0495	2.6%	0.6262
9:39:59	140.3	141.9	1.6	0.252	68.8	400.8		385.9	3195	0.0511	3.4%	0.6202
9:40:59	154.1	155.8	1.6	0.250	68.8	399.1		385.9	3178	0.0558	4.2%	0.6170
9:41:59	155.1	156.7	1.5	0.248	68.8	396.4		385.9	3167	0.0560	5.0%	0.6077
9:42:59	190.4	191.9	1.5	0.254	68.8	390.8		385.9	3204	0.0696	6.0%	0.6276
9:43:59	220.2	221.8	1.5	0.253	68.8	385.1		385.9	3196	0.0803	7.1%	0.6390
9:44:59	239.0	240.6	1.5	0.250	68.8	381.6		385.9	3178	0.0866	8.3%	0.6402
9:45:59	234.1	235.7	1.5	0.248	68.7	381.6		385.8	3169	0.0846	9.6%	0.6360
9:46:59	235.2	236.7	1.5	0.249	68.7	381.6		385.8	3174	0.0851	10.8%	0.6288
9:47:59	239.7	241.2	1.5	0.257	68.7	381.9		385.8	3227	0.0882	12.0%	0.6186
9:48:59	244.0	245.5	1.5	0.259	68.8	381.6		385.9	3237	0.0901	13.3%	0.5972
9:49:59	231.0	232.6	1.5	0.254	68.7	381.6		385.8	3208	0.0845	14.5%	0.5766
9:50:59	211.9	213.5	1.6	0.258	68.7	381.6		385.8	3231	0.0781	15.6%	0.5692
9:51:59	212.4	214.1	1.7	0.258	68.7	381.6		385.8	3231	0.0783	16.8%	0.5612
9:52:59	195.0	196.6	1.7	0.256	68.7	381.6		385.8	3215	0.0715	17.8%	0.5517
9:53:59	192.6	193.9	1.3	0.251	68.7	381.6		385.8	3188	0.0700	18.8%	0.5580
9:54:59	187.0	188.6	1.7	0.250	68.7	381.7		385.8	3179	0.0678	19.8%	0.5588
9:55:59	186.6	187.8	1.2	0.249	68.7	381.6		385.8	3173	0.0675	20.7%	0.5536
9:56:59	176.1	177.0	0.9	0.249	68.6	381.6		385.8	3175	0.0638	21.6%	0.5514
9:57:59	173.6	174.5	0.9	0.251	68.6	381.6		385.7	3189	0.0632	22.5%	0.5436
9:58:59	170.3	171.1	0.7	0.251	68.5	381.6		385.7	3187	0.0619	23.4%	0.5304
9:59:59	162.3	163.3	1.0	0.248	68.5	381.6		385.7	3169	0.0587	24.3%	0.5071
10:00:59	158.5	159.1	0.6	0.254	68.5	381.6		385.7	3202	0.0579	25.1%	0.4921
10:01:59	151.5	152.2	0.7	0.251	68.5	381.6		385.7	3188	0.0551	25.9%	0.4911
10:02:59	150.5	151.5	0.9	0.250	68.5	381.6		385.7	3182	0.0547	26.7%	0.4829
10:03:59	150.3	151.2	0.9	0.248	68.5	381.6		385.7	3170	0.0544	27.4%	0.4802
10:04:59	147.4	147.9	0.6	0.250	68.5	381.7		385.7	3177	0.0534	28.2%	0.4880
10:05:59	141.9	142.4	0.5	0.245	68.4	381.6		385.6	3150	0.0510	28.9%	0.4910
10:06:59	139.4	140.0	0.5	0.250	68.4	381.6		385.6	3178	0.0506	29.7%	0.4861
10:07:59	132.8	133.2	0.4	0.250	68.3	381.6		385.6	3178	0.0482	30.3%	0.4876
10:08:59	132.7	133.3	0.6	0.250	68.3	381.6		385.6	3179	0.0481	31.0%	0.4805
10:09:59	132.8	133.4	0.6	0.251	68.3	381.6		385.6	3185	0.0483	31.7%	0.4685
10:10:59	127.5	129.0	1.4	0.246	68.2	381.6		385.5	3152	0.0459	32.4%	0.4484
10:11:59	121.9	123.2	1.3	0.249	68.2	381.6		385.5	3174	0.0442	33.0%	0.4342
10:12:59	124.5	126.0	1.5	0.251	68.3	381.6		385.5	3184	0.0452	33.7%	0.4360
10:13:59	120.8	121.8	1.0	0.250	68.3	381.6		385.5	3180	0.0438	34.3%	0.4282
10:14:59	118.4	118.7	0.3	0.250	68.3	381.7		385.5	3180	0.0430	34.9%	0.4258
10:15:59	111.0	111.1	0.1	0.247	68.2	381.6		385.5	3159	0.0400	35.5%	0.4346
10:16:59	109.5	109.5	0.0	0.250	68.2	381.6		385.5	3180	0.0397	36.0%	0.4400
10:17:59	107.3	107.3	0.1	0.248	68.2	381.6		385.5	3166	0.0388	36.6%	0.4355
10:18:59	106.1	106.1	-0.1	0.256	68.2	381.6		385.5	3221	0.0390	37.2%	0.4395
10:19:59	108.3	107.7	-0.6	0.260	68.2	381.7		385.5	3244	0.0401	37.7%	0.4324
10:20:59	101.7	102.4	0.7	0.261	68.2	381.6		385.5	3247	0.0377	38.3%	0.4202
10:21:59	97.4	98.4	1.0	0.262	68.2	381.7		385.5	3256	0.0362	38.8%	0.4025
10:22:59	92.5	93.6	1.1	0.263	68.2	381.7		385.5	3263	0.0345	39.3%	0.3901
10:23:59	92.3	93.5	1.2	0.262	68.2	381.6		385.4	3258	0.0343	39.8%	0.3907
10:24:59	88.7	88.8	0.1	0.262	68.0	381.7		385.3	3253	0.0330	40.2%	0.3844
10:25:59	91.8	92.6	0.8	0.263	68.1	380.6		385.4	3260	0.0342	40.7%	0.3828
10:26:59	110.3	111.7	1.4	0.261	68.2	374.5		385.5	3249	0.0409	41.3%	0.3946
10:27:59	129.3	128.5	-0.9	0.263	68.2	367.7		385.5	3262	0.0482	42.0%	0.4002
10:28:59	140.9	138.1	-2.8	0.264	68.2	364.0		385.5	3269	0.0526	42.7%	0.3967

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:29:59	147.9	141.7	-6.3	0.263	68.2	362.2		385.5	3261	0.0551	43.5%	0.4005
10:30:59	168.1	159.5	-8.6	0.266	68.3	355.6		385.5	3280	0.0629	44.4%	0.3923
10:31:59	191.5	183.5	-8.0	0.268	68.3	351.9		385.6	3291	0.0719	45.5%	0.3826
10:32:59	181.4	177.5	-3.9	0.269	68.4	349.1		385.6	3296	0.0682	46.4%	0.3663
10:33:59	189.7	191.3	1.6	0.272	68.4	345.1		385.6	3315	0.0718	47.5%	0.3556
10:34:59	215.3	216.9	1.6	0.271	68.5	339.8		385.7	3312	0.0813	48.6%	0.3564
10:35:59	233.6	235.3	1.7	0.271	68.5	333.8		385.7	3311	0.0882	49.9%	0.3514
10:36:59	257.4	259.1	1.6	0.270	68.5	330.2		385.7	3303	0.0970	51.3%	0.3487
10:37:59	300.4	302.0	1.7	0.270	68.6	324.1		385.7	3304	0.1132	52.9%	0.3537
10:38:59	326.1	327.8	1.7	0.269	68.6	317.7		385.7	3301	0.1228	54.7%	0.3521
10:39:59	339.1	340.8	1.7	0.267	68.6	311.6		385.8	3287	0.1271	56.5%	0.3441
10:40:59	365.2	366.9	1.7	0.271	68.7	310.3		385.8	3311	0.1379	58.4%	0.3454
10:41:59	343.8	345.5	1.8	0.271	68.7	310.3		385.8	3312	0.1298	60.3%	0.3293
10:42:59	321.6	323.4	1.8	0.272	68.7	310.3		385.8	3315	0.1216	62.0%	0.3106
10:43:59	307.8	309.6	1.8	0.270	68.7	311.1		385.9	3302	0.1159	63.7%	0.2981
10:44:59	285.4	287.2	1.8	0.273	68.7	310.3		385.8	3323	0.1081	65.2%	0.2838
10:45:59	280.6	282.4	1.8	0.269	68.8	310.2		385.9	3299	0.1056	66.8%	0.2751
10:46:59	269.8	271.7	1.9	0.272	68.8	310.2		385.9	3317	0.1020	68.2%	0.2632
10:47:59	255.0	256.9	1.9	0.274	68.8	310.2		385.9	3328	0.0968	69.6%	0.2517
10:48:59	246.3	248.3	2.0	0.267	68.8	310.3		385.9	3289	0.0924	70.9%	0.2405
10:49:59	234.0	236.0	2.1	0.267	68.9	310.3		385.9	3289	0.0877	72.2%	0.2293
10:50:59	224.3	226.4	2.1	0.269	68.9	310.3		386.0	3299	0.0844	73.4%	0.2170
10:51:59	220.1	222.2	2.1	0.273	68.9	310.3		386.0	3323	0.0834	74.6%	0.2075
10:52:59	212.6	214.7	2.1	0.271	69.0	310.2		386.0	3313	0.0803	75.7%	0.1995
10:53:59	203.1	205.2	2.1	0.273	69.0	310.2		386.0	3321	0.0769	76.8%	0.1891
10:54:59	201.6	203.7	2.1	0.269	69.0	310.3		386.0	3301	0.0758	77.9%	0.1822
10:55:59	199.4	201.5	2.1	0.271	69.0	310.2		386.1	3310	0.0752	79.0%	0.1757
10:56:59	192.8	195.0	2.1	0.272	69.0	310.2		386.1	3320	0.0730	80.0%	0.1695
10:57:59	184.0	186.1	2.1	0.272	69.1	310.3		386.1	3317	0.0695	81.0%	0.1611
10:58:59	177.3	179.4	2.1	0.276	69.1	310.3		386.1	3344	0.0676	82.0%	0.1549
10:59:59	174.0	176.2	2.2	0.272	69.1	310.2		386.1	3314	0.0657	82.9%	0.1481
11:00:59	171.8	174.0	2.2	0.271	69.2	310.2		386.2	3309	0.0648	83.8%	0.1416
11:01:59	167.9	170.1	2.2	0.273	69.3	310.2		386.2	3320	0.0635	84.8%	0.1327
11:02:59	159.8	162.0	2.2	0.271	69.3	310.2		386.3	3313	0.0603	85.6%	0.1242
11:03:59	159.3	161.5	2.2	0.273	69.3	310.2		386.3	3320	0.0603	86.5%	0.1192
11:04:59	154.6	156.8	2.2	0.260	69.4	310.2		386.3	3244	0.0571	87.3%	0.1122
11:05:59	148.0	150.3	2.2	0.260	69.4	310.2		386.3	3241	0.0546	88.1%	0.1064
11:06:59	144.8	147.0	2.2	0.257	69.5	310.2		386.4	3227	0.0532	88.8%	0.1005
11:07:59	143.7	145.9	2.2	0.260	69.5	310.2		386.4	3244	0.0531	89.6%	0.0966
11:08:59	138.6	140.8	2.2	0.264	69.6	310.2		386.5	3269	0.0516	90.3%	0.0916
11:09:59	131.9	134.1	2.2	0.274	69.6	310.2		386.5	3331	0.0500	91.0%	0.0874
11:10:59	125.6	127.8	2.2	0.276	69.6	310.2		386.5	3343	0.0478	91.7%	0.0824
11:11:59	117.5	119.7	2.2	0.277	69.7	310.2		386.5	3347	0.0448	92.4%	0.0768
11:12:59	106.9	109.1	2.2	0.275	69.7	310.2		386.5	3336	0.0406	93.0%	0.0691
11:13:59	100.6	102.8	2.2	0.273	69.7	310.2		386.5	3321	0.0380	93.5%	0.0638
11:14:59	95.3	97.5	2.2	0.260	69.7	310.2		386.6	3243	0.0352	94.0%	0.0589
11:15:59	90.5	92.7	2.2	0.262	69.8	310.2		386.6	3257	0.0335	94.5%	0.0551
11:16:59	83.8	86.0	2.2	0.262	69.8	310.2		386.6	3254	0.0310	94.9%	0.0517
11:17:59	77.0	79.2	2.2	0.262	69.8	310.2		386.6	3252	0.0285	95.3%	0.0473
11:18:59	71.1	73.3	2.2	0.261	69.8	310.2		386.6	3248	0.0263	95.7%	0.0435
11:19:59	64.6	66.8	2.2	0.263	69.8	310.2		386.7	3259	0.0239	96.0%	0.0400
11:20:59	60.4	62.7	2.2	0.259	69.9	310.2		386.7	3237	0.0223	96.4%	0.0373
11:21:59	56.2	58.4	2.2	0.258	69.9	310.2		386.7	3232	0.0207	96.7%	0.0346
11:22:59	51.4	53.7	2.3	0.265	69.9	310.2		386.7	3272	0.0191	96.9%	0.0321
11:23:59	47.2	49.5	2.3	0.261	70.0	310.2		386.7	3250	0.0175	97.2%	0.0285
11:24:59	43.3	45.6	2.3	0.261	70.0	310.2		386.8	3247	0.0160	97.4%	0.0258
11:25:59	39.4	41.7	2.2	0.262	70.0	310.2		386.8	3258	0.0146	97.6%	0.0238

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:26:59	36.3	38.6	2.2	0.263	70.1	310.2		386.8	3262	0.0135	97.8%	0.0215
11:27:59	33.9	36.1	2.2	0.263	70.1	310.2		386.9	3264	0.0126	98.0%	0.0207
11:28:59	30.6	32.9	2.2	0.262	70.1	310.2		386.8	3253	0.0113	98.2%	0.0188
11:29:59	27.9	30.2	2.2	0.261	70.1	310.2		386.8	3247	0.0103	98.3%	0.0173
11:30:59	26.0	28.2	2.3	0.265	70.1	310.2		386.9	3274	0.0097	98.4%	0.0161
11:31:59	23.9	26.1	2.2	0.264	70.1	310.2		386.9	3268	0.0089	98.6%	0.0151
11:32:59	22.2	24.4	2.3	0.262	70.2	310.2		386.9	3255	0.0082	98.7%	0.0139
11:33:59	20.6	22.8	2.2	0.263	70.2	310.2		387.0	3259	0.0076	98.8%	0.0129
11:34:59	18.8	21.0	2.2	0.192	70.2	310.2		386.9	2784	0.0059	98.9%	0.0111
11:35:59	18.5	20.7	2.2	0.244	70.3	310.2		387.0	3145	0.0066	99.0%	0.0098
11:36:59	17.5	19.6	2.2	0.248	70.3	310.2		387.0	3165	0.0063	99.1%	0.0092
11:37:59	15.5	17.7	2.2	0.221	70.4	310.2		387.0	2987	0.0053	99.1%	0.0081
11:38:59	15.0	17.2	2.2	0.264	70.2	310.1		386.9	3269	0.0056	99.2%	0.0081
11:39:59	13.2	15.4	2.2	0.260	70.2	310.1		386.9	3243	0.0049	99.3%	0.0074
11:40:59	12.3	14.5	2.2	0.263	70.2	310.1		386.9	3261	0.0046	99.4%	0.0069
11:41:59	11.6	13.8	2.2	0.262	70.2	310.2		386.9	3256	0.0043	99.4%	0.0064
11:42:59	11.0	13.2	2.2	0.263	70.2	310.1		386.9	3260	0.0041	99.5%	0.0062
11:43:59	10.4	12.6	2.2	0.262	70.2	310.1		386.9	3254	0.0038	99.5%	0.0057
11:44:59	9.7	11.9	2.2	0.261	70.2	310.1		387.0	3249	0.0036	99.6%	0.0053
11:45:59	9.1	11.3	2.2	0.264	70.2	310.1		386.9	3269	0.0034	99.6%	0.0051
11:46:59	8.6	10.8	2.2	0.264	70.3	310.1		387.0	3268	0.0032	99.7%	0.0032
11:47:59	7.7	9.9	2.2	0.263	70.3	310.1		387.0	3264	0.0029	99.7%	0.0029
11:48:59	7.5	9.7	2.2	0.264	70.3	310.1		387.0	3265	0.0028	99.8%	0.0028
11:49:59	6.8	9.0	2.2	0.263	70.3	310.1		387.0	3260	0.0025	99.8%	0.0025
11:50:59	6.9	9.1	2.2	0.267	70.3	310.1		387.0	3284	0.0026	99.8%	0.0026
11:51:59	6.5	8.6	2.2	0.259	70.3	310.1		387.0	3236	0.0024	99.9%	0.0024
11:52:59	5.8	7.9	2.2	0.266	70.3	310.1		387.0	3281	0.0021	99.9%	0.0021
11:53:59	5.8	7.9	2.1	0.263	70.3	310.1		387.0	3262	0.0021	99.9%	0.0021
11:54:59	5.0	7.2	2.1	0.263	70.4	310.1		387.0	3265	0.0019	100.0%	0.0019
11:55:59	4.6	6.8	2.2	0.262	70.4	310.1		387.0	3258	0.0017	100.0%	0.0017
11:56:59	4.7	6.8	2.1	0.267	70.3	310.1		387.0	3286	0.0018	100.0%	0.0018
	130.0	131.4		0.260	69.1	115.9		386.1	3243	6.99		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:31:29	1.5	2.0	0.5	0.266	70.8	405.8		387.3	3315	0.0006	0.0%	1.1715
13:32:29	2.2	2.3	0.1	0.270	70.8	405.2		387.4	3340	0.0008	0.0%	1.2138
13:33:29	5.9	8.0	2.2	0.270	70.8	403.8		387.4	3338	0.0022	0.1%	1.2183
13:34:29	18.8	20.9	2.1	0.267	70.8	405.1		387.3	3318	0.0071	0.1%	1.2121
13:35:29	59.3	61.4	2.1	0.266	70.8	396.2		387.3	3311	0.0223	0.5%	1.1975
13:36:29	100.1	102.2	2.1	0.263	70.7	397.3		387.3	3298	0.0375	1.0%	1.1873
13:37:29	105.9	107.9	2.1	0.266	70.7	388.5		387.3	3312	0.0398	1.5%	1.1709
13:38:29	151.4	153.5	2.1	0.261	70.7	378.1		387.3	3286	0.0565	2.3%	1.2129
13:39:29	203.5	205.5	2.0	0.262	70.8	373.1		387.3	3287	0.0760	3.4%	1.2161
13:40:29	162.5	164.5	2.0	0.265	70.8	372.5		387.4	3309	0.0611	4.2%	1.2050
13:41:29	147.5	149.5	2.0	0.266	70.8	371.4		387.4	3311	0.0555	5.0%	1.1752
13:42:29	151.6	153.6	2.0	0.263	70.8	365.8		387.4	3297	0.0568	5.8%	1.1498
13:43:29	165.4	167.4	2.0	0.262	70.9	355.7		387.4	3286	0.0617	6.6%	1.1311
13:44:29	189.4	191.4	2.0	0.267	70.9	349.1		387.4	3321	0.0714	7.6%	1.1564
13:45:29	209.7	211.7	1.9	0.262	70.8	346.7		387.4	3290	0.0784	8.7%	1.1401
13:46:29	231.5	233.4	1.9	0.264	70.8	340.8		387.4	3301	0.0868	9.9%	1.1439
13:47:29	273.2	275.1	1.9	0.262	70.8	334.4		387.4	3291	0.1021	11.3%	1.1197
13:48:29	275.7	277.6	1.9	0.265	70.8	328.5		387.4	3311	0.1037	12.8%	1.0931
13:49:29	287.0	288.9	1.9	0.265	70.8	327.8		387.4	3310	0.1079	14.3%	1.0693
13:50:29	234.0	235.9	1.9	0.270	70.8	327.8		387.4	3336	0.0887	15.5%	1.0850
13:51:29	226.7	228.6	1.9	0.264	70.8	327.8		387.4	3300	0.0850	16.7%	1.0617
13:52:29	192.9	194.7	1.9	0.264	70.8	327.8		387.4	3300	0.0723	17.7%	1.0571
13:53:29	180.3	182.2	1.9	0.264	70.8	327.8		387.4	3303	0.0676	18.6%	1.0176
13:54:29	173.0	174.9	1.9	0.261	70.8	327.8		387.4	3280	0.0644	19.5%	0.9894
13:55:29	154.6	156.6	2.0	0.264	70.8	327.8		387.4	3300	0.0580	20.3%	0.9614
13:56:29	140.7	142.7	2.0	0.266	70.8	327.8		387.4	3317	0.0530	21.1%	0.9963
13:57:29	143.1	145.1	2.0	0.261	70.8	327.8		387.4	3283	0.0534	21.8%	0.9768
13:58:29	133.6	135.6	2.0	0.262	70.8	327.8		387.4	3286	0.0499	22.5%	0.9848
13:59:29	133.2	135.1	1.9	0.265	70.8	327.8		387.4	3306	0.0500	23.2%	0.9500
14:00:29	133.6	135.6	1.9	0.262	70.8	327.8		387.4	3291	0.0500	23.9%	0.9249
14:01:29	127.6	129.5	1.9	0.264	70.8	327.8		387.4	3302	0.0479	24.6%	0.9034
14:02:29	127.4	129.3	1.9	0.263	70.8	327.8		387.4	3298	0.0477	25.2%	0.9433
14:03:29	125.0	126.9	1.9	0.263	70.8	327.8		387.4	3298	0.0468	25.9%	0.9234
14:04:29	110.6	112.5	1.9	0.261	70.8	327.8		387.4	3284	0.0413	26.4%	0.9350
14:05:29	104.3	106.1	1.9	0.263	70.8	327.8		387.4	3293	0.0390	27.0%	0.9000
14:06:29	116.2	118.0	1.9	0.266	70.8	327.8		387.4	3312	0.0437	27.6%	0.8750
14:07:29	116.9	118.7	1.8	0.277	70.8	327.8		387.4	3380	0.0449	28.2%	0.8555
14:08:29	105.8	107.7	1.8	0.277	70.9	327.8		387.4	3383	0.0407	28.8%	0.8955
14:09:29	98.3	100.1	1.8	0.278	70.9	327.8		387.4	3391	0.0378	29.3%	0.8766
14:10:29	109.4	111.2	1.8	0.279	70.9	327.8		387.4	3392	0.0421	29.9%	0.8937
14:11:29	117.4	119.2	1.8	0.276	70.9	327.8		387.4	3376	0.0450	30.5%	0.8610
14:12:29	100.2	102.0	1.8	0.276	70.9	327.8		387.4	3374	0.0384	31.1%	0.8313
14:13:29	93.3	95.1	1.8	0.282	70.9	327.8		387.4	3413	0.0362	31.6%	0.8107
14:14:29	95.5	97.3	1.8	0.282	71.0	327.8		387.5	3411	0.0370	32.1%	0.8549
14:15:29	98.6	100.5	1.8	0.282	70.9	330.1		387.5	3412	0.0382	32.6%	0.8387
14:16:29	112.7	114.5	1.8	0.279	70.9	338.2		387.5	3395	0.0434	33.2%	0.8516
14:17:29	113.9	115.7	1.8	0.280	70.9	338.0		387.5	3400	0.0440	33.8%	0.8160
14:18:29	99.1	101.0	1.8	0.278	71.0	337.9		387.5	3390	0.0382	34.3%	0.7929
14:19:29	125.1	127.0	1.8	0.280	70.9	344.4		387.5	3402	0.0483	35.0%	0.7745
14:20:29	178.1	179.9	1.8	0.279	71.0	334.5		387.5	3391	0.0686	36.0%	0.8179
14:21:29	196.9	198.8	1.8	0.278	71.0	331.4		387.5	3389	0.0758	37.0%	0.8005
14:22:29	254.4	256.3	1.9	0.276	71.0	334.8		387.5	3378	0.0976	38.4%	0.8081
14:23:29	253.7	255.5	1.8	0.273	71.0	330.3		387.5	3359	0.0968	39.7%	0.7720
14:24:29	246.9	248.7	1.9	0.274	71.1	321.1		387.6	3366	0.0943	41.0%	0.7547
14:25:29	235.0	236.9	1.9	0.273	71.1	326.7		387.6	3360	0.0896	42.3%	0.7262
14:26:29	294.8	296.7	1.9	0.273	71.1	314.9		387.6	3355	0.1123	43.8%	0.7493
14:27:29	289.0	290.9	1.9	0.274	71.1	319.5		387.6	3362	0.1103	45.4%	0.7247

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:28:29	285.2	287.1	1.9	0.276	71.1	306.8		387.6	3373	0.1092	46.9%	0.7106
14:29:29	271.2	273.1	1.9	0.275	71.1	306.7		387.6	3371	0.1038	48.3%	0.6752
14:30:29	244.3	246.1	1.9	0.273	71.1	306.9		387.6	3355	0.0930	49.6%	0.6604
14:31:29	214.4	216.2	1.9	0.271	71.1	307.0		387.6	3346	0.0814	50.7%	0.6366
14:32:29	194.8	196.7	1.9	0.274	71.1	307.0		387.6	3362	0.0743	51.8%	0.6370
14:33:29	175.3	177.3	2.0	0.275	71.1	307.0		387.6	3372	0.0671	52.7%	0.6144
14:34:29	169.8	171.9	2.1	0.271	71.2	307.0		387.7	3343	0.0644	53.6%	0.6014
14:35:29	156.9	158.9	2.1	0.275	71.2	306.9		387.7	3367	0.0599	54.4%	0.5715
14:36:29	157.2	159.3	2.1	0.276	71.3	307.0		387.7	3375	0.0602	55.3%	0.5674
14:37:29	149.8	151.9	2.1	0.279	71.3	307.0		387.7	3392	0.0577	56.1%	0.5551
14:38:29	154.3	156.4	2.1	0.274	71.2	307.0		387.7	3365	0.0589	56.9%	0.5626
14:39:29	146.8	148.9	2.1	0.279	71.3	307.0		387.7	3393	0.0565	57.7%	0.5473
14:40:29	144.3	146.3	2.0	0.273	71.3	307.0		387.8	3360	0.0550	58.4%	0.5369
14:41:29	138.5	140.5	2.0	0.276	71.3	307.0		387.7	3375	0.0530	59.2%	0.5115
14:42:29	138.6	140.6	2.0	0.270	71.3	307.0		387.8	3340	0.0525	59.9%	0.5072
14:43:29	135.5	137.5	2.0	0.269	71.3	307.0		387.7	3331	0.0512	60.6%	0.4975
14:44:29	132.0	133.9	2.0	0.271	71.3	306.9		387.8	3345	0.0501	61.3%	0.5037
14:45:29	133.5	135.4	2.0	0.273	71.4	306.4		387.8	3359	0.0509	62.0%	0.4908
14:46:29	131.0	132.9	1.9	0.273	71.4	300.5		387.8	3359	0.0499	62.7%	0.4819
14:47:29	140.5	142.5	2.0	0.275	71.4	289.8		387.8	3369	0.0537	63.5%	0.4585
14:48:29	143.4	145.4	2.0	0.271	71.5	288.4		387.9	3344	0.0544	64.2%	0.4546
14:49:29	143.3	145.3	2.0	0.275	71.4	283.0		387.8	3370	0.0548	65.0%	0.4462
14:50:29	194.7	196.7	1.9	0.276	71.5	279.8		387.9	3374	0.0746	66.0%	0.4536
14:51:29	194.0	195.9	1.9	0.279	71.5	273.9		387.9	3397	0.0748	67.0%	0.4399
14:52:29	242.6	244.6	1.9	0.277	71.5	271.4		387.9	3379	0.0930	68.3%	0.4320
14:53:29	221.0	222.9	1.9	0.278	71.6	269.3		387.9	3385	0.0849	69.5%	0.4048
14:54:29	237.5	239.4	1.9	0.276	71.6	264.1		387.9	3377	0.0910	70.8%	0.4002
14:55:29	263.2	265.1	1.9	0.273	71.6	259.2		388.0	3360	0.1003	72.2%	0.3915
14:56:29	282.0	283.9	1.9	0.269	71.6	254.8		388.0	3333	0.1066	73.7%	0.3791
14:57:29	266.4	268.3	1.9	0.273	71.7	256.8		388.0	3359	0.1015	75.1%	0.3651
14:58:29	238.1	240.0	1.9	0.269	71.7	250.6		388.0	3334	0.0900	76.3%	0.3390
14:59:29	228.8	230.7	1.9	0.274	71.7	249.8		388.0	3364	0.0873	77.5%	0.3199
15:00:29	222.1	224.1	1.9	0.273	71.7	249.8		388.0	3355	0.0845	78.7%	0.3093
15:01:29	203.5	205.6	2.1	0.274	71.7	249.8		388.0	3364	0.0776	79.8%	0.2912
15:02:29	181.5	183.7	2.2	0.276	71.7	248.8		388.0	3373	0.0694	80.7%	0.2725
15:03:29	182.9	185.0	2.1	0.274	71.7	248.8		388.0	3361	0.0697	81.7%	0.2637
15:04:29	171.3	173.3	2.0	0.271	71.7	248.7		388.0	3347	0.0650	82.6%	0.2490
15:05:29	163.6	165.6	2.0	0.270	71.7	250.4		388.0	3339	0.0619	83.5%	0.2326
15:06:29	161.1	163.1	2.0	0.270	71.8	248.5		388.1	3337	0.0609	84.3%	0.2248
15:07:29	158.9	160.9	2.0	0.270	71.8	248.5		388.1	3342	0.0602	85.2%	0.2135
15:08:29	150.9	152.9	2.0	0.269	71.9	248.5		388.2	3334	0.0570	85.9%	0.2031
15:09:29	147.8	149.8	2.0	0.269	71.9	248.5		388.1	3331	0.0558	86.7%	0.1940
15:10:29	138.3	140.3	2.0	0.270	71.8	248.5		388.1	3341	0.0524	87.5%	0.1839
15:11:29	131.9	133.9	2.0	0.272	71.9	248.5		388.1	3349	0.0501	88.1%	0.1707
15:12:29	119.7	121.6	1.9	0.269	71.8	248.5		388.1	3335	0.0453	88.8%	0.1638
15:13:29	118.3	120.2	1.9	0.268	71.8	248.5		388.1	3324	0.0446	89.4%	0.1534
15:14:29	116.4	118.3	1.9	0.268	71.8	248.5		388.1	3329	0.0439	90.0%	0.1460
15:15:29	110.0	111.9	1.9	0.269	71.8	248.5		388.1	3334	0.0416	90.6%	0.1381
15:16:29	111.9	113.7	1.9	0.267	71.9	248.5		388.2	3322	0.0421	91.2%	0.1316
15:17:29	113.9	115.8	1.8	0.270	72.0	248.5		388.3	3337	0.0431	91.8%	0.1206
15:18:29	108.9	110.8	1.9	0.270	72.1	248.5		388.3	3340	0.0412	92.3%	0.1186
15:19:29	103.6	105.5	1.9	0.271	72.1	248.5		388.3	3343	0.0393	92.9%	0.1088
15:20:29	95.8	97.7	1.9	0.272	72.1	248.5		388.3	3351	0.0364	93.4%	0.1021
15:21:29	92.4	94.2	1.8	0.268	72.2	248.5		388.4	3324	0.0348	93.9%	0.0966
15:22:29	86.7	88.6	1.8	0.270	72.2	248.5		388.4	3340	0.0328	94.3%	0.0894
15:23:29	79.1	80.9	1.8	0.268	72.2	248.5		388.4	3328	0.0298	94.7%	0.0775
15:24:29	77.0	78.8	1.8	0.270	72.2	248.5		388.4	3337	0.0291	95.1%	0.0773

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:25:29	69.6	71.4	1.8	0.267	72.2	248.5		388.4	3321	0.0262	95.5%	0.0695
15:26:29	65.7	67.5	1.8	0.267	72.3	248.5		388.4	3318	0.0247	95.9%	0.0657
15:27:29	61.0	62.7	1.7	0.283	72.3	248.5		388.5	3419	0.0236	96.2%	0.0618
15:28:29	57.5	59.2	1.7	0.246	72.3	248.5		388.4	3184	0.0207	96.5%	0.0566
15:29:29	51.8	53.6	1.8	0.189	72.1	248.5		388.3	2791	0.0164	96.7%	0.0477
15:30:29	50.5	52.3	1.8	0.265	72.3	248.5		388.5	3308	0.0189	97.0%	0.0482
15:31:29	45.1	46.9	1.8	0.240	72.4	248.5		388.5	3149	0.0161	97.2%	0.0433
15:32:29	41.8	43.6	1.7	0.270	72.4	248.5		388.5	3342	0.0158	97.4%	0.0410
15:33:29	38.8	40.6	1.7	0.270	72.3	248.5		388.5	3340	0.0147	97.6%	0.0382
15:34:29	35.5	37.2	1.7	0.273	72.3	248.5		388.4	3356	0.0135	97.8%	0.0359
15:35:29	33.0	34.7	1.7	0.270	72.3	248.5		388.5	3337	0.0125	98.0%	0.0313
15:36:29	30.1	31.8	1.7	0.268	72.4	248.5		388.5	3326	0.0113	98.1%	0.0293
15:37:29	27.5	29.1	1.7	0.270	72.4	248.5		388.5	3341	0.0104	98.3%	0.0272
15:38:29	25.0	26.7	1.7	0.267	72.4	248.5		388.5	3317	0.0094	98.4%	0.0252
15:39:29	23.3	25.0	1.7	0.268	72.4	248.5		388.5	3328	0.0088	98.5%	0.0235
15:40:29	21.9	23.6	1.7	0.267	72.4	248.5		388.5	3323	0.0082	98.6%	0.0224
15:41:29	20.0	21.7	1.7	0.268	72.4	248.5		388.5	3326	0.0075	98.7%	0.0188
15:42:29	18.5	20.2	1.6	0.266	72.4	248.5		388.5	3313	0.0070	98.8%	0.0180
15:43:29	17.4	19.1	1.7	0.271	72.4	248.5		388.5	3343	0.0066	98.9%	0.0169
15:44:29	16.0	17.6	1.6	0.269	72.4	248.5		388.5	3332	0.0060	99.0%	0.0158
15:45:29	15.3	16.9	1.6	0.267	72.4	248.5		388.6	3318	0.0057	99.1%	0.0147
15:46:29	13.6	15.2	1.6	0.270	72.4	248.5		388.6	3338	0.0051	99.2%	0.0142
15:47:29	13.1	14.8	1.6	0.270	72.5	248.5		388.6	3337	0.0050	99.2%	0.0113
15:48:29	12.6	14.2	1.6	0.267	72.4	248.5		388.6	3319	0.0047	99.3%	0.0110
15:49:29	11.8	13.4	1.6	0.274	72.4	248.5		388.6	3364	0.0045	99.4%	0.0103
15:50:29	11.3	12.9	1.6	0.267	72.4	248.5		388.5	3323	0.0043	99.4%	0.0098
15:51:29	10.5	12.1	1.6	0.265	72.4	248.5		388.5	3309	0.0039	99.5%	0.0089
15:52:29	10.3	11.9	1.6	0.267	72.4	248.5		388.5	3319	0.0039	99.5%	0.0090
15:53:29	9.5	11.0	1.6	0.268	72.4	248.5		388.5	3325	0.0036	99.6%	0.0063
15:54:29	9.3	10.9	1.6	0.266	72.4	248.5		388.5	3313	0.0035	99.6%	0.0063
15:55:29	8.6	10.2	1.6	0.266	72.4	248.5		388.6	3315	0.0032	99.7%	0.0058
15:56:29	8.2	9.7	1.6	0.271	72.4	248.5		388.6	3347	0.0031	99.7%	0.0055
15:57:29	6.9	8.5	1.6	0.268	72.3	248.5		388.5	3324	0.0026	99.7%	0.0050
15:58:29	7.3	8.9	1.6	0.266	72.4	248.5		388.5	3315	0.0028	99.8%	0.0051
15:59:29	7.4	8.9	1.5	0.263	72.4	248.5		388.5	3296	0.0028	99.8%	0.0028
16:00:29	7.4	8.9	1.6	0.268	72.4	248.5		388.6	3329	0.0028	99.9%	0.0028
16:01:29	6.7	8.3	1.6	0.264	72.4	248.5		388.6	3300	0.0025	99.9%	0.0025
16:02:29	6.4	7.9	1.5	0.265	72.4	248.5		388.6	3306	0.0024	99.9%	0.0024
16:03:29	6.4	7.9	1.5	0.267	72.4	248.5		388.5	3320	0.0024	100.0%	0.0024
16:04:29	6.3	7.9	1.6	0.269	72.4	248.5		388.6	3332	0.0024	100.0%	0.0024
	123.3	125.1		0.269	71.5	157.3		387.9	3334	7.20		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
8:31:14	0.6	1.9	1.4	0.218	64.0	236.3		382.4	3233	0.0002	0.0%	0.0916
8:32:14	12.3	13.6	1.3	0.220	64.4	235.9		382.7	3246	0.0046	0.4%	0.0904
8:33:14	131.2	132.4	1.3	0.218	64.7	232.9		382.9	3232	0.0487	4.2%	0.1291
8:34:14	191.4	192.7	1.2	0.219	65.0	232.6		383.1	3236	0.0711	9.8%	0.1492
8:35:14	153.3	154.5	1.2	0.218	65.4	232.0		383.4	3229	0.0568	14.3%	0.1320
8:36:14	188.2	189.4	1.2	0.223	65.5	230.7		383.5	3267	0.0705	19.8%	0.1429
8:37:14	165.9	167.1	1.2	0.220	65.7	230.6		383.6	3247	0.0618	24.7%	0.1276
8:38:14	132.6	133.8	1.2	0.219	65.9	230.6		383.8	3238	0.0492	28.6%	0.1066
8:39:14	119.1	120.3	1.2	0.220	66.0	230.6		383.8	3244	0.0443	32.1%	0.1025
8:40:14	112.8	114.1	1.2	0.218	66.0	230.2		383.8	3230	0.0418	35.4%	0.1008
8:41:14	103.6	104.9	1.2	0.222	65.9	230.9		383.8	3264	0.0388	38.4%	0.0970
8:42:14	98.0	99.3	1.2	0.218	65.6	230.9		383.5	3230	0.0363	41.3%	0.0914
8:43:14	92.5	93.8	1.3	0.218	65.7	230.9		383.6	3228	0.0342	44.0%	0.0858
8:44:14	84.4	85.6	1.3	0.221	65.7	230.9		383.7	3257	0.0315	46.5%	0.0804
8:45:14	76.9	78.2	1.3	0.219	65.8	230.9		383.7	3240	0.0286	48.7%	0.0780
8:46:14	71.3	72.6	1.3	0.219	65.8	230.9		383.7	3239	0.0265	50.8%	0.0752
8:47:14	66.2	67.5	1.3	0.225	65.6	230.9		383.6	3280	0.0249	52.8%	0.0724
8:48:14	61.4	62.7	1.3	0.176	65.3	230.9		383.4	2902	0.0205	54.4%	0.0658
8:49:14	52.4	53.6	1.2	0.174	65.8	230.9		383.7	2884	0.0173	55.7%	0.0574
8:50:14	51.7	53.0	1.2	0.189	65.5	230.9		383.5	3008	0.0179	57.1%	0.0582
8:51:14	53.5	54.7	1.2	0.215	64.6	230.9		382.8	3212	0.0197	58.7%	0.0590
8:52:14	54.5	55.7	1.2	0.215	64.6	230.9		382.8	3208	0.0201	60.3%	0.0582
8:53:14	50.0	51.2	1.2	0.216	64.7	230.9		382.9	3218	0.0185	61.7%	0.0551
8:54:14	49.9	51.1	1.2	0.217	64.7	230.9		382.9	3223	0.0185	63.2%	0.0516
8:55:14	46.5	47.6	1.2	0.216	64.8	230.9		383.0	3215	0.0172	64.5%	0.0488
8:56:14	44.3	45.5	1.2	0.217	64.8	230.9		383.0	3225	0.0164	65.8%	0.0495
8:57:14	43.2	44.4	1.2	0.215	64.8	230.9		383.0	3209	0.0159	67.1%	0.0487
8:58:14	40.6	41.7	1.1	0.214	64.9	230.9		383.1	3201	0.0149	68.3%	0.0474
8:59:14	40.6	41.7	1.1	0.215	65.0	230.9		383.1	3211	0.0150	69.4%	0.0453
9:00:14	39.4	40.5	1.1	0.219	65.1	230.9		383.2	3236	0.0146	70.6%	0.0401
9:01:14	38.3	39.4	1.1	0.215	65.2	230.9		383.3	3210	0.0141	71.7%	0.0404
9:02:14	36.1	37.2	1.1	0.217	65.3	230.9		383.4	3224	0.0134	72.8%	0.0392
9:03:14	36.2	37.3	1.1	0.215	65.4	230.9		383.4	3207	0.0133	73.8%	0.0381
9:04:14	36.8	37.9	1.1	0.214	65.8	230.9		383.7	3198	0.0135	74.9%	0.0366
9:05:14	27.9	29.0	1.1	0.213	66.0	230.9		383.8	3195	0.0102	75.7%	0.0331
9:06:14	25.3	26.4	1.1	0.216	65.7	230.9		383.6	3220	0.0093	76.4%	0.0317
9:07:14	29.6	30.7	1.1	0.215	65.3	230.9		383.4	3206	0.0109	77.3%	0.0330
9:08:14	32.2	33.3	1.1	0.212	65.3	230.9		383.4	3190	0.0118	78.2%	0.0328
9:09:14	32.8	33.9	1.1	0.213	65.4	230.9		383.4	3197	0.0120	79.2%	0.0325
9:10:14	30.0	31.1	1.1	0.212	65.4	230.9		383.4	3188	0.0110	80.0%	0.0304
9:11:14	28.5	29.6	1.1	0.213	65.3	230.9		383.3	3195	0.0105	80.8%	0.0254
9:12:14	28.1	29.1	1.0	0.211	65.3	230.9		383.3	3179	0.0102	81.6%	0.0263
9:13:14	25.9	27.0	1.1	0.213	65.3	230.9		383.3	3192	0.0095	82.4%	0.0259
9:14:14	24.5	25.6	1.1	0.212	65.2	230.9		383.3	3184	0.0090	83.1%	0.0248
9:15:14	21.8	22.9	1.0	0.218	65.2	230.9		383.3	3234	0.0081	83.7%	0.0231
9:16:14	21.9	23.0	1.1	0.217	65.2	230.9		383.2	3227	0.0081	84.4%	0.0229
9:17:14	21.7	22.8	1.1	0.214	65.2	230.9		383.2	3203	0.0080	85.0%	0.0223
9:18:14	21.6	22.7	1.1	0.215	65.3	230.9		383.3	3208	0.0080	85.6%	0.0221
9:19:14	21.8	22.9	1.1	0.217	65.3	230.9		383.3	3224	0.0081	86.3%	0.0210
9:20:14	20.9	22.1	1.2	0.213	65.3	230.9		383.4	3195	0.0077	86.9%	0.0205
9:21:14	19.6	20.7	1.1	0.215	65.4	230.9		383.4	3212	0.0072	87.4%	0.0194
9:22:14	13.8	14.9	1.1	0.216	65.5	230.9		383.5	3213	0.0051	87.8%	0.0150
9:23:14	19.0	20.0	1.0	0.216	65.5	230.9		383.5	3216	0.0070	88.4%	0.0160
9:24:14	19.3	20.3	1.0	0.226	65.6	230.9		383.5	3289	0.0073	89.0%	0.0164
9:25:14	18.9	20.0	1.1	0.230	65.6	230.9		383.6	3322	0.0072	89.5%	0.0158
9:26:14	18.8	19.9	1.1	0.230	65.7	230.9		383.6	3319	0.0071	90.1%	0.0150
9:27:14	17.6	18.7	1.1	0.230	65.7	230.9		383.6	3319	0.0067	90.6%	0.0148

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:28:14	17.3	18.4	1.1	0.232	65.9	230.9		383.8	3330	0.0066	91.1%	0.0144
9:29:14	18.4	19.6	1.1	0.229	65.9	230.9		383.8	3312	0.0070	91.7%	0.0142
9:30:14	15.7	16.8	1.1	0.233	66.0	230.9		383.9	3339	0.0060	92.2%	0.0130
9:31:14	16.1	17.2	1.1	0.232	66.0	230.9		383.9	3331	0.0062	92.7%	0.0128
9:32:14	15.7	16.8	1.2	0.231	66.0	230.9		383.8	3330	0.0060	93.1%	0.0122
9:33:14	15.7	16.9	1.1	0.228	65.9	230.9		383.8	3303	0.0060	93.6%	0.0099
9:34:14	14.4	15.5	1.1	0.232	65.9	230.9		383.8	3336	0.0055	94.0%	0.0090
9:35:14	14.4	15.5	1.1	0.232	65.9	230.9		383.8	3331	0.0055	94.5%	0.0091
9:36:14	13.6	14.7	1.1	0.230	65.9	230.9		383.8	3322	0.0052	94.9%	0.0086
9:37:14	13.0	14.0	1.1	0.228	66.1	230.9		384.0	3302	0.0049	95.3%	0.0079
9:38:14	13.4	14.5	1.0	0.230	66.3	230.9		384.1	3316	0.0051	95.7%	0.0081
9:39:14	12.7	13.7	1.1	0.231	66.2	230.9		384.0	3330	0.0048	96.0%	0.0078
9:40:14	11.6	12.6	1.1	0.234	66.2	230.9		384.0	3345	0.0044	96.4%	0.0072
9:41:14	11.2	12.3	1.1	0.230	66.1	230.9		383.9	3322	0.0043	96.7%	0.0069
9:42:14	10.8	12.0	1.2	0.231	66.1	230.9		384.0	3326	0.0041	97.1%	0.0066
9:43:14	10.2	11.4	1.2	0.231	66.1	230.9		383.9	3326	0.0039	97.4%	0.0062
9:44:14	10.2	11.3	1.1	0.234	66.2	230.9		384.0	3348	0.0039	97.7%	0.0039
9:45:14	9.3	10.5	1.1	0.228	66.2	230.9		384.0	3303	0.0035	97.9%	0.0035
9:46:14	9.4	10.5	1.1	0.233	66.3	230.9		384.1	3343	0.0036	98.2%	0.0036
9:47:14	8.9	10.1	1.1	0.233	66.4	230.9		384.1	3339	0.0034	98.5%	0.0034
9:48:14	7.7	8.9	1.2	0.232	66.4	230.9		384.1	3334	0.0030	98.7%	0.0030
9:49:14	7.7	8.9	1.2	0.231	66.4	230.9		384.1	3326	0.0029	99.0%	0.0029
9:50:14	7.7	8.8	1.1	0.231	66.5	230.9		384.2	3324	0.0029	99.2%	0.0029
9:51:14	7.2	8.3	1.1	0.231	66.5	230.9		384.2	3326	0.0028	99.4%	0.0028
9:52:14	7.0	8.2	1.2	0.232	66.4	230.9		384.2	3333	0.0027	99.6%	0.0027
9:53:14	6.6	7.8	1.2	0.232	66.5	230.9		384.2	3331	0.0025	99.8%	0.0025
9:54:14	6.0	7.2	1.2	0.230	66.6	230.9		384.3	3319	0.0023	100.0%	0.0023
	40.8	42.0		0.221	65.6	5.4		383.6	3249	1.27		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
7:55:08	1.9	1.9	3.0	0.192	62.8	462.5		381.5	3288	0.0007	0.0%	2.6150
7:56:08	4.0	7.0	3.0	0.189	62.9	461.7		381.6	3258	0.0015	0.0%	2.4557
7:57:08	52.2	55.2	3.0	0.189	63.0	458.4		381.7	3260	0.0196	0.1%	2.3641
7:58:08	239.8	242.7	3.0	0.189	63.0	452.1		381.7	3260	0.0901	0.4%	2.3815
7:59:08	382.5	385.5	3.0	0.187	63.2	445.8		381.8	3244	0.1430	0.9%	2.5335
8:00:08	374.9	377.8	3.0	0.174	63.1	441.5		381.7	3130	0.1352	1.4%	2.6327
8:01:08	392.6	395.6	3.0	0.169	63.1	436.4		381.7	3082	0.1395	1.9%	2.6146
8:02:08	433.2	436.2	2.9	0.175	63.2	432.8		381.8	3136	0.1566	2.4%	2.5766
8:03:08	390.0	392.9	2.9	0.172	63.2	432.8		381.8	3113	0.1399	2.9%	2.6541
8:04:08	311.0	313.9	2.9	0.171	63.2	432.9		381.8	3102	0.1112	3.3%	2.8230
8:05:08	268.5	271.6	3.0	0.170	63.1	432.8		381.8	3096	0.0958	3.6%	2.7517
8:06:08	243.5	246.5	3.0	0.170	63.2	432.9		381.8	3098	0.0869	3.9%	2.6143
8:07:08	212.5	215.5	3.0	0.170	63.2	432.9		381.8	3094	0.0758	4.2%	2.4542
8:08:08	199.8	202.8	3.0	0.170	63.3	432.5		381.8	3097	0.0713	4.5%	2.3444
8:09:08	187.8	190.8	3.0	0.169	63.2	432.4		381.8	3082	0.0667	4.7%	2.2913
8:10:08	167.6	170.5	3.0	0.169	63.3	432.4		381.8	3084	0.0595	4.9%	2.3905
8:11:08	234.8	237.7	2.9	0.174	63.3	428.7		381.9	3130	0.0847	5.2%	2.4974
8:12:08	380.1	383.0	2.9	0.172	63.3	423.0		381.9	3110	0.1362	5.7%	2.4751
8:13:08	285.6	288.5	2.9	0.170	63.2	421.5		381.8	3092	0.1018	6.0%	2.4200
8:14:08	367.3	370.3	2.9	0.172	63.2	417.1		381.8	3109	0.1316	6.5%	2.5142
8:15:08	372.3	375.4	3.0	0.174	63.2	416.9		381.8	3127	0.1342	7.0%	2.7118
8:16:08	446.4	449.4	3.0	0.168	63.3	414.2		381.9	3072	0.1580	7.5%	2.6559
8:17:08	343.1	346.0	3.0	0.171	63.3	413.9		381.9	3103	0.1226	8.0%	2.5274
8:18:08	289.1	292.1	3.0	0.171	63.3	413.7		381.9	3104	0.1034	8.3%	2.3784
8:19:08	263.7	266.7	3.0	0.170	63.3	413.7		381.9	3093	0.0940	8.7%	2.2731
8:20:08	269.3	272.2	2.9	0.169	63.2	411.4		381.8	3083	0.0957	9.0%	2.2246
8:21:08	457.2	460.0	2.9	0.169	63.2	405.0		381.8	3082	0.1623	9.6%	2.3309
8:22:08	571.6	574.5	2.8	0.170	63.2	400.0		381.8	3093	0.2037	10.3%	2.4128
8:23:08	514.3	517.1	2.8	0.167	63.2	398.7		381.8	3071	0.1820	10.9%	2.3389
8:24:08	450.4	453.2	2.8	0.168	63.1	397.1		381.7	3078	0.1598	11.5%	2.3183
8:25:08	357.0	359.8	2.8	0.170	63.0	397.1		381.7	3097	0.1275	11.9%	2.3826
8:26:08	316.0	318.8	2.8	0.167	63.1	397.1		381.7	3069	0.1118	12.3%	2.5777
8:27:08	299.5	302.3	2.8	0.167	63.1	397.1		381.8	3067	0.1059	12.7%	2.4978
8:28:08	277.8	280.6	2.8	0.171	63.1	397.1		381.8	3098	0.0992	13.1%	2.4047
8:29:08	268.9	271.6	2.8	0.170	63.0	397.1		381.7	3090	0.0958	13.4%	2.2750
8:30:08	230.0	232.8	2.8	0.167	63.0	397.0		381.6	3069	0.0814	13.7%	2.1791
8:31:08	173.8	176.6	2.8	0.168	63.0	397.0		381.6	3073	0.0616	13.9%	2.1290
8:32:08	154.0	156.8	2.8	0.167	62.9	397.0		381.6	3069	0.0545	14.1%	2.1686
8:33:08	144.2	147.0	2.7	0.170	62.9	397.1		381.6	3096	0.0515	14.3%	2.2090
8:34:08	139.4	142.2	2.7	0.168	62.9	397.1		381.6	3072	0.0494	14.4%	2.1570
8:35:08	132.9	135.6	2.7	0.169	62.9	397.1		381.6	3083	0.0472	14.6%	2.1585
8:36:08	122.2	124.9	2.7	0.170	62.9	397.1		381.6	3097	0.0436	14.8%	2.2552
8:37:08	122.7	125.4	2.7	0.167	62.9	397.1		381.6	3071	0.0435	14.9%	2.4659
8:38:08	121.6	124.3	2.7	0.170	62.9	397.1		381.6	3091	0.0433	15.1%	2.3920
8:39:08	115.1	117.8	2.7	0.173	62.9	397.1		381.6	3119	0.0414	15.2%	2.3055
8:40:08	108.9	111.6	2.7	0.168	62.9	397.1		381.6	3076	0.0386	15.3%	2.1792
8:41:08	108.1	110.8	2.7	0.168	63.0	397.1		381.6	3080	0.0384	15.5%	2.0977
8:42:08	109.7	112.4	2.7	0.167	63.0	397.1		381.6	3070	0.0388	15.6%	2.0674
8:43:08	102.3	105.0	2.7	0.168	63.0	397.1		381.6	3076	0.0363	15.7%	2.1141
8:44:08	101.2	103.8	2.7	0.170	63.0	397.1		381.6	3097	0.0361	15.9%	2.1575
8:45:08	108.2	110.9	2.6	0.169	63.0	397.1		381.6	3083	0.0385	16.0%	2.1076
8:46:08	103.5	106.1	2.6	0.170	63.0	397.1		381.6	3095	0.0369	16.1%	2.1112
8:47:08	110.2	112.8	2.6	0.168	63.0	397.1		381.7	3079	0.0391	16.3%	2.2116
8:48:08	109.9	112.6	2.6	0.167	63.0	397.1		381.7	3067	0.0389	16.4%	2.4224
8:49:08	106.7	109.3	2.7	0.168	63.0	397.1		381.6	3078	0.0378	16.5%	2.3486
8:50:08	105.9	108.5	2.6	0.169	63.0	397.1		381.7	3087	0.0377	16.7%	2.2641
8:51:08	107.3	109.9	2.6	0.170	63.0	397.1		381.7	3098	0.0383	16.8%	2.1406

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
8:52:08	104.2	106.7	2.6	0.171	63.0	397.1		381.7	3103	0.0373	16.9%	2.0594
8:53:08	108.6	111.1	2.6	0.168	62.9	397.1		381.6	3077	0.0385	17.1%	2.0286
8:54:08	111.6	114.2	2.5	0.168	63.0	397.1		381.6	3077	0.0396	17.2%	2.0778
8:55:08	116.9	119.4	2.5	0.166	63.0	397.1		381.6	3060	0.0412	17.4%	2.1214
8:56:08	118.6	121.1	2.5	0.167	62.9	397.1		381.6	3070	0.0420	17.5%	2.0691
8:57:08	104.4	106.9	2.5	0.169	63.0	397.1		381.6	3088	0.0372	17.6%	2.0743
8:58:08	104.0	106.5	2.5	0.170	62.9	397.1		381.6	3095	0.0371	17.8%	2.1725
8:59:08	101.6	104.1	2.5	0.169	62.9	397.1		381.6	3083	0.0361	17.9%	2.3836
9:00:08	97.8	100.4	2.5	0.171	62.9	397.1		381.6	3104	0.0350	18.0%	2.3108
9:01:08	100.4	102.9	2.5	0.169	62.9	397.1		381.6	3084	0.0357	18.2%	2.2264
9:02:08	106.2	108.6	2.5	0.170	63.0	397.1		381.6	3090	0.0378	18.3%	2.1023
9:03:08	100.3	102.8	2.5	0.170	62.9	397.1		381.6	3093	0.0358	18.4%	2.0221
9:04:08	109.3	111.8	2.5	0.169	63.0	397.1		381.7	3086	0.0389	18.5%	1.9900
9:05:08	98.6	101.0	2.5	0.172	63.1	397.1		381.7	3108	0.0353	18.7%	2.0382
9:06:08	103.9	106.3	2.5	0.170	63.1	397.0		381.7	3090	0.0370	18.8%	2.0802
9:07:08	110.8	113.2	2.5	0.170	63.2	397.1		381.8	3097	0.0395	18.9%	2.0271
9:08:08	115.8	118.2	2.4	0.172	63.1	397.1		381.8	3115	0.0416	19.1%	2.0372
9:09:08	126.3	128.7	2.4	0.172	63.2	397.0		381.8	3110	0.0453	19.2%	2.1353
9:10:08	135.7	138.2	2.5	0.169	63.3	397.0		381.9	3086	0.0483	19.4%	2.3474
9:11:08	146.4	148.9	2.5	0.177	63.3	400.7		381.9	3153	0.0532	19.6%	2.2758
9:12:08	143.3	145.8	2.5	0.176	63.2	399.2		381.8	3147	0.0520	19.8%	2.1908
9:13:08	150.8	153.3	2.5	0.176	63.2	397.4		381.8	3146	0.0547	20.0%	2.0645
9:14:08	135.0	137.5	2.5	0.176	63.2	395.9		381.8	3145	0.0489	20.2%	1.9863
9:15:08	209.6	212.2	2.6	0.173	63.3	392.9		381.9	3119	0.0753	20.4%	1.9512
9:16:08	293.1	295.6	2.5	0.172	63.3	388.5		381.9	3113	0.1051	20.8%	2.0029
9:17:08	292.9	295.5	2.6	0.173	63.3	387.5		381.9	3125	0.1055	21.2%	2.0432
9:18:08	357.0	359.6	2.6	0.173	63.3	382.2		381.9	3124	0.1285	21.6%	1.9876
9:19:08	419.7	422.3	2.6	0.176	63.4	377.8		381.9	3147	0.1522	22.1%	1.9956
9:20:08	496.2	498.8	2.6	0.171	63.4	372.6		382.0	3099	0.1771	22.8%	2.0901
9:21:08	530.7	533.3	2.6	0.171	63.4	367.7		381.9	3107	0.1899	23.4%	2.2992
9:22:08	599.8	602.4	2.6	0.177	63.4	364.2		382.0	3155	0.2179	24.2%	2.2226
9:23:08	574.3	576.9	2.6	0.174	63.4	361.0		382.0	3131	0.2071	24.9%	2.1388
9:24:08	581.5	584.1	2.6	0.173	63.5	359.1		382.0	3117	0.2088	25.7%	2.0098
9:25:08	531.5	534.1	2.6	0.178	63.5	358.6		382.1	3161	0.1935	26.4%	1.9374
9:26:08	478.8	481.5	2.6	0.173	63.5	354.3		382.0	3119	0.1720	27.0%	1.8758
9:27:08	491.1	493.8	2.6	0.176	63.5	352.2		382.0	3144	0.1778	27.6%	1.8978
9:28:08	602.1	604.7	2.6	0.174	63.6	346.8		382.1	3133	0.2172	28.4%	1.9377
9:29:08	558.0	560.7	2.7	0.175	63.6	345.6		382.1	3137	0.2016	29.1%	1.8591
9:30:08	575.8	578.5	2.7	0.174	63.6	341.2		382.1	3133	0.2077	29.8%	1.8434
9:31:08	683.2	685.8	2.7	0.178	63.6	335.1		382.1	3164	0.2490	30.7%	1.9129
9:32:08	751.7	754.4	2.7	0.175	63.5	331.8		382.1	3143	0.2721	31.6%	2.1092
9:33:08	645.3	648.0	2.7	0.174	63.6	331.1		382.1	3126	0.2323	32.4%	2.0046
9:34:08	554.3	557.0	2.7	0.174	63.6	331.0		382.1	3133	0.2000	33.1%	1.9317
9:35:08	437.3	440.1	2.8	0.174	63.6	331.0		382.1	3133	0.1578	33.7%	1.8010
9:36:08	348.7	351.5	2.8	0.174	63.6	331.0		382.1	3133	0.1258	34.1%	1.7439
9:37:08	318.3	321.2	2.9	0.174	63.6	331.0		382.1	3131	0.1147	34.6%	1.7038
9:38:08	280.8	283.8	3.0	0.173	63.6	331.0		382.1	3124	0.1010	34.9%	1.7199
9:39:08	229.4	232.5	3.1	0.175	63.6	331.0		382.1	3143	0.0831	35.2%	1.7205
9:40:08	220.7	223.8	3.1	0.174	63.6	331.0		382.1	3134	0.0796	35.5%	1.6575
9:41:08	192.4	195.6	3.1	0.174	63.5	331.0		382.0	3133	0.0694	35.7%	1.6357
9:42:08	191.4	194.6	3.2	0.175	63.5	331.0		382.1	3142	0.0693	36.0%	1.6640
9:43:08	171.8	175.1	3.2	0.173	63.5	331.0		382.0	3118	0.0617	36.2%	1.8372
9:44:08	149.0	152.2	3.2	0.177	63.5	331.0		382.0	3156	0.0542	36.4%	1.7723
9:45:08	142.8	146.0	3.2	0.175	63.5	331.0		382.1	3143	0.0517	36.6%	1.7317
9:46:08	150.0	153.1	3.2	0.175	63.6	331.0		382.1	3136	0.0542	36.7%	1.6433
9:47:08	144.1	147.2	3.1	0.177	63.7	331.0		382.1	3155	0.0524	36.9%	1.6181
9:48:08	139.5	142.7	3.2	0.176	63.7	331.0		382.2	3147	0.0505	37.1%	1.5890

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:49:08	132.5	135.7	3.2	0.176	63.6	331.0		382.1	3149	0.0481	37.3%	1.6189
9:50:08	126.1	129.2	3.1	0.178	63.7	331.0		382.2	3169	0.0460	37.4%	1.6375
9:51:08	115.9	119.1	3.1	0.181	63.7	331.0		382.2	3194	0.0426	37.6%	1.5778
9:52:08	103.1	106.3	3.1	0.174	63.5	331.0		382.1	3126	0.0371	37.7%	1.5662
9:53:08	113.8	116.9	3.1	0.176	63.7	331.0		382.2	3144	0.0412	37.9%	1.5947
9:54:08	127.7	130.8	3.1	0.178	63.9	331.0		382.3	3168	0.0466	38.0%	1.7754
9:55:08	120.4	123.5	3.1	0.178	63.9	331.0		382.3	3165	0.0438	38.2%	1.7182
9:56:08	105.7	108.8	3.1	0.174	63.9	331.0		382.3	3125	0.0380	38.3%	1.6800
9:57:08	107.2	110.3	3.1	0.176	64.0	331.0		382.4	3145	0.0388	38.5%	1.5891
9:58:08	96.4	99.6	3.2	0.179	64.0	331.0		382.4	3170	0.0352	38.6%	1.5657
9:59:08	97.5	100.6	3.1	0.177	63.9	331.0		382.3	3159	0.0354	38.7%	1.5385
10:00:08	99.5	102.6	3.2	0.175	64.0	331.0		382.4	3137	0.0359	38.8%	1.5708
10:01:08	90.7	93.9	3.2	0.179	63.9	331.0		382.3	3177	0.0332	38.9%	1.5914
10:02:08	87.3	90.5	3.2	0.177	63.9	331.0		382.3	3154	0.0317	39.1%	1.5352
10:03:08	90.7	93.9	3.2	0.175	63.9	331.0		382.3	3141	0.0328	39.2%	1.5291
10:04:08	103.4	106.6	3.2	0.179	63.9	331.0		382.3	3171	0.0377	39.3%	1.5535
10:05:08	91.6	94.8	3.2	0.176	63.9	331.0		382.4	3149	0.0332	39.4%	1.7289
10:06:08	87.7	91.0	3.2	0.176	63.9	331.0		382.3	3152	0.0318	39.5%	1.6743
10:07:08	81.9	85.1	3.2	0.179	63.9	331.0		382.3	3177	0.0300	39.6%	1.6420
10:08:08	93.7	96.9	3.3	0.177	64.0	331.0		382.4	3154	0.0340	39.8%	1.5503
10:09:08	97.7	101.0	3.3	0.176	64.1	331.0		382.5	3147	0.0354	39.9%	1.5306
10:10:08	97.8	101.0	3.2	0.177	64.1	331.0		382.5	3154	0.0355	40.0%	1.5030
10:11:08	100.4	103.6	3.2	0.178	64.2	331.0		382.5	3169	0.0366	40.1%	1.5349
10:12:08	87.3	90.5	3.2	0.177	64.1	331.0		382.5	3155	0.0317	40.3%	1.5583
10:13:08	87.3	90.4	3.2	0.178	64.2	331.0		382.5	3163	0.0318	40.4%	1.5035
10:14:08	93.1	96.4	3.3	0.175	64.2	331.0		382.6	3142	0.0337	40.5%	1.4963
10:15:08	93.0	96.3	3.2	0.177	64.2	331.0		382.6	3157	0.0338	40.6%	1.5158
10:16:08	95.2	98.3	3.2	0.177	64.2	331.0		382.6	3155	0.0345	40.7%	1.6957
10:17:08	87.4	90.5	3.1	0.179	64.3	331.0		382.6	3173	0.0319	40.8%	1.6425
10:18:08	83.7	86.8	3.1	0.177	64.3	331.0		382.6	3154	0.0304	40.9%	1.6120
10:19:08	81.2	84.3	3.1	0.179	64.3	331.0		382.6	3177	0.0297	41.0%	1.5163
10:20:08	83.1	86.2	3.1	0.175	64.3	331.0		382.6	3136	0.0300	41.2%	1.4952
10:21:08	85.6	88.8	3.1	0.177	64.4	331.0		382.7	3154	0.0311	41.3%	1.4676
10:22:08	93.3	96.3	3.0	0.179	64.5	331.0		382.8	3178	0.0341	41.4%	1.4983
10:23:08	96.0	99.2	3.2	0.175	64.6	331.0		382.8	3143	0.0347	41.5%	1.5266
10:24:08	88.9	92.2	3.3	0.181	64.5	331.0		382.8	3196	0.0326	41.6%	1.4718
10:25:08	91.1	94.3	3.2	0.176	64.6	331.1		382.8	3149	0.0330	41.7%	1.4627
10:26:08	165.5	168.7	3.2	0.178	64.7	328.5		382.9	3163	0.0601	41.9%	1.4820
10:27:08	377.9	381.2	3.4	0.178	64.7	322.0		382.9	3163	0.1373	42.4%	1.6612
10:28:08	545.6	548.9	3.3	0.179	64.8	317.2		383.0	3178	0.1992	43.1%	1.6106
10:29:08	468.8	472.1	3.3	0.180	64.8	316.0		383.0	3179	0.1713	43.7%	1.5817
10:30:08	418.8	422.1	3.2	0.175	64.9	314.3		383.0	3140	0.1511	44.3%	1.4867
10:31:08	390.3	393.5	3.2	0.179	64.9	312.8		383.0	3176	0.1424	44.8%	1.4652
10:32:08	512.9	516.3	3.4	0.181	64.9	307.5		383.1	3194	0.1882	45.4%	1.4365
10:33:08	555.1	558.6	3.5	0.177	64.9	306.2		383.1	3154	0.2011	46.1%	1.4642
10:34:08	493.6	497.0	3.4	0.181	65.0	306.2		383.1	3191	0.1809	46.8%	1.4919
10:35:08	439.8	443.2	3.4	0.178	65.0	307.7		383.1	3167	0.1600	47.3%	1.4391
10:36:08	462.1	465.6	3.5	0.176	65.1	304.1		383.2	3148	0.1671	47.9%	1.4297
10:37:08	541.0	544.5	3.5	0.181	65.0	298.0		383.1	3190	0.1982	48.6%	1.4219
10:38:08	648.0	651.5	3.5	0.182	65.1	294.2		383.2	3203	0.2383	49.5%	1.5238
10:39:08	578.8	582.3	3.5	0.174	65.1	291.5		383.2	3131	0.2081	50.2%	1.4114
10:40:08	643.0	646.6	3.5	0.179	65.1	287.0		383.2	3171	0.2341	51.0%	1.4104
10:41:08	658.2	661.8	3.6	0.180	65.1	284.1		383.2	3184	0.2407	51.9%	1.3356
10:42:08	616.3	619.9	3.6	0.178	65.0	281.2		383.1	3167	0.2241	52.7%	1.3228
10:43:08	608.8	612.5	3.6	0.180	65.1	278.5		383.2	3179	0.2223	53.4%	1.2483
10:44:08	593.2	596.8	3.6	0.179	65.1	274.4		383.2	3173	0.2161	54.2%	1.2631
10:45:08	628.2	631.8	3.6	0.176	65.2	269.1		383.2	3146	0.2269	55.0%	1.3110

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:46:08	610.6	614.2	3.6	0.179	65.2	266.0		383.2	3177	0.2227	55.8%	1.2791
10:47:08	584.4	588.1	3.7	0.179	65.1	264.5		383.2	3172	0.2128	56.5%	1.2626
10:48:08	516.0	519.7	3.7	0.178	65.2	261.8		383.2	3163	0.1874	57.2%	1.2237
10:49:08	589.9	593.6	3.7	0.178	65.2	258.9		383.3	3161	0.2141	57.9%	1.2855
10:50:08	513.8	517.6	3.8	0.176	65.2	257.4		383.3	3146	0.1856	58.6%	1.2032
10:51:08	535.4	539.1	3.7	0.180	65.2	255.2		383.3	3181	0.1955	59.3%	1.1763
10:52:08	504.0	507.6	3.6	0.177	65.2	252.4		383.3	3153	0.1824	59.9%	1.0949
10:53:08	497.6	501.3	3.7	0.177	65.2	250.4		383.3	3159	0.1805	60.6%	1.0987
10:54:08	453.9	457.5	3.7	0.178	65.3	249.3		383.3	3162	0.1647	61.1%	1.0260
10:55:08	404.6	408.2	3.7	0.175	65.3	249.1		383.3	3142	0.1459	61.7%	1.0470
10:56:08	392.9	396.6	3.6	0.176	65.3	248.7		383.3	3146	0.1419	62.2%	1.0841
10:57:08	349.8	353.4	3.6	0.176	65.3	248.2		383.3	3146	0.1263	62.6%	1.0564
10:58:08	312.6	316.3	3.6	0.176	65.3	248.2		383.3	3148	0.1130	63.0%	1.0498
10:59:08	285.5	289.2	3.7	0.176	65.3	248.2		383.3	3151	0.1032	63.4%	1.0363
11:00:08	257.2	260.9	3.7	0.177	65.3	248.2		383.3	3157	0.0932	63.7%	1.0714
11:01:08	231.3	235.0	3.7	0.179	65.3	248.2		383.3	3177	0.0844	64.0%	1.0177
11:02:08	199.6	203.4	3.8	0.180	65.3	248.2		383.3	3181	0.0729	64.2%	0.9808
11:03:08	183.2	187.2	4.0	0.178	65.3	248.2		383.3	3168	0.0666	64.5%	0.9125
11:04:08	177.6	181.5	3.9	0.179	65.4	248.3		383.4	3177	0.0648	64.7%	0.9182
11:05:08	168.3	172.1	3.8	0.175	65.4	248.3		383.4	3137	0.0606	64.9%	0.8613
11:06:08	157.9	161.9	4.1	0.177	65.4	248.3		383.4	3153	0.0571	65.1%	0.9011
11:07:08	151.6	155.6	4.0	0.178	65.4	248.3		383.4	3164	0.0550	65.3%	0.9422
11:08:08	146.9	151.0	4.1	0.180	65.4	248.3		383.4	3186	0.0537	65.5%	0.9301
11:09:08	143.2	147.3	4.1	0.179	65.5	248.3		383.5	3177	0.0522	65.7%	0.9369
11:10:08	140.4	144.5	4.2	0.178	65.5	248.3		383.5	3166	0.0510	65.9%	0.9330
11:11:08	135.5	139.7	4.2	0.180	65.6	248.3		383.5	3181	0.0495	66.0%	0.9782
11:12:08	132.9	137.1	4.1	0.176	65.6	248.3		383.5	3151	0.0481	66.2%	0.9333
11:13:08	137.6	141.7	4.1	0.176	65.6	248.3		383.6	3152	0.0497	66.4%	0.9079
11:14:08	136.5	140.6	4.1	0.182	65.7	248.2		383.6	3198	0.0501	66.6%	0.8459
11:15:08	132.5	136.6	4.1	0.182	65.7	248.3		383.6	3201	0.0486	66.7%	0.8534
11:16:08	128.5	132.6	4.2	0.174	65.6	248.3		383.6	3133	0.0462	66.9%	0.8007
11:17:08	126.4	130.5	4.1	0.177	65.7	248.3		383.6	3161	0.0458	67.1%	0.8440
11:18:08	128.9	133.1	4.1	0.176	65.7	248.3		383.7	3147	0.0465	67.2%	0.8872
11:19:08	125.2	129.3	4.1	0.178	65.8	248.3		383.7	3170	0.0455	67.4%	0.8764
11:20:08	130.0	134.1	4.1	0.180	65.8	248.3		383.7	3181	0.0474	67.6%	0.8847
11:21:08	130.1	134.2	4.1	0.176	65.9	248.3		383.7	3152	0.0470	67.7%	0.8821
11:22:08	127.0	131.1	4.0	0.182	65.9	248.2		383.8	3198	0.0466	67.9%	0.9287
11:23:08	124.3	128.3	4.0	0.183	65.9	248.3		383.8	3212	0.0458	68.0%	0.8852
11:24:08	124.9	128.7	3.8	0.181	66.0	248.3		383.8	3191	0.0457	68.2%	0.8582
11:25:08	122.3	126.1	3.8	0.179	65.9	248.3		383.8	3176	0.0445	68.4%	0.7958
11:26:08	115.9	119.7	3.8	0.181	65.9	248.2		383.8	3189	0.0424	68.5%	0.8048
11:27:08	114.1	117.9	3.8	0.179	66.0	248.3		383.8	3179	0.0416	68.7%	0.7545
11:28:08	117.1	121.0	3.9	0.179	66.1	248.3		383.9	3173	0.0426	68.8%	0.7981
11:29:08	114.3	118.2	3.9	0.185	66.2	248.2		384.0	3223	0.0422	69.0%	0.8406
11:30:08	107.6	111.8	4.1	0.181	66.2	248.2		384.0	3190	0.0394	69.1%	0.8309
11:31:08	106.5	110.4	3.9	0.181	66.2	248.2		384.0	3193	0.0390	69.2%	0.8372
11:32:08	108.0	112.1	4.2	0.180	66.3	248.2		384.0	3181	0.0393	69.4%	0.8350
11:33:08	104.2	108.2	3.9	0.182	66.3	248.2		384.1	3198	0.0382	69.5%	0.8822
11:34:08	103.1	106.8	3.7	0.181	66.3	248.2		384.1	3193	0.0377	69.6%	0.8395
11:35:08	100.1	104.1	4.0	0.182	66.4	248.2		384.1	3202	0.0367	69.8%	0.8125
11:36:08	94.3	98.4	4.1	0.180	66.4	248.2		384.2	3183	0.0344	69.9%	0.7513
11:37:08	93.5	97.7	4.2	0.178	66.5	248.2		384.2	3161	0.0338	70.0%	0.7624
11:38:08	92.4	96.6	4.2	0.183	66.6	248.2		384.3	3210	0.0340	70.1%	0.7130
11:39:08	87.7	92.1	4.4	0.183	66.6	248.2		384.3	3206	0.0322	70.2%	0.7555
11:40:08	81.8	86.3	4.4	0.183	66.6	248.2		384.3	3210	0.0301	70.3%	0.7984
11:41:08	78.2	82.7	4.5	0.182	66.7	248.2		384.3	3201	0.0287	70.4%	0.7916
11:42:08	75.9	80.3	4.4	0.182	66.7	248.2		384.4	3204	0.0278	70.5%	0.7983

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:43:08	75.6	80.0	4.3	0.183	66.8	248.2		384.4	3206	0.0278	70.6%	0.7957
11:44:08	70.8	75.1	4.2	0.182	66.8	248.2		384.4	3204	0.0260	70.7%	0.8440
11:45:08	67.4	71.9	4.4	0.181	66.8	248.2		384.5	3196	0.0247	70.8%	0.8018
11:46:08	65.2	69.7	4.5	0.178	66.8	248.2		384.5	3168	0.0236	70.9%	0.7758
11:47:08	64.5	69.0	4.5	0.184	66.9	248.2		384.5	3214	0.0237	71.0%	0.7170
11:48:08	60.8	65.2	4.4	0.183	66.9	248.2		384.5	3214	0.0223	71.1%	0.7286
11:49:08	56.7	61.3	4.5	0.183	66.9	248.2		384.5	3208	0.0208	71.1%	0.6790
11:50:08	54.4	59.1	4.6	0.182	66.9	248.2		384.5	3201	0.0199	71.2%	0.7233
11:51:08	51.7	56.4	4.7	0.186	67.0	248.2		384.6	3236	0.0191	71.3%	0.7683
11:52:08	49.9	54.5	4.6	0.182	67.0	248.2		384.6	3203	0.0183	71.3%	0.7629
11:53:08	48.5	53.2	4.8	0.186	67.1	248.2		384.6	3239	0.0180	71.4%	0.7704
11:54:08	44.8	49.5	4.7	0.184	67.1	248.2		384.7	3216	0.0165	71.5%	0.7679
11:55:08	43.4	48.1	4.7	0.180	67.1	248.2		384.7	3186	0.0158	71.5%	0.8180
11:56:08	42.5	47.3	4.8	0.181	67.2	248.2		384.7	3194	0.0155	71.6%	0.7771
11:57:08	40.7	45.5	4.8	0.182	67.2	248.2		384.7	3203	0.0149	71.6%	0.7522
11:58:08	37.1	41.9	4.8	0.185	67.0	248.2		384.6	3231	0.0137	71.7%	0.6932
11:59:08	35.9	40.8	4.9	0.181	67.1	246.7		384.6	3192	0.0131	71.7%	0.7062
12:00:08	36.1	41.0	4.9	0.182	67.3	248.4		384.8	3199	0.0132	71.8%	0.6582
12:01:08	33.1	37.9	4.8	0.179	67.3	248.6		384.8	3172	0.0120	71.8%	0.7034
12:02:08	31.2	36.1	4.9	0.183	67.3	247.7		384.8	3209	0.0115	71.8%	0.7492
12:03:08	31.8	36.8	5.0	0.184	67.4	249.4		384.9	3218	0.0117	71.9%	0.7446
12:04:08	31.4	36.4	5.0	0.184	67.5	248.4		384.9	3218	0.0116	71.9%	0.7525
12:05:08	29.2	34.0	4.7	0.182	67.5	247.3		384.9	3200	0.0107	72.0%	0.7515
12:06:08	29.5	34.2	4.6	0.187	67.6	246.3		385.0	3241	0.0109	72.0%	0.8022
12:07:08	26.1	30.9	4.8	0.187	67.5	249.1		385.0	3242	0.0097	72.0%	0.7616
12:08:08	31.8	36.5	4.7	0.179	67.5	248.2		385.0	3177	0.0115	72.1%	0.7373
12:09:08	31.2	36.0	4.8	0.184	67.5	248.3		385.0	3220	0.0115	72.1%	0.6795
12:10:08	47.7	52.4	4.7	0.181	67.6	247.1		385.0	3196	0.0174	72.2%	0.6931
12:11:08	125.2	130.2	5.0	0.186	67.6	241.8		385.0	3238	0.0463	72.3%	0.6450
12:12:08	299.9	304.7	4.8	0.186	67.6	236.1		385.0	3239	0.1110	72.7%	0.6914
12:13:08	395.5	400.3	4.8	0.187	67.6	232.6		385.0	3243	0.1466	73.3%	0.7377
12:14:08	460.1	464.9	4.8	0.186	67.6	227.1		385.0	3235	0.1701	73.9%	0.7329
12:15:08	522.4	526.7	4.4	0.184	67.7	221.6		385.1	3215	0.1919	74.5%	0.7409
12:16:08	617.4	621.9	4.6	0.189	67.7	215.7		385.1	3265	0.2303	75.3%	0.7408
12:17:08	699.9	704.1	4.3	0.188	67.8	211.2		385.1	3249	0.2598	76.3%	0.7912
12:18:08	699.3	703.9	4.6	0.187	67.8	205.5		385.2	3247	0.2594	77.2%	0.7519
12:19:08	778.2	782.8	4.6	0.184	67.9	200.1		385.2	3222	0.2864	78.2%	0.7257
12:20:08	730.7	735.6	4.9	0.185	67.9	195.6		385.2	3227	0.2693	79.1%	0.6680
12:21:08	740.2	745.1	4.9	0.183	67.9	193.0		385.2	3207	0.2711	80.1%	0.6757
12:22:08	615.9	619.7	3.8	0.183	67.9	191.3		385.2	3210	0.2258	80.9%	0.5986
12:23:08	626.8	631.2	4.4	0.182	67.9	187.3		385.3	3202	0.2292	81.7%	0.5804
12:24:08	703.2	707.2	4.0	0.187	68.0	183.3		385.3	3246	0.2607	82.6%	0.5911
12:25:08	667.6	670.9	3.3	0.184	68.0	179.5		385.3	3216	0.2451	83.5%	0.5628
12:26:08	646.7	649.9	3.3	0.190	68.1	178.0		385.4	3271	0.2415	84.3%	0.5490
12:27:08	580.7	581.3	0.6	0.181	68.1	175.6		385.4	3190	0.2115	85.1%	0.5105
12:28:08	665.9	665.9	0.0	0.191	68.1	171.9		385.4	3280	0.2494	85.9%	0.5314
12:29:08	575.6	580.1	4.5	0.190	68.2	170.5		385.4	3272	0.2150	86.7%	0.4925
12:30:08	471.4	475.9	4.5	0.191	68.1	169.9		385.4	3275	0.1763	87.3%	0.4394
12:31:08	388.9	393.4	4.5	0.191	68.1	169.9		385.4	3280	0.1456	87.8%	0.3987
12:32:08	399.0	403.7	4.7	0.189	68.1	169.9		385.4	3263	0.1487	88.3%	0.4046
12:33:08	340.4	345.3	5.0	0.190	68.1	169.9		385.4	3269	0.1270	88.8%	0.3728
12:34:08	290.6	295.8	5.2	0.190	68.1	169.9		385.4	3272	0.1086	89.2%	0.3512
12:35:08	256.9	262.0	5.1	0.192	68.1	169.9		385.4	3292	0.0965	89.5%	0.3305
12:36:08	240.1	245.2	5.1	0.188	68.2	169.9		385.4	3253	0.0892	89.8%	0.3177
12:37:08	215.5	220.6	5.1	0.187	68.2	169.9		385.5	3246	0.0798	90.1%	0.3075
12:38:08	208.9	214.0	5.1	0.193	68.2	169.9		385.5	3295	0.0786	90.4%	0.2990
12:39:08	169.9	174.9	5.1	0.192	68.2	169.9		385.5	3286	0.0637	90.6%	0.2821

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:40:08	175.3	180.4	5.1	0.190	68.2	169.9		385.5	3267	0.0654	90.8%	0.2775
12:41:08	147.0	152.2	5.2	0.188	68.2	169.9		385.5	3255	0.0546	91.0%	0.2631
12:42:08	136.9	142.0	5.1	0.191	68.2	169.9		385.4	3279	0.0512	91.2%	0.2531
12:43:08	136.0	141.0	5.0	0.191	68.2	169.9		385.5	3282	0.0510	91.4%	0.2559
12:44:08	127.1	132.1	5.0	0.191	68.2	169.9		385.5	3283	0.0476	91.6%	0.2458
12:45:08	125.1	130.1	4.9	0.192	68.3	169.9		385.5	3289	0.0470	91.7%	0.2426
12:46:08	114.6	119.5	4.9	0.187	68.3	169.9		385.6	3243	0.0424	91.9%	0.2339
12:47:08	115.9	120.9	5.0	0.188	68.4	169.9		385.6	3251	0.0430	92.0%	0.2285
12:48:08	111.1	116.0	4.9	0.189	68.4	169.9		385.6	3265	0.0414	92.2%	0.2277
12:49:08	111.0	115.8	4.8	0.188	68.4	169.9		385.6	3256	0.0413	92.3%	0.2204
12:50:08	104.6	109.3	4.8	0.191	68.4	169.9		385.6	3283	0.0392	92.5%	0.2184
12:51:08	96.3	101.0	4.7	0.191	68.4	169.9		385.6	3276	0.0360	92.6%	0.2121
12:52:08	100.8	105.5	4.7	0.190	68.4	169.9		385.6	3274	0.0376	92.7%	0.2085
12:53:08	94.6	99.3	4.6	0.192	68.4	169.9		385.6	3288	0.0355	92.8%	0.2018
12:54:08	101.2	105.7	4.5	0.190	68.5	169.9		385.6	3273	0.0378	93.0%	0.2050
12:55:08	97.0	101.5	4.5	0.191	68.5	169.9		385.6	3282	0.0363	93.1%	0.1982
12:56:08	99.0	103.4	4.5	0.192	68.5	169.9		385.7	3291	0.0372	93.2%	0.1956
12:57:08	98.5	103.0	4.5	0.189	68.5	169.9		385.7	3264	0.0367	93.4%	0.1915
12:58:08	99.7	104.2	4.5	0.192	68.4	169.9		385.6	3289	0.0374	93.5%	0.1855
12:59:08	98.8	103.3	4.5	0.191	68.4	169.9		385.6	3276	0.0369	93.6%	0.1863
13:00:08	93.0	97.5	4.5	0.189	68.5	169.9		385.6	3258	0.0346	93.7%	0.1792
13:01:08	92.8	97.1	4.3	0.191	68.5	169.9		385.7	3280	0.0347	93.9%	0.1792
13:02:08	94.0	98.3	4.3	0.191	68.4	169.9		385.6	3277	0.0351	94.0%	0.1761
13:03:08	95.0	99.2	4.3	0.189	68.4	169.9		385.6	3261	0.0353	94.1%	0.1708
13:04:08	95.0	99.2	4.2	0.194	68.5	169.9		385.7	3305	0.0358	94.2%	0.1663
13:05:08	97.0	101.3	4.2	0.192	68.5	169.9		385.7	3284	0.0364	94.4%	0.1672
13:06:08	95.9	99.9	4.1	0.188	68.5	169.9		385.7	3254	0.0356	94.5%	0.1618
13:07:08	95.5	99.6	4.1	0.186	68.6	169.9		385.7	3236	0.0353	94.6%	0.1585
13:08:08	96.5	100.7	4.2	0.191	68.6	169.9		385.7	3281	0.0361	94.7%	0.1548
13:09:08	95.3	99.3	4.1	0.192	68.6	169.9		385.8	3291	0.0358	94.9%	0.1481
13:10:08	94.2	98.2	4.0	0.190	68.6	169.9		385.8	3271	0.0352	95.0%	0.1493
13:11:08	95.6	99.5	3.9	0.189	68.6	169.9		385.8	3265	0.0356	95.1%	0.1446
13:12:08	94.5	98.4	3.9	0.194	68.6	169.9		385.8	3303	0.0356	95.2%	0.1445
13:13:08	92.5	96.4	3.8	0.194	68.6	169.9		385.8	3302	0.0349	95.4%	0.1410
13:14:08	86.5	90.4	3.9	0.195	68.6	169.9		385.8	3312	0.0327	95.5%	0.1355
13:15:08	80.7	84.6	3.9	0.192	68.6	169.8		385.7	3288	0.0303	95.6%	0.1305
13:16:08	90.2	94.0	3.8	0.190	68.6	169.9		385.8	3269	0.0337	95.7%	0.1308
13:17:08	89.4	93.1	3.7	0.189	68.6	169.9		385.8	3264	0.0333	95.8%	0.1262
13:18:08	86.0	90.0	3.9	0.189	68.6	169.8		385.8	3260	0.0320	95.9%	0.1232
13:19:08	85.9	90.0	4.2	0.192	68.7	169.8		385.8	3284	0.0322	96.1%	0.1187
13:20:08	82.5	86.6	4.1	0.194	68.7	169.8		385.8	3307	0.0311	96.2%	0.1123
13:21:08	81.7	85.8	4.1	0.193	68.7	169.8		385.8	3295	0.0307	96.3%	0.1142
13:22:08	78.6	82.7	4.1	0.195	68.7	169.8		385.9	3313	0.0297	96.4%	0.1090
13:23:08	76.8	80.9	4.0	0.193	68.8	169.8		385.9	3293	0.0289	96.5%	0.1089
13:24:08	75.3	79.2	4.0	0.196	68.8	169.8		385.9	3324	0.0285	96.6%	0.1061
13:25:08	71.1	75.1	4.0	0.195	68.8	169.8		385.9	3313	0.0269	96.7%	0.1028
13:26:08	68.1	72.1	4.0	0.193	68.8	169.8		385.9	3300	0.0256	96.8%	0.1002
13:27:08	66.8	70.7	3.9	0.191	68.8	169.8		385.9	3278	0.0250	96.8%	0.0972
13:28:08	63.9	67.9	3.9	0.191	68.8	169.8		385.9	3281	0.0239	96.9%	0.0929
13:29:08	63.4	67.2	3.9	0.193	68.9	169.8		386.0	3300	0.0238	97.0%	0.0912
13:30:08	61.1	64.9	3.9	0.156	68.8	169.8		385.9	2960	0.0206	97.1%	0.0866
13:31:08	57.9	61.7	3.8	0.114	68.8	169.8		385.9	2538	0.0167	97.1%	0.0812
13:32:08	55.7	59.5	3.8	0.190	68.8	169.8		385.9	3269	0.0208	97.2%	0.0835
13:33:08	53.2	56.9	3.7	0.157	68.8	169.8		385.9	2972	0.0180	97.3%	0.0793
13:34:08	52.7	56.5	3.7	0.189	68.9	169.8		386.0	3260	0.0196	97.4%	0.0800
13:35:08	49.4	53.0	3.7	0.189	68.9	169.8		386.0	3263	0.0184	97.4%	0.0776
13:36:08	48.2	51.9	3.7	0.191	69.0	169.8		386.0	3278	0.0180	97.5%	0.0759

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:37:08	47.0	50.7	3.7	0.196	69.0	169.8		386.0	3319	0.0178	97.5%	0.0746
13:38:08	46.3	49.9	3.6	0.195	69.0	169.8		386.1	3310	0.0174	97.6%	0.0722
13:39:08	43.7	47.3	3.6	0.195	69.1	169.8		386.1	3314	0.0165	97.7%	0.0690
13:40:08	42.0	45.6	3.7	0.193	69.1	169.8		386.1	3298	0.0158	97.7%	0.0674
13:41:08	41.3	44.9	3.6	0.192	69.1	169.8		386.1	3292	0.0155	97.8%	0.0660
13:42:08	40.6	44.2	3.5	0.192	69.1	169.8		386.1	3286	0.0152	97.8%	0.0644
13:43:08	38.8	42.3	3.6	0.191	69.2	169.8		386.2	3282	0.0145	97.9%	0.0627
13:44:08	37.3	40.8	3.5	0.191	69.2	169.8		386.2	3278	0.0139	97.9%	0.0613
13:45:08	36.8	40.3	3.5	0.197	69.3	169.8		386.2	3329	0.0139	98.0%	0.0604
13:46:08	35.6	39.1	3.5	0.191	69.2	169.8		386.2	3278	0.0133	98.0%	0.0593
13:47:08	34.0	37.5	3.5	0.190	69.2	169.8		386.2	3275	0.0127	98.1%	0.0579
13:48:08	32.2	35.7	3.5	0.194	69.2	169.8		386.2	3305	0.0121	98.1%	0.0568
13:49:08	31.6	35.1	3.5	0.190	69.3	169.8		386.2	3271	0.0118	98.2%	0.0548
13:50:08	33.4	36.8	3.4	0.190	69.3	169.8		386.3	3274	0.0125	98.2%	0.0525
13:51:08	33.3	36.8	3.4	0.193	69.3	169.8		386.3	3294	0.0125	98.2%	0.0516
13:52:08	31.4	34.8	3.4	0.191	69.3	169.8		386.3	3279	0.0117	98.3%	0.0505
13:53:08	30.3	33.7	3.4	0.194	69.3	169.8		386.3	3305	0.0114	98.3%	0.0492
13:54:08	30.0	33.5	3.5	0.190	69.4	169.8		386.3	3270	0.0112	98.4%	0.0482
13:55:08	29.2	32.7	3.5	0.192	69.3	169.8		386.3	3286	0.0109	98.4%	0.0474
13:56:08	28.3	31.9	3.6	0.193	69.4	169.8		386.3	3297	0.0106	98.4%	0.0465
13:57:08	27.9	31.5	3.6	0.193	69.4	169.8		386.3	3293	0.0104	98.5%	0.0459
13:58:08	27.5	31.3	3.8	0.195	69.4	169.8		386.3	3317	0.0104	98.5%	0.0452
13:59:08	27.1	30.9	3.8	0.196	69.5	169.8		386.4	3321	0.0102	98.5%	0.0447
14:00:08	26.5	30.4	3.9	0.192	69.5	169.8		386.4	3290	0.0099	98.6%	0.0430
14:01:08	26.3	30.3	4.0	0.192	69.5	169.8		386.4	3290	0.0099	98.6%	0.0401
14:02:08	25.6	29.7	4.1	0.192	69.5	169.8		386.4	3286	0.0096	98.7%	0.0391
14:03:08	24.9	29.3	4.3	0.194	69.4	169.8		386.4	3306	0.0094	98.7%	0.0388
14:04:08	25.3	29.7	4.4	0.194	69.5	169.8		386.4	3302	0.0095	98.7%	0.0378
14:05:08	24.6	29.2	4.6	0.192	69.5	169.8		386.4	3291	0.0092	98.7%	0.0370
14:06:08	24.1	28.8	4.7	0.194	69.5	169.8		386.4	3307	0.0091	98.8%	0.0364
14:07:08	23.2	28.1	4.9	0.194	69.5	169.8		386.4	3302	0.0087	98.8%	0.0359
14:08:08	23.3	28.2	4.9	0.193	69.4	169.8		386.3	3294	0.0087	98.8%	0.0355
14:09:08	22.1	27.1	5.0	0.194	69.3	169.8		386.3	3305	0.0083	98.9%	0.0348
14:10:08	22.2	27.3	5.1	0.193	69.3	169.8		386.3	3294	0.0083	98.9%	0.0344
14:11:08	22.7	27.9	5.2	0.197	69.4	169.8		386.3	3327	0.0086	98.9%	0.0331
14:12:08	21.2	26.5	5.3	0.192	69.4	169.8		386.4	3286	0.0080	99.0%	0.0302
14:13:08	21.1	26.5	5.4	0.192	69.4	169.8		386.4	3283	0.0079	99.0%	0.0295
14:14:08	21.1	26.5	5.4	0.195	69.5	169.8		386.4	3310	0.0080	99.0%	0.0294
14:15:08	21.0	26.5	5.4	0.192	69.5	169.8		386.4	3289	0.0079	99.0%	0.0283
14:16:08	20.9	26.5	5.5	0.194	69.5	169.8		386.4	3302	0.0079	99.1%	0.0278
14:17:08	20.5	26.0	5.5	0.193	69.5	169.7		386.4	3297	0.0077	99.1%	0.0274
14:18:08	19.7	25.2	5.5	0.191	69.5	169.8		386.4	3279	0.0073	99.1%	0.0271
14:19:08	19.2	24.7	5.6	0.189	69.5	169.8		386.4	3266	0.0071	99.1%	0.0268
14:20:08	19.0	24.7	5.7	0.195	69.5	169.7		386.4	3313	0.0072	99.2%	0.0265
14:21:08	19.0	24.7	5.7	0.191	69.5	169.8		386.4	3282	0.0071	99.2%	0.0261
14:22:08	19.1	24.7	5.6	0.190	69.5	169.7		386.4	3274	0.0071	99.2%	0.0244
14:23:08	18.3	24.0	5.7	0.193	69.6	169.7		386.4	3296	0.0069	99.2%	0.0223
14:24:08	17.9	23.6	5.7	0.198	69.5	169.7		386.4	3336	0.0068	99.3%	0.0216
14:25:08	17.7	23.1	5.4	0.197	69.0	169.7		386.1	3333	0.0067	99.3%	0.0214
14:26:08	16.7	21.6	4.9	0.197	68.3	169.8		385.6	3327	0.0063	99.3%	0.0204
14:27:08	16.9	21.3	4.5	0.195	67.8	169.8		385.1	3311	0.0064	99.3%	0.0199
14:28:08	16.7	20.9	4.2	0.198	67.4	169.8		384.9	3336	0.0064	99.4%	0.0197
14:29:08	15.6	19.5	3.9	0.200	67.1	169.8		384.6	3359	0.0060	99.4%	0.0198
14:30:08	16.1	19.7	3.6	0.197	66.9	169.8		384.5	3329	0.0061	99.4%	0.0196
14:31:08	15.9	19.4	3.5	0.202	66.6	169.8		384.3	3369	0.0061	99.4%	0.0193
14:32:08	15.9	19.1	3.2	0.197	66.4	169.8		384.2	3327	0.0060	99.4%	0.0190
14:33:08	14.7	17.7	3.0	0.195	66.2	169.8		384.0	3313	0.0056	99.5%	0.0173

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
14:34:08	15.3	18.2	2.9	0.201	66.2	169.8		384.0	3362	0.0059	99.5%	0.0154
14:35:08	15.0	17.7	2.7	0.200	66.1	169.8		383.9	3356	0.0058	99.5%	0.0148
14:36:08	15.1	17.7	2.6	0.200	66.0	169.8		383.9	3352	0.0058	99.5%	0.0147
14:37:08	14.7	17.2	2.5	0.197	66.0	169.8		383.8	3333	0.0056	99.5%	0.0141
14:38:08	13.5	15.8	2.3	0.202	65.9	169.8		383.8	3374	0.0052	99.6%	0.0135
14:39:08	13.6	16.0	2.3	0.199	65.8	169.8		383.7	3345	0.0052	99.6%	0.0133
14:40:08	14.0	16.2	2.2	0.199	65.8	169.8		383.7	3348	0.0054	99.6%	0.0138
14:41:08	13.9	16.0	2.1	0.201	65.8	169.8		383.7	3360	0.0054	99.6%	0.0135
14:42:08	13.9	16.0	2.1	0.202	65.7	169.8		383.6	3374	0.0054	99.6%	0.0132
14:43:08	14.0	16.0	2.0	0.196	65.7	169.8		383.6	3325	0.0053	99.7%	0.0130
14:44:08	13.7	15.8	2.0	0.192	65.9	169.8		383.8	3291	0.0052	99.7%	0.0117
14:45:08	13.9	16.0	2.1	0.196	66.2	169.8		384.0	3319	0.0053	99.7%	0.0095
14:46:08	12.9	15.1	2.2	0.194	66.5	169.8		384.2	3301	0.0049	99.7%	0.0090
14:47:08	12.6	14.8	2.2	0.193	66.8	169.8		384.4	3296	0.0047	99.7%	0.0089
14:48:08	12.0	14.2	2.2	0.195	66.9	169.8		384.5	3317	0.0045	99.7%	0.0085
14:49:08	11.8	14.2	2.4	0.192	67.1	169.8		384.7	3291	0.0044	99.8%	0.0083
14:50:08	11.7	14.2	2.5	0.194	67.3	169.8		384.8	3308	0.0044	99.8%	0.0081
14:51:08	11.7	14.2	2.5	0.194	67.4	169.8		384.9	3309	0.0044	99.8%	0.0084
14:52:08	11.7	14.2	2.6	0.194	67.5	169.8		385.0	3305	0.0044	99.8%	0.0082
14:53:08	11.4	14.1	2.7	0.193	67.6	169.8		385.0	3293	0.0043	99.8%	0.0078
14:54:08	11.4	14.1	2.7	0.191	67.7	169.8		385.1	3277	0.0043	99.8%	0.0076
14:55:08	10.3	12.9	2.7	0.192	67.7	169.8		385.1	3285	0.0039	99.9%	0.0066
14:56:08	11.2	14.1	2.9	0.193	67.8	169.8		385.2	3293	0.0042	99.9%	0.0042
14:57:08	11.0	13.9	2.9	0.192	67.9	169.7		385.2	3292	0.0042	99.9%	0.0042
14:58:08	10.9	13.7	2.8	0.196	68.0	169.8		385.3	3324	0.0041	99.9%	0.0041
14:59:08	10.6	13.4	2.8	0.188	68.0	169.7		385.3	3253	0.0039	99.9%	0.0039
15:00:08	10.3	13.3	3.0	0.192	68.1	169.7		385.4	3285	0.0039	99.9%	0.0039
15:01:08	9.6	12.7	3.0	0.193	68.1	169.7		385.4	3294	0.0036	99.9%	0.0036
15:02:08	10.6	13.6	3.0	0.188	68.2	169.7		385.4	3253	0.0039	100.0%	0.0039
15:03:08	10.1	13.2	3.1	0.189	68.1	169.7		385.4	3261	0.0038	100.0%	0.0038
15:04:08	9.5	12.6	3.1	0.188	68.2	169.7		385.4	3256	0.0035	100.0%	0.0035
15:05:08	9.0	12.2	3.2	0.188	68.2	169.7		385.4	3256	0.0034	100.0%	0.0034
15:06:08	7.3	10.5	3.3	0.190	68.2	169.7		385.4	3271	0.0027	100.0%	0.0027
	180.6	184.2		0.182	66.0	292.7		383.9	3201	28.40		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
15:49:48	0.9	5.3	4.4	0.190	67.6	170.7		385.0	3250	0.0003	0.0%	0.1165
15:50:48	80.8	85.1	4.3	0.185	67.7	185.0		385.1	3212	0.0297	3.6%	0.1411
15:51:48	186.1	190.4	4.3	0.184	67.7	172.3		385.1	3199	0.0680	11.8%	0.1670
15:52:48	136.1	140.4	4.3	0.185	67.8	167.1		385.2	3212	0.0500	17.8%	0.1479
15:53:48	106.7	110.9	4.3	0.186	67.9	169.9		385.2	3216	0.0392	22.5%	0.1329
15:54:48	107.9	112.2	4.3	0.186	67.9	166.0		385.3	3216	0.0396	27.2%	0.1276
15:55:48	98.2	102.5	4.2	0.184	67.9	167.4		385.3	3199	0.0359	31.5%	0.1162
15:56:48	88.2	92.4	4.2	0.188	67.9	165.9		385.3	3233	0.0326	35.4%	0.1114
15:57:48	81.2	85.4	4.2	0.186	68.0	165.9		385.3	3219	0.0299	39.0%	0.0990
15:58:48	82.1	86.2	4.2	0.187	68.0	165.9		385.3	3227	0.0302	42.7%	0.0980
15:59:48	80.4	84.5	4.1	0.185	68.0	165.9		385.3	3215	0.0295	46.2%	0.0937
16:00:48	70.9	75.0	4.1	0.189	68.0	165.9		385.3	3242	0.0262	49.4%	0.0880
16:01:48	63.2	67.3	4.1	0.187	68.0	165.9		385.3	3232	0.0233	52.2%	0.0803
16:02:48	59.7	63.8	4.1	0.185	67.9	165.9		385.3	3206	0.0219	54.8%	0.0789
16:03:48	50.3	54.4	4.1	0.187	67.9	165.9		385.3	3230	0.0186	57.0%	0.0691
16:04:48	52.7	56.7	4.1	0.183	67.9	165.9		385.2	3197	0.0192	59.3%	0.0677
16:05:48	51.5	55.5	4.0	0.188	67.9	165.9		385.2	3236	0.0190	61.6%	0.0642
16:06:48	44.1	48.1	4.0	0.187	67.9	165.9		385.2	3230	0.0163	63.6%	0.0617
16:07:48	40.3	44.3	4.0	0.189	67.8	165.9		385.2	3242	0.0149	65.3%	0.0570
16:08:48	42.0	45.9	3.9	0.188	67.8	165.9		385.2	3241	0.0155	67.2%	0.0570
16:09:48	36.4	40.3	3.9	0.188	67.7	165.9		385.1	3236	0.0135	68.8%	0.0506
16:10:48	32.9	36.9	4.0	0.189	67.7	165.9		385.1	3248	0.0122	70.3%	0.0485
16:11:48	34.7	38.7	3.9	0.186	67.7	165.9		385.1	3219	0.0128	71.8%	0.0451
16:12:48	32.6	36.5	3.9	0.187	67.7	165.9		385.1	3231	0.0120	73.3%	0.0455
16:13:48	28.0	31.9	4.0	0.186	67.7	165.9		385.1	3220	0.0103	74.5%	0.0420
16:14:48	27.6	31.6	3.9	0.185	67.7	165.9		385.1	3213	0.0101	75.7%	0.0415
16:15:48	25.0	28.9	3.9	0.134	67.6	165.9		385.0	2730	0.0078	76.7%	0.0371
16:16:48	24.2	28.2	3.9	0.187	67.7	165.9		385.1	3226	0.0089	77.7%	0.0363
16:17:48	22.8	26.7	3.9	0.148	67.9	165.9		385.3	2870	0.0075	78.6%	0.0324
16:18:48	24.4	28.3	3.9	0.191	67.6	165.9		385.1	3260	0.0091	79.7%	0.0334
16:19:48	22.5	26.4	3.8	0.189	67.6	165.9		385.0	3246	0.0084	80.7%	0.0318
16:20:48	21.4	25.3	3.8	0.190	67.6	165.9		385.0	3251	0.0080	81.7%	0.0313
16:21:48	20.1	23.9	3.8	0.189	67.6	165.9		385.0	3247	0.0075	82.6%	0.0293
16:22:48	19.9	23.7	3.8	0.188	67.6	165.9		385.0	3232	0.0074	83.5%	0.0273
16:23:48	19.3	23.0	3.7	0.186	67.6	165.9		385.0	3221	0.0071	84.3%	0.0249
16:24:48	18.9	22.6	3.7	0.186	67.6	165.9		385.0	3222	0.0069	85.1%	0.0243
16:25:48	17.9	21.6	3.7	0.191	67.6	165.9		385.0	3266	0.0067	85.9%	0.0234
16:26:48	20.9	24.7	3.7	0.188	67.6	165.9		385.0	3236	0.0077	86.9%	0.0234
16:27:48	20.0	23.9	3.9	0.185	67.6	165.9		385.0	3208	0.0073	87.8%	0.0219
16:28:48	17.6	21.4	3.8	0.191	67.6	165.9		385.0	3260	0.0066	88.5%	0.0200
16:29:48	15.1	18.8	3.8	0.189	67.5	165.9		385.0	3245	0.0056	89.2%	0.0178
16:30:48	14.6	18.3	3.7	0.187	67.5	165.9		385.0	3229	0.0054	89.9%	0.0174
16:31:48	13.8	17.5	3.7	0.188	67.5	165.9		385.0	3236	0.0051	90.5%	0.0167
16:32:48	13.1	16.8	3.7	0.190	67.5	165.9		385.0	3251	0.0049	91.0%	0.0156
16:33:48	15.0	18.7	3.7	0.189	67.5	165.9		384.9	3244	0.0056	91.7%	0.0145
16:34:48	12.3	15.9	3.7	0.188	67.5	165.9		385.0	3236	0.0045	92.3%	0.0134
16:35:48	11.3	14.9	3.7	0.187	67.5	165.9		384.9	3227	0.0042	92.8%	0.0122
16:36:48	11.6	15.3	3.7	0.188	67.5	165.9		384.9	3239	0.0043	93.3%	0.0120
16:37:48	11.8	15.5	3.7	0.184	67.4	165.9		384.9	3200	0.0043	93.8%	0.0116
16:38:48	10.7	14.4	3.6	0.188	67.4	165.9		384.9	3234	0.0040	94.3%	0.0108
16:39:48	11.0	14.7	3.7	0.190	67.4	165.9		384.9	3251	0.0041	94.8%	0.0089
16:40:48	10.2	13.9	3.6	0.185	67.4	165.9		384.9	3215	0.0038	95.2%	0.0089
16:41:48	9.3	12.9	3.6	0.186	67.4	165.9		384.9	3220	0.0034	95.6%	0.0081
16:42:48	8.7	12.2	3.5	0.188	67.4	165.9		384.9	3238	0.0032	96.0%	0.0077
16:43:48	8.6	12.2	3.5	0.187	67.4	165.9		384.9	3224	0.0032	96.4%	0.0073
16:44:48	8.4	11.9	3.5	0.190	67.4	165.9		384.9	3253	0.0031	96.8%	0.0068
16:45:48	7.1	10.5	3.5	0.188	67.4	165.9		384.9	3233	0.0026	97.1%	0.0048

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
16:46:48	7.9	11.3	3.4	0.189	67.4	165.9		384.9	3245	0.0029	97.4%	0.0051
16:47:48	7.1	10.5	3.4	0.188	67.4	165.9		384.9	3236	0.0026	97.7%	0.0046
16:48:48	6.8	10.2	3.4	0.188	67.3	165.9		384.8	3238	0.0025	98.0%	0.0045
16:49:48	6.4	9.7	3.4	0.188	67.3	165.9		384.8	3233	0.0024	98.3%	0.0042
16:50:48	6.0	9.3	3.3	0.186	67.3	165.9		384.8	3219	0.0022	98.6%	0.0037
16:51:48	6.0	9.3	3.3	0.189	67.3	165.9		384.8	3243	0.0022	98.9%	0.0022
16:52:48	5.9	9.2	3.3	0.188	67.3	165.9		384.8	3240	0.0022	99.1%	0.0022
16:53:48	5.5	8.8	3.3	0.187	67.3	165.9		384.8	3226	0.0020	99.4%	0.0020
16:54:48	5.4	8.7	3.4	0.189	67.3	165.9		384.8	3246	0.0020	99.6%	0.0020
16:55:48	4.9	8.2	3.4	0.188	67.3	165.9		384.8	3238	0.0018	99.8%	0.0018
16:56:48	3.9	7.2	3.2	0.185	67.2	165.9		384.7	3211	0.0014	100.0%	0.0014
	33.4	37.2		0.186	67.6	4.73		385.0	3218	0.83		

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
7:39:24	0.3	2.9	2.5	0.231	64.2	496.5		382.6	3312	0.0001	0.0%	1.8412
7:40:24	1.1	3.5	2.5	0.224	65.4	496.3		383.4	3264	0.0004	0.0%	1.8741
7:41:24	96.7	99.1	2.4	0.229	66.4	491.6		384.1	3297	0.0365	0.1%	2.0013
7:42:24	364.2	366.5	2.3	0.228	67.0	485.1		384.6	3289	0.1370	0.6%	2.1400
7:43:24	470.2	472.5	2.3	0.232	67.3	478.8		384.8	3318	0.1784	1.1%	2.1190
7:44:24	462.4	464.7	2.3	0.229	66.6	472.7		384.3	3298	0.1746	1.7%	2.2385
7:45:24	510.0	512.3	2.3	0.229	66.0	467.9		383.9	3298	0.1928	2.3%	2.2433
7:46:24	397.1	399.4	2.3	0.227	65.9	467.7		383.8	3285	0.1495	2.8%	2.1269
7:47:24	305.6	307.8	2.2	0.228	66.3	467.7		384.1	3293	0.1153	3.1%	2.0649
7:48:24	298.0	300.2	2.2	0.225	66.8	467.8		384.4	3267	0.1114	3.5%	1.9178
7:49:24	262.1	264.3	2.1	0.227	67.3	467.8		384.8	3283	0.0984	3.8%	1.8350
7:50:24	229.5	231.7	2.1	0.229	67.6	467.1		385.0	3301	0.0866	4.1%	1.7298
7:51:24	246.3	248.3	2.1	0.230	67.7	463.4		385.1	3303	0.0929	4.4%	1.6922
7:52:24	507.9	510.0	2.1	0.230	67.7	456.8		385.1	3307	0.1919	5.0%	1.8046
7:53:24	589.3	591.4	2.1	0.226	67.8	451.3		385.2	3278	0.2206	5.7%	1.8413
7:54:24	572.7	574.7	2.1	0.231	67.9	449.7		385.2	3311	0.2166	6.4%	1.8207
7:55:24	472.7	474.7	2.1	0.233	67.4	447.7		384.9	3330	0.1799	7.0%	1.8410
7:56:24	698.3	700.3	2.0	0.232	67.1	441.1		384.6	3316	0.2649	7.8%	1.8737
7:57:24	693.5	695.5	2.1	0.228	66.8	434.9		384.4	3292	0.2613	8.7%	1.9648
7:58:24	847.0	848.9	2.0	0.230	66.7	428.7		384.4	3302	0.3201	9.7%	2.0030
7:59:24	791.4	793.4	2.0	0.232	66.6	423.9		384.3	3321	0.3010	10.6%	1.9406
8:00:24	857.1	859.0	1.9	0.232	66.7	419.6		384.3	3318	0.3255	11.7%	2.0639
8:01:24	712.2	714.0	1.8	0.229	67.1	417.9		384.6	3299	0.2688	12.5%	2.0505
8:02:24	542.7	544.5	1.8	0.232	67.6	417.9		385.1	3319	0.2058	13.2%	1.9774
8:03:24	425.5	427.3	1.8	0.232	67.4	417.9		384.9	3316	0.1614	13.7%	1.9496
8:04:24	337.2	339.0	1.8	0.236	67.1	417.9		384.7	3349	0.1292	14.1%	1.8064
8:05:24	318.7	320.5	1.8	0.237	67.3	417.9		384.8	3358	0.1224	14.5%	1.7366
8:06:24	283.4	285.1	1.8	0.238	67.7	417.9		385.1	3361	0.1088	14.9%	1.6432
8:07:24	307.2	309.0	1.8	0.238	67.5	417.9		385.0	3363	0.1181	15.2%	1.5993
8:08:24	235.3	237.3	2.0	0.240	67.2	417.9		384.7	3374	0.0908	15.5%	1.6126
8:09:24	198.4	200.6	2.1	0.241	66.9	417.9		384.5	3386	0.0769	15.8%	1.6207
8:10:24	211.8	214.0	2.2	0.237	67.0	417.9		384.6	3355	0.0813	16.0%	1.6041
8:11:24	223.4	225.6	2.2	0.234	67.7	417.9		385.1	3336	0.0851	16.3%	1.6611
8:12:24	233.0	235.2	2.2	0.234	68.1	417.9		385.4	3334	0.0887	16.6%	1.6088
8:13:24	199.4	201.5	2.1	0.233	67.9	417.9		385.3	3330	0.0758	16.8%	1.7035
8:14:24	168.6	170.6	2.1	0.237	67.5	417.9		385.0	3355	0.0646	17.0%	1.6829
8:15:24	152.2	154.2	2.0	0.236	67.4	417.9		384.9	3345	0.0582	17.2%	1.6396
8:16:24	157.5	159.4	1.9	0.235	67.6	417.9		385.0	3339	0.0601	17.4%	1.7384
8:17:24	160.0	161.9	1.9	0.235	68.0	417.9		385.3	3339	0.0610	17.6%	1.7817
8:18:24	142.9	144.7	1.8	0.235	68.2	417.9		385.4	3344	0.0545	17.8%	1.7716
8:19:24	134.2	136.1	1.8	0.235	67.9	417.9		385.2	3341	0.0512	18.0%	1.7883
8:20:24	130.8	132.6	1.8	0.237	67.6	417.9		385.0	3357	0.0502	18.1%	1.6772
8:21:24	130.7	132.5	1.8	0.237	67.4	417.9		384.8	3353	0.0501	18.3%	1.6142
8:22:24	130.2	132.0	1.8	0.237	67.3	417.9		384.8	3357	0.0500	18.4%	1.5344
8:23:24	131.5	133.3	1.7	0.237	67.3	417.9		384.8	3358	0.0505	18.6%	1.4812
8:24:24	122.4	124.1	1.7	0.238	67.3	417.9		384.8	3361	0.0470	18.7%	1.5218
8:25:24	121.9	123.5	1.7	0.238	67.4	417.9		384.9	3364	0.0469	18.9%	1.5438
8:26:24	122.7	124.4	1.7	0.238	67.4	417.8		384.9	3359	0.0471	19.0%	1.5228
8:27:24	122.6	124.3	1.7	0.240	67.6	417.9		385.0	3374	0.0473	19.2%	1.5760
8:28:24	109.6	111.3	1.7	0.239	67.6	417.9		385.1	3367	0.0422	19.3%	1.5201
8:29:24	116.7	118.4	1.7	0.237	67.7	417.8		385.1	3357	0.0448	19.5%	1.6277
8:30:24	103.4	105.0	1.7	0.239	67.9	417.9		385.3	3371	0.0398	19.6%	1.6182
8:31:24	100.6	102.3	1.7	0.238	68.2	417.8		385.5	3363	0.0386	19.7%	1.5814
8:32:24	95.2	96.9	1.7	0.240	68.3	417.8		385.5	3374	0.0367	19.8%	1.6783
8:33:24	102.5	104.1	1.6	0.242	68.1	417.8		385.4	3392	0.0397	20.0%	1.7207
8:34:24	86.9	88.6	1.7	0.239	67.5	418.0		385.0	3373	0.0335	20.1%	1.7171
8:35:24	131.8	133.4	1.6	0.240	67.8	295.2		385.2	3379	0.0509	20.2%	1.7370
8:36:24	131.1	132.7	1.6	0.244	68.1	421.3		385.4	3406	0.0510	20.4%	1.6270
8:37:24	131.7	133.2	1.6	0.242	68.5	416.5		385.7	3391	0.0509	20.6%	1.5641
8:38:24	99.4	100.9	1.5	0.250	69.1	415.1		386.1	3447	0.0390	20.7%	1.4844
8:39:24	102.2	103.7	1.6	0.243	69.1	418.3		386.1	3401	0.0396	20.8%	1.4307

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
8:40:24	65.1	66.7	1.6	0.245	69.0	428.6		386.0	3409	0.0253	20.9%	1.4748
8:41:24	71.7	73.3	1.6	0.242	69.2	415.9		386.2	3390	0.0277	21.0%	1.4969
8:42:24	132.3	133.9	1.6	0.244	69.6	414.8		386.5	3403	0.0513	21.2%	1.4757
8:43:24	240.9	242.5	1.6	0.240	69.9	410.1		386.7	3375	0.0925	21.4%	1.5287
8:44:24	483.2	484.8	1.6	0.240	69.9	403.6		386.7	3380	0.1858	22.0%	1.4779
8:45:24	711.6	713.2	1.6	0.240	69.8	398.0		386.7	3380	0.2737	22.9%	1.5829
8:46:24	704.0	705.6	1.6	0.242	69.9	392.9		386.7	3387	0.2713	23.8%	1.5784
8:47:24	814.0	815.6	1.6	0.237	70.2	387.5		386.9	3358	0.3109	24.8%	1.5427
8:48:24	823.3	824.9	1.6	0.241	70.3	384.0		387.0	3382	0.3166	25.8%	1.6416
8:49:24	747.3	748.9	1.6	0.241	70.4	379.7		387.1	3383	0.2874	26.7%	1.6810
8:50:24	800.1	801.7	1.6	0.241	70.3	374.7		387.0	3380	0.3075	27.7%	1.6836
8:51:24	879.1	880.6	1.5	0.242	70.3	369.9		387.0	3394	0.3392	28.8%	1.6862
8:52:24	767.8	769.4	1.6	0.241	70.4	-113.1		387.1	3385	0.2954	29.7%	1.5760
8:53:24	598.5	600.0	1.5	0.238	70.6	-301.5		387.2	3366	0.2289	30.4%	1.5131
8:54:24	581.9	583.4	1.5	0.242	70.7	-308.6		387.3	3393	0.2244	31.2%	1.4454
8:55:24	494.5	496.0	1.5	0.241	70.8	-309.5		387.4	3384	0.1901	31.8%	1.3911
8:56:24	693.0	694.6	1.6	0.238	70.8	-310.4		387.4	3359	0.2644	32.6%	1.4495
8:57:24	800.3	801.9	1.6	0.241	70.6	-311.4		387.2	3387	0.3080	33.6%	1.4692
8:58:24	853.9	855.6	1.7	0.239	70.6	-310.2		387.2	3369	0.3269	34.6%	1.4245
8:59:24	804.0	805.6	1.6	0.241	70.6	-310.2		387.2	3385	0.3093	35.6%	1.4362
9:00:24	656.1	657.7	1.6	0.245	70.5	-310.3		387.1	3409	0.2542	36.4%	1.2921
9:01:24	571.7	573.4	1.6	0.242	70.2	-310.2		386.9	3390	0.2204	37.2%	1.3092
9:02:24	485.2	486.9	1.8	0.238	70.0	-310.3		386.8	3366	0.1858	37.7%	1.3071
9:03:24	338.6	340.4	1.8	0.248	69.9	-310.4		386.7	3430	0.1321	38.2%	1.2319
9:04:24	304.8	306.5	1.7	0.244	69.6	-310.3		386.5	3402	0.1180	38.5%	1.3251
9:05:24	363.6	365.4	1.8	0.239	69.5	-310.3		386.4	3371	0.1396	39.0%	1.3936
9:06:24	336.3	338.1	1.8	0.244	69.8	-310.3		386.6	3405	0.1303	39.4%	1.3761
9:07:24	292.6	294.4	1.8	0.243	69.8	-310.4		386.7	3397	0.1131	39.8%	1.3470
9:08:24	263.7	265.5	1.8	0.242	70.0	-310.3		386.8	3389	0.1017	40.1%	1.2806
9:09:24	249.6	251.4	1.8	0.245	69.9	-310.4		386.7	3415	0.0970	40.4%	1.2842
9:10:24	231.3	233.2	1.8	0.240	70.1	-310.4		386.8	3380	0.0889	40.7%	1.2210
9:11:24	216.9	218.7	1.8	0.244	70.1	-310.4		386.8	3403	0.0840	41.0%	1.2010
9:12:24	191.0	192.7	1.8	0.242	70.0	-310.4		386.8	3393	0.0737	41.2%	1.1851
9:13:24	192.0	193.8	1.8	0.245	70.2	-310.4		386.9	3409	0.0745	41.4%	1.1612
9:14:24	164.5	166.2	1.7	0.247	70.5	-310.4		387.1	3424	0.0640	41.6%	1.0976
9:15:24	171.5	173.2	1.7	0.243	70.2	-310.4		386.9	3398	0.0663	41.8%	1.1269
9:16:24	163.3	165.0	1.6	0.242	70.3	-310.4		387.0	3390	0.0630	42.0%	1.0379
9:17:24	163.3	165.0	1.7	0.243	70.3	-310.4		387.0	3400	0.0631	42.3%	1.0888
9:18:24	139.3	141.0	1.7	0.246	70.2	-310.4		387.0	3418	0.0541	42.4%	1.1213
9:19:24	153.4	155.1	1.8	0.245	70.3	-310.4		387.0	3413	0.0595	42.6%	1.0998
9:20:24	142.8	144.6	1.8	0.244	70.3	-310.4		387.0	3407	0.0553	42.8%	1.2070
9:21:24	136.5	138.3	1.8	0.245	70.0	-310.4		386.8	3411	0.0530	43.0%	1.2540
9:22:24	128.0	129.8	1.8	0.245	70.2	-310.3		386.9	3408	0.0496	43.1%	1.2457
9:23:24	146.1	148.0	1.8	0.244	70.5	-310.4		387.1	3401	0.0565	43.3%	1.2339
9:24:24	121.6	123.5	1.9	0.241	70.8	-310.4		387.4	3384	0.0468	43.4%	1.1789
9:25:24	134.7	136.5	1.8	0.242	70.8	-310.4		387.4	3391	0.0519	43.6%	1.1873
9:26:24	116.7	118.5	1.8	0.241	70.7	-310.4		387.3	3387	0.0449	43.8%	1.1321
9:27:24	102.5	104.3	1.8	0.245	70.5	-310.4		387.1	3415	0.0398	43.9%	1.1171
9:28:24	96.3	98.2	1.9	0.247	70.5	-310.4		387.1	3426	0.0375	44.0%	1.1114
9:29:24	100.6	102.3	1.8	0.244	70.6	-310.4		387.2	3406	0.0389	44.1%	1.0868
9:30:24	100.6	102.3	1.8	0.241	70.7	-310.4		387.3	3381	0.0386	44.3%	1.0335
9:31:24	100.6	102.4	1.8	0.245	70.6	-310.4		387.2	3413	0.0390	44.4%	1.0606
9:32:24	94.1	95.9	1.8	0.243	70.5	-310.4		387.1	3399	0.0363	44.5%	0.9749
9:33:24	82.4	84.3	1.9	0.248	70.3	-310.3		387.0	3435	0.0322	44.6%	1.0256
9:34:24	80.1	82.0	1.9	0.245	70.1	-310.3		386.9	3414	0.0311	44.7%	1.0672
9:35:24	77.6	79.5	1.8	0.240	70.1	-310.3		386.8	3378	0.0298	44.8%	1.0403
9:36:24	76.6	78.4	1.8	0.245	70.2	-310.3		386.9	3409	0.0297	44.9%	1.1517
9:37:24	80.3	82.1	1.8	0.247	70.2	-310.3		386.9	3426	0.0313	45.0%	1.2010
9:38:24	83.2	85.1	1.8	0.244	70.2	-310.1		386.9	3408	0.0323	45.1%	1.1961
9:39:24	98.1	99.9	1.8	0.243	70.1	-310.2		386.9	3397	0.0379	45.2%	1.1774
9:40:24	112.8	114.7	1.9	0.240	70.1	-310.3		386.8	3380	0.0434	45.3%	1.1322

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
9:41:24	104.8	106.7	1.9	0.245	70.1	-9.1		386.8	3411	0.0407	45.5%	1.1354
9:42:24	104.7	106.5	1.8	0.244	69.9	343.7		386.7	3403	0.0405	45.6%	1.0872
9:43:24	122.6	124.4	1.8	0.247	69.8	343.9		386.6	3424	0.0478	45.8%	1.0773
9:44:24	114.4	116.2	1.8	0.247	69.5	343.6		386.4	3424	0.0446	45.9%	1.0739
9:45:24	121.2	123.1	1.9	0.249	69.6	345.8		386.5	3439	0.0474	46.1%	1.0479
9:46:24	126.9	128.7	1.8	0.245	69.7	346.8		386.6	3412	0.0493	46.2%	0.9949
9:47:24	134.5	136.3	1.8	0.245	69.8	346.9		386.6	3411	0.0522	46.4%	1.0216
9:48:24	126.7	128.5	1.8	0.251	69.6	346.3		386.5	3451	0.0498	46.5%	0.9386
9:49:24	127.5	129.4	1.9	0.249	69.3	346.7		386.3	3437	0.0499	46.7%	0.9934
9:50:24	159.8	161.7	1.9	0.246	68.9	345.2		386.0	3419	0.0623	46.9%	1.0361
9:51:24	169.0	170.8.	1.8	0.245	68.6	344.3		385.7	3415	0.0658	47.1%	1.0104
9:52:24	192.0	193.8	1.8	0.250	68.4	339.9		385.6	3443	0.0754	47.3%	1.1220
9:53:24	334.2	336.1	1.9	0.248	68.5	333.9		385.7	3432	0.1308	47.8%	1.1698
9:54:24	440.2	442.1	1.9	0.245	68.7	330.5		385.8	3413	0.1714	48.3%	1.1639
9:55:24	525.0	526.9	1.9	0.246	68.7	324.1		385.9	3416	0.2045	49.0%	1.1395
9:56:24	591.0	592.9	1.9	0.245	68.7	318.0		385.8	3413	0.2301	49.7%	1.0888
9:57:24	711.0	712.9	1.9	0.246	68.8	311.8		385.9	3417	0.2770	50.6%	1.0947
9:58:24	762.7	764.7	2.0	0.240	68.8	305.4		385.9	3376	0.2935	51.5%	1.0466
9:59:24	815.4	817.4	2.0	0.241	68.9	300.3		386.0	3381	0.3143	52.5%	1.0295
10:00:24	791.8	793.7	1.9	0.246	68.9	298.3		386.0	3416	0.3084	53.5%	1.0293
10:01:24	760.7	762.7	1.9	0.240	68.6	296.7		385.7	3379	0.2932	54.5%	1.0004
10:02:24	689.4	691.4	1.9	0.239	68.5	296.1		385.7	3367	0.2648	55.3%	0.9457
10:03:24	774.8	776.7	2.0	0.242	68.7	292.6		385.8	3390	0.2995	56.3%	0.9694
10:04:24	628.7	630.5	1.8	0.243	68.9	291.6		386.0	3395	0.2433	57.0%	0.8888
10:05:24	718.8	720.6	1.8	0.237	69.1	286.2		386.1	3357	0.2750	57.9%	0.9435
10:06:24	797.3	799.0	1.8	0.244	69.2	282.8		386.2	3405	0.3093	58.9%	0.9738
10:07:24	665.7	667.6	1.9	0.237	69.2	280.0		386.2	3353	0.2543	59.7%	0.9446
10:08:24	794.8	796.6	1.9	0.236	69.2	272.7		386.2	3349	0.3033	60.7%	1.0466
10:09:24	803.6	805.4	1.8	0.241	69.4	268.2		386.3	3385	0.3098	61.7%	1.0389
10:10:24	660.0	661.8	1.8	0.236	69.1	266.2		386.1	3352	0.2521	62.5%	0.9925
10:11:24	640.5	642.3	1.8	0.238	69.1	264.9		386.1	3360	0.2453	63.3%	0.9350
10:12:24	579.7	581.4	1.8	0.237	69.0	264.5		386.1	3359	0.2219	64.0%	0.8588
10:13:24	515.1	516.9	1.8	0.242	69.0	264.5		386.1	3389	0.1990	64.6%	0.8176
10:14:24	466.7	468.6	1.9	0.238	68.9	264.5		386.0	3360	0.1788	65.2%	0.7531
10:15:24	423.3	425.1	1.9	0.238	68.8	264.5		385.9	3359	0.1621	65.7%	0.7152
10:16:24	386.7	388.8	2.0	0.236	68.7	264.5		385.8	3348	0.1476	66.2%	0.7210
10:17:24	345.3	347.4	2.1	0.235	68.5	264.5		385.7	3345	0.1317	66.6%	0.7073
10:18:24	314.5	316.6	2.1	0.233	68.5	264.5		385.7	3326	0.1193	67.0%	0.6809
10:19:24	288.0	290.1	2.2	0.238	68.5	264.6		385.7	3360	0.1104	67.3%	0.6699
10:20:24	266.6	268.8	2.2	0.240	68.5	264.6		385.7	3374	0.1026	67.7%	0.6455
10:21:24	237.6	239.8	2.2	0.236	68.5	264.5		385.7	3350	0.0908	67.9%	0.6686
10:22:24	222.7	225.0	2.2	0.237	68.4	264.5		385.6	3358	0.0854	68.2%	0.6645
10:23:24	210.4	212.7	2.2	0.235	68.2	264.5		385.5	3344	0.0803	68.5%	0.6903
10:24:24	205.5	207.8	2.3	0.233	68.3	264.5		385.5	3327	0.0780	68.7%	0.7433
10:25:24	196.1	198.3	2.2	0.238	68.4	264.5		385.6	3361	0.0752	69.0%	0.7291
10:26:24	186.1	188.3	2.2	0.230	68.3	264.5		385.6	3306	0.0702	69.2%	0.7404
10:27:24	181.7	183.8	2.1	0.235	68.3	264.5		385.6	3340	0.0693	69.4%	0.6897
10:28:24	176.4	178.5	2.2	0.236	68.4	264.5		385.6	3350	0.0674	69.6%	0.6369
10:29:24	173.3	175.4	2.1	0.235	68.4	264.5		385.6	3339	0.0660	69.8%	0.6187
10:30:24	168.5	170.7	2.2	0.233	68.3	264.5		385.5	3327	0.0640	70.0%	0.5743
10:31:24	165.9	168.1	2.2	0.232	68.2	264.5		385.5	3317	0.0628	70.2%	0.5531
10:32:24	160.5	162.7	2.2	0.233	68.3	264.5		385.5	3326	0.0609	70.4%	0.5733
10:33:24	157.7	159.9	2.2	0.231	68.2	264.5		385.5	3311	0.0596	70.6%	0.5755
10:34:24	150.5	152.7	2.2	0.233	68.0	264.5		385.3	3327	0.0572	70.8%	0.5615
10:35:24	147.6	149.8	2.2	0.232	67.9	264.5		385.3	3321	0.0560	71.0%	0.5596
10:36:24	145.3	147.4	2.1	0.234	68.1	264.5		385.4	3333	0.0553	71.2%	0.5429
10:37:24	142.0	144.2	2.1	0.232	68.0	264.5		385.3	3317	0.0538	71.3%	0.5778
10:38:24	134.1	136.2	2.1	0.228	67.7	264.5		385.1	3291	0.0504	71.5%	0.5791
10:39:24	130.6	132.5	2.0	0.230	67.8	264.5		385.2	3305	0.0493	71.7%	0.6100
10:40:24	127.7	129.7	2.0	0.229	67.9	264.5		385.3	3296	0.0480	71.8%	0.6653
10:41:24	123.1	125.2	2.0	0.230	68.0	264.5		385.3	3303	0.0464	72.0%	0.6539

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
10:42:24	120.4	122.3	1.9	0.232	68.0	264.5		385.3	3320	0.0456	72.1%	0.6702
10:43:24	113.1	115.1	2.1	0.231	67.9	264.5		385.3	3315	0.0428	72.2%	0.6204
10:44:24	106.9	108.8	1.9	0.234	68.0	264.6		385.3	3333	0.0407	72.4%	0.5694
10:45:24	101.8	103.8	2.0	0.237	67.9	264.5		385.3	3359	0.0391	72.5%	0.5527
10:46:24	89.4	91.3	1.9	0.233	67.6	264.5		385.0	3324	0.0339	72.6%	0.5104
10:47:24	89.4	91.4	2.0	0.235	67.7	264.0		385.1	3338	0.0341	72.7%	0.4903
10:48:24	80.4	82.4	2.0	0.235	67.7	264.3		385.1	3342	0.0307	72.8%	0.5124
10:49:24	74.9	76.8	1.9	0.234	67.8	264.6		385.1	3335	0.0286	72.9%	0.5159
10:50:24	80.0	81.9	1.9	0.233	67.6	264.1		385.0	3326	0.0304	73.0%	0.5044
10:51:24	88.3	90.2	1.9	0.231	67.6	263.2		385.0	3314	0.0334	73.1%	0.5036
10:52:24	128.0	129.9	1.9	0.233	67.6	259.0		385.1	3326	0.0486	73.3%	0.4876
10:53:24	337.4	339.3	1.9	0.231	67.6	252.8		385.0	3316	0.1278	73.7%	0.5240
10:54:24	440.5	442.4	1.9	0.232	67.6	247.2		385.0	3321	0.1672	74.2%	0.5287
10:55:24	540.6	542.6	2.0	0.231	67.5	240.6		384.9	3315	0.2049	74.9%	0.5607
10:56:24	679.6	681.6	2.0	0.231	67.5	234.6		385.0	3313	0.2573	75.7%	0.6173
10:57:24	707.2	709.0	1.8	0.229	67.6	228.2		385.0	3300	0.2666	76.5%	0.6074
10:58:24	810.0	811.8	1.9	0.229	67.5	222.2		384.9	3301	0.3056	77.5%	0.6246
10:59:24	743.7	745.6	1.8	0.230	67.5	216.7		384.9	3305	0.2809	78.4%	0.5776
11:00:24	675.1	677.0	1.9	0.229	67.5	215.2		385.0	3295	0.2543	79.2%	0.5288
11:01:24	656.2	658.1	1.8	0.230	67.5	211.7		385.0	3308	0.2481	80.0%	0.5136
11:02:24	592.7	594.5	1.8	0.230	67.6	210.6		385.0	3309	0.2242	80.7%	0.4764
11:03:24	574.0	575.8	1.8	0.229	67.5	205.6		385.0	3296	0.2162	81.4%	0.4562
11:04:24	670.1	671.8	1.7	0.228	67.6	201.9		385.0	3292	0.2521	82.2%	0.4817
11:05:24	695.6	697.3	1.7	0.230	67.7	195.2		385.1	3307	0.2628	83.1%	0.4874
11:06:24	690.8	692.6	1.8	0.231	67.7	189.5		385.1	3310	0.2612	83.9%	0.4740
11:07:24	697.2	698.9	1.7	0.229	67.7	185.1		385.1	3295	0.2625	84.7%	0.4702
11:08:24	633.1	634.9	1.9	0.226	67.6	184.2		385.0	3275	0.2369	85.5%	0.4389
11:09:24	530.4	532.3	1.9	0.231	67.4	183.6		384.9	3311	0.2007	86.1%	0.3962
11:10:24	475.4	477.1	1.8	0.230	67.3	182.4		384.8	3309	0.1798	86.7%	0.3616
11:11:24	463.8	465.7	1.9	0.230	67.2	182.0		384.7	3309	0.1755	87.3%	0.3558
11:12:24	482.6	484.5	1.9	0.234	67.1	180.8		384.7	3337	0.1842	87.9%	0.3600
11:13:24	439.8	441.7	2.0	0.231	67.0	180.8		384.6	3313	0.1667	88.4%	0.3408
11:14:24	397.7	399.7	1.9	0.230	67.0	180.8		384.6	3305	0.1504	88.9%	0.3190
11:15:24	350.6	352.6	1.9	0.233	67.1	180.8		384.6	3328	0.1335	89.3%	0.2967
11:16:24	307.9	309.8	1.9	0.228	67.1	180.8		384.6	3290	0.1159	89.7%	0.2745
11:17:24	302.3	304.3	2.0	0.227	67.3	180.8		384.8	3284	0.1135	90.0%	0.2655
11:18:24	276.5	278.6	2.1	0.231	67.4	180.7		384.9	3313	0.1047	90.4%	0.2523
11:19:24	249.2	251.3	2.1	0.231	67.1	180.7		384.6	3315	0.0945	90.7%	0.2400
11:20:24	239.9	241.9	2.1	0.229	67.1	180.7		384.6	3295	0.0904	91.0%	0.2296
11:21:24	227.8	229.9	2.1	0.229	67.2	180.7		384.7	3302	0.0860	91.2%	0.2245
11:22:24	210.6	212.5	1.9	0.227	67.4	180.7		384.9	3287	0.0791	91.5%	0.2127
11:23:24	205.7	207.6	1.9	0.227	67.2	180.7		384.8	3287	0.0773	91.7%	0.2077
11:24:24	196.9	198.8	1.9	0.227	67.0	180.8		384.6	3285	0.0740	92.0%	0.2020
11:25:24	188.2	190.1	1.9	0.229	66.9	180.8		384.5	3299	0.0711	92.2%	0.1954
11:26:24	166.2	168.3	2.1	0.226	66.7	180.8		384.3	3278	0.0624	92.4%	0.1817
11:27:24	169.9	171.9	2.0	0.230	66.6	180.8		384.3	3305	0.0643	92.6%	0.1803
11:28:24	171.6	173.7	2.1	0.229	66.5	180.8		384.2	3296	0.0648	92.8%	0.1757
11:29:24	168.9	170.9	2.1	0.229	66.7	180.8		384.3	3296	0.0637	93.0%	0.1741
11:30:24	162.2	164.4	2.2	0.229	66.8	180.8		384.4	3302	0.0613	93.2%	0.1686
11:31:24	159.5	161.6	2.2	0.226	66.7	180.8		384.4	3273	0.0597	93.4%	0.1632
11:32:24	161.5	163.6	2.1	0.226	66.8	180.8		384.4	3279	0.0606	93.6%	0.1586
11:33:24	156.5	158.5	1.9	0.227	66.9	180.8		384.5	3287	0.0589	93.8%	0.1520
11:34:24	157.0	159.0	2.0	0.230	66.8	180.8		384.5	3307	0.0594	94.0%	0.1476
11:35:24	151.9	153.8	1.9	0.230	66.8	180.8		384.4	3307	0.0575	94.2%	0.1455
11:36:24	147.6	149.5	1.9	0.226	66.8	180.8		384.5	3273	0.0553	94.3%	0.1392
11:37:24	146.2	148.0	1.8	0.226	66.9	180.8		384.5	3275	0.0548	94.5%	0.1385
11:38:24	142.6	144.5	1.9	0.228	67.0	180.8		384.6	3290	0.0537	94.7%	0.1336
11:39:24	140.1	141.9	1.9	0.225	67.0	180.8		384.6	3272	0.0524	94.8%	0.1304
11:40:24	138.9	140.7	1.8	0.228	67.0	180.8		384.6	3290	0.0523	95.0%	0.1280
11:41:24	135.0	136.8	1.8	0.228	67.0	180.8		384.6	3288	0.0508	95.2%	0.1243
11:42:24	128.5	130.3	1.8	0.228	67.0	180.8		384.6	3291	0.0484	95.3%	0.1193

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
11:43:24	126.2	127.9	1.8	0.228	66.9	180.8		384.5	3289	0.0475	95.5%	0.1160
11:44:24	117.4	119.2	1.7	0.226	66.9	180.8		384.5	3277	0.0440	95.6%	0.1110
11:45:24	117.9	119.6	1.8	0.229	66.9	180.8		384.5	3296	0.0445	95.8%	0.1104
11:46:24	116.0	117.7	1.7	0.226	66.9	180.8		384.5	3279	0.0435	95.9%	0.1073
11:47:24	110.7	112.5	1.8	0.230	66.8	180.8		384.4	3307	0.0419	96.0%	0.1034
11:48:24	105.5	107.1	1.7	0.228	66.8	180.8		384.5	3288	0.0397	96.2%	0.0980
11:49:24	99.3	100.9	1.6	0.228	66.8	180.8		384.4	3294	0.0374	96.3%	0.0931
11:50:24	97.5	99.2	1.6	0.229	66.7	180.8		384.4	3297	0.0368	96.4%	0.0881
11:51:24	92.7	94.3	1.6	0.224	66.7	180.8		384.4	3265	0.0346	96.5%	0.0880
11:52:24	90.3	92.0	1.7	0.228	66.8	180.8		384.4	3293	0.0340	96.6%	0.0839
11:53:24	85.7	87.5	1.7	0.232	66.7	180.8		384.4	3319	0.0326	96.7%	0.0838
11:54:24	81.0	82.8	1.8	0.228	66.7	180.8		384.3	3290	0.0305	96.8%	0.0799
11:55:24	77.3	79.0	1.7	0.229	66.6	180.8		384.3	3297	0.0292	96.9%	0.0779
11:56:24	74.3	76.0	1.7	0.228	66.5	180.8		384.2	3289	0.0280	97.0%	0.0757
11:57:24	69.9	71.5	1.6	0.228	66.3	180.8		384.1	3294	0.0264	97.1%	0.0736
11:58:24	65.5	67.1	1.6	0.225	66.4	180.8		384.1	3271	0.0245	97.2%	0.0709
11:59:24	63.8	65.5	1.7	0.228	66.5	180.8		384.2	3295	0.0241	97.2%	0.0685
12:00:24	61.7	63.4	1.7	0.229	66.6	180.8		384.3	3295	0.0233	97.3%	0.0669
12:01:24	60.7	62.3	1.6	0.228	66.4	180.8		384.1	3288	0.0229	97.4%	0.0660
12:02:24	57.4	59.0	1.6	0.230	66.3	180.8		384.1	3309	0.0218	97.5%	0.0638
12:03:24	54.6	56.2	1.6	0.227	66.5	180.8		384.2	3284	0.0205	97.5%	0.0615
12:04:24	52.7	54.2	1.5	0.226	66.5	180.8		384.2	3280	0.0198	97.6%	0.0583
12:05:24	49.9	51.4	1.5	0.225	66.5	180.8		384.2	3273	0.0187	97.7%	0.0557
12:06:24	49.4	51.0	1.6	0.227	66.6	180.8		384.3	3285	0.0186	97.7%	0.0513
12:07:24	48.1	49.6	1.5	0.226	66.5	180.8		384.2	3279	0.0181	97.8%	0.0533
12:08:24	45.4	47.0	1.5	0.224	66.5	180.8		384.2	3265	0.0170	97.8%	0.0499
12:09:24	43.9	45.5	1.5	0.227	66.5	180.8		384.2	3284	0.0165	97.9%	0.0512
12:10:24	42.1	43.7	1.5	0.222	66.5	180.8		384.2	3248	0.0157	97.9%	0.0494
12:11:24	40.1	41.7	1.5	0.226	66.5	180.8		384.2	3276	0.0151	98.0%	0.0487
12:12:24	39.3	40.8	1.5	0.228	66.5	180.8		384.2	3288	0.0148	98.0%	0.0477
12:13:24	38.8	40.3	1.6	0.227	66.3	180.8		384.1	3284	0.0146	98.1%	0.0472
12:14:24	37.1	38.6	1.5	0.233	66.3	180.8		384.1	3326	0.0141	98.1%	0.0464
12:15:24	35.3	36.7	1.5	0.228	66.2	180.8		384.0	3292	0.0133	98.2%	0.0444
12:16:24	34.1	35.7	1.5	0.231	66.2	180.8		384.0	3310	0.0129	98.2%	0.0437
12:17:24	33.3	34.8	1.5	0.226	66.3	180.8		384.1	3279	0.0125	98.2%	0.0431
12:18:24	31.9	33.4	1.5	0.233	66.3	180.8		384.1	3325	0.0122	98.3%	0.0420
12:19:24	31.3	32.9	1.5	0.232	66.3	180.8		384.1	3323	0.0119	98.3%	0.0410
12:20:24	30.9	32.4	1.5	0.237	66.4	180.8		384.1	3353	0.0119	98.4%	0.0385
12:21:24	30.6	32.1	1.5	0.212	66.3	180.8		384.0	3176	0.0111	98.4%	0.0370
12:22:24	28.3	29.8	1.5	0.114	66.2	180.8		384.0	2327	0.0075	98.4%	0.0327
12:23:24	28.7	30.1	1.4	0.221	66.3	180.8		384.1	3242	0.0106	98.4%	0.0353
12:24:24	27.1	28.6	1.4	0.157	66.4	180.8		384.1	2727	0.0085	98.5%	0.0329
12:25:24	27.5	28.8	1.4	0.224	66.3	180.8		384.1	3262	0.0103	98.5%	0.0347
12:26:24	27.1	28.4	1.4	0.227	66.2	180.8		384.0	3287	0.0102	98.5%	0.0338
12:27:24	26.8	28.1	1.4	0.228	66.2	180.8		384.0	3293	0.0101	98.6%	0.0337
12:28:24	25.3	26.7	1.4	0.224	66.3	180.8		384.0	3263	0.0095	98.6%	0.0329
12:29:24	25.1	26.6	1.5	0.228	66.3	180.8		384.1	3288	0.0095	98.6%	0.0326
12:30:24	24.5	25.9	1.5	0.227	66.2	180.8		384.0	3284	0.0092	98.7%	0.0323
12:31:24	23.9	25.4	1.5	0.229	66.2	180.8		384.0	3296	0.0090	98.7%	0.0311
12:32:24	23.5	25.0	1.4	0.229	66.2	180.8		384.0	3298	0.0089	98.7%	0.0307
12:33:24	23.1	24.6	1.5	0.230	66.3	180.8		384.0	3307	0.0087	98.7%	0.0306
12:34:24	22.2	23.6	1.5	0.229	66.3	180.8		384.0	3297	0.0084	98.8%	0.0299
12:35:24	21.2	22.7	1.5	0.226	66.3	180.8		384.0	3278	0.0080	98.8%	0.0291
12:36:24	22.1	23.5	1.4	0.223	66.2	180.8		384.0	3256	0.0083	98.8%	0.0266
12:37:24	21.1	22.5	1.4	0.228	66.2	180.8		384.0	3289	0.0080	98.8%	0.0258
12:38:24	21.1	22.6	1.5	0.228	66.2	180.8		384.0	3288	0.0080	98.9%	0.0252
12:39:24	20.4	21.9	1.5	0.228	66.2	180.8		384.0	3288	0.0077	98.9%	0.0246
12:40:24	19.9	21.3	1.5	0.226	66.2	180.8		384.0	3276	0.0075	98.9%	0.0244
12:41:24	20.1	21.5	1.4	0.228	66.1	180.8		383.9	3293	0.0076	98.9%	0.0244
12:42:24	19.3	20.7	1.4	0.227	66.1	180.8		383.9	3286	0.0073	99.0%	0.0236
12:43:24	19.3	20.6	1.3	0.229	66.1	180.8		383.9	3295	0.0073	99.0%	0.0236

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
12:44:24	19.2	20.6	1.4	0.226	66.0	180.8		383.9	3277	0.0072	99.0%	0.0235
12:45:24	18.3	19.7	1.4	0.228	66.0	180.8		383.8	3293	0.0069	99.0%	0.0232
12:46:24	18.2	19.6	1.4	0.228	65.9	180.8		383.8	3288	0.0069	99.1%	0.0231
12:47:24	17.6	18.9	1.3	0.226	66.0	180.8		383.8	3275	0.0066	99.1%	0.0221
12:48:24	17.3	18.6	1.3	0.228	65.9	180.8		383.8	3294	0.0065	99.1%	0.0218
12:49:24	17.3	18.7	1.3	0.232	66.0	180.8		383.8	3322	0.0066	99.1%	0.0219
12:50:24	17.2	18.5	1.3	0.232	66.0	180.8		383.8	3319	0.0065	99.1%	0.0215
12:51:24	16.6	18.0	1.3	0.228	66.0	180.8		383.9	3291	0.0063	99.2%	0.0211
12:52:24	16.4	17.7	1.3	0.229	66.0	180.8		383.8	3295	0.0062	99.2%	0.0184
12:53:24	16.3	17.6	1.3	0.233	66.0	180.8		383.8	3324	0.0062	99.2%	0.0179
12:54:24	15.7	17.0	1.4	0.228	65.9	180.8		383.8	3289	0.0059	99.2%	0.0172
12:55:24	15.4	16.8	1.4	0.227	65.9	180.8		383.8	3281	0.0058	99.2%	0.0170
12:56:24	15.4	16.7	1.4	0.227	65.8	180.8		383.7	3286	0.0058	99.3%	0.0170
12:57:24	15.4	16.7	1.3	0.229	65.7	180.8		383.7	3301	0.0058	99.3%	0.0168
12:58:24	14.6	15.9	1.4	0.230	65.7	180.8		383.6	3303	0.0055	99.3%	0.0163
12:59:24	14.4	15.8	1.4	0.229	65.7	180.8		383.6	3295	0.0054	99.3%	0.0163
13:00:24	14.4	15.8	1.4	0.230	65.7	180.8		383.7	3309	0.0055	99.3%	0.0162
13:01:24	14.4	15.8	1.3	0.233	65.7	180.8		383.6	3326	0.0055	99.3%	0.0163
13:02:24	14.4	15.8	1.3	0.229	65.8	180.8		383.7	3301	0.0055	99.4%	0.0162
13:03:24	13.6	14.9	1.3	0.229	65.8	180.8		383.7	3296	0.0051	99.4%	0.0155
13:04:24	13.6	14.9	1.3	0.227	65.9	180.8		383.8	3286	0.0051	99.4%	0.0153
13:05:24	13.3	14.6	1.3	0.232	65.9	180.8		383.8	3316	0.0051	99.4%	0.0153
13:06:24	13.3	14.6	1.3	0.230	65.9	180.8		383.8	3303	0.0050	99.4%	0.0149
13:07:24	13.3	14.6	1.3	0.232	65.9	180.8		383.8	3318	0.0051	99.4%	0.0148
13:08:24	13.2	14.5	1.3	0.229	65.8	180.8		383.7	3300	0.0050	99.5%	0.0122
13:09:24	12.5	13.8	1.3	0.231	65.8	180.8		383.7	3312	0.0047	99.5%	0.0117
13:10:24	12.3	13.6	1.3	0.229	65.7	180.8		383.7	3300	0.0047	99.5%	0.0113
13:11:24	12.4	13.6	1.3	0.227	65.8	180.8		383.7	3287	0.0047	99.5%	0.0112
13:12:24	12.4	13.6	1.3	0.229	65.8	180.8		383.7	3298	0.0047	99.5%	0.0112
13:13:24	12.0	13.3	1.3	0.229	65.7	180.8		383.6	3299	0.0045	99.5%	0.0110
13:14:24	11.4	12.8	1.3	0.227	65.7	180.8		383.6	3285	0.0043	99.6%	0.0108
13:15:24	11.5	12.8	1.3	0.227	65.7	180.8		383.6	3287	0.0043	99.6%	0.0108
13:16:24	11.5	12.8	1.3	0.228	65.7	180.8		383.6	3295	0.0043	99.6%	0.0108
13:17:24	11.5	12.8	1.3	0.228	65.6	180.8		383.6	3294	0.0043	99.6%	0.0108
13:18:24	11.5	12.8	1.3	0.230	65.6	180.8		383.6	3304	0.0044	99.6%	0.0107
13:19:24	11.1	12.3	1.2	0.226	65.6	180.8		383.6	3276	0.0042	99.6%	0.0103
13:20:24	10.6	11.8	1.2	0.228	65.7	180.8		383.6	3288	0.0040	99.6%	0.0101
13:21:24	10.6	11.8	1.2	0.230	65.6	180.8		383.5	3307	0.0040	99.6%	0.0102
13:22:24	10.5	11.8	1.2	0.226	65.6	180.8		383.5	3277	0.0040	99.7%	0.0099
13:23:24	10.6	11.8	1.2	0.229	65.6	180.8		383.6	3300	0.0040	99.7%	0.0098
13:24:24	10.6	11.8	1.2	0.229	65.5	180.8		383.5	3295	0.0040	99.7%	0.0072
13:25:24	10.1	11.3	1.2	0.229	65.5	180.8		383.5	3299	0.0038	99.7%	0.0070
13:26:24	9.5	10.8	1.3	0.233	65.5	180.8		383.5	3324	0.0036	99.7%	0.0067
13:27:24	9.5	10.8	1.3	0.227	65.6	180.8		383.6	3285	0.0036	99.7%	0.0065
13:28:24	9.5	10.8	1.3	0.228	65.6	180.9		383.6	3294	0.0036	99.7%	0.0065
13:29:24	9.5	10.8	1.3	0.230	65.6	180.8		383.6	3302	0.0036	99.7%	0.0065
13:30:24	9.6	10.8	1.2	0.229	65.7	180.8		383.6	3301	0.0036	99.8%	0.0065
13:31:24	9.5	10.8	1.2	0.232	65.6	180.9		383.6	3320	0.0036	99.8%	0.0065
13:32:24	9.4	10.6	1.2	0.229	65.7	180.9		383.6	3296	0.0035	99.8%	0.0064
13:33:24	9.3	10.5	1.2	0.230	65.7	180.9		383.6	3304	0.0035	99.8%	0.0064
13:34:24	9.2	10.4	1.2	0.230	65.6	180.8		383.6	3303	0.0035	99.8%	0.0064
13:35:24	8.6	9.9	1.2	0.234	65.6	180.9		383.6	3335	0.0033	99.8%	0.0062
13:36:24	8.6	9.8	1.2	0.232	65.6	180.8		383.6	3318	0.0033	99.8%	0.0061
13:37:24	8.6	9.8	1.2	0.230	65.7	180.9		383.6	3308	0.0033	99.8%	0.0062
13:38:24	8.6	9.8	1.2	0.229	65.6	180.9		383.6	3302	0.0032	99.8%	0.0059
13:39:24	8.6	9.8	1.2	0.229	65.6	180.9		383.5	3300	0.0032	99.9%	0.0058
13:40:24	8.5	9.8	1.3	0.227	65.6	180.8		383.6	3287	0.0032	99.9%	0.0032
13:41:24	8.2	9.4	1.2	0.230	65.6	180.8		383.6	3305	0.0031	99.9%	0.0031
13:42:24	8.0	9.3	1.2	0.230	65.6	180.8		383.6	3304	0.0030	99.9%	0.0030
13:43:24	7.7	9.0	1.2	0.231	65.5	180.9		383.5	3316	0.0029	99.9%	0.0029
13:44:24	7.6	8.8	1.2	0.230	65.4	180.9		383.4	3307	0.0029	99.9%	0.0029

Time (PST)	THC Δ (ppm)	THC o (ppm)	THC i (ppm)	Flow (inH2O)	Temp (F)	Resin (lb)	Comments	Molar Volume	Flow (cfm)	Mass as Propane	Cum Percent	Declining Mass
13:45:24	7.5	8.8	1.3	0.229	65.5	180.9		383.5	3300	0.0029	99.9%	0.0029
13:46:24	7.5	8.8	1.3	0.232	65.5	180.9		383.5	3318	0.0029	99.9%	0.0029
13:47:24	7.6	8.8	1.3	0.232	65.6	180.9		383.5	3320	0.0029	99.9%	0.0029
13:48:24	7.6	8.8	1.3	0.232	65.6	180.9		383.5	3317	0.0029	99.9%	0.0029
13:49:24	7.5	8.8	1.3	0.234	65.6	180.9		383.6	3335	0.0029	99.9%	0.0029
13:50:24	7.6	8.8	1.2	0.232	65.5	180.9		383.5	3320	0.0029	100.0%	0.0029
13:51:24	7.6	8.8	1.2	0.231	65.6	180.9		383.5	3312	0.0029	100.0%	0.0029
13:52:24	7.5	8.8	1.2	0.235	65.6	180.9		383.6	3340	0.0029	100.0%	0.0029
13:53:24	7.6	8.8	1.2	0.235	65.6	180.9		383.6	3343	0.0029	100.0%	0.0029
13:54:24	7.1	8.3	1.2	0.233	65.7	180.9		383.6	3328	0.0027	100.0%	0.0027
13:55:24	6.6	7.8	1.2	0.232	65.7	180.9		383.6	3317	0.0025	100.0%	0.0025
	217.4	219.1		0.233	67.6	315.7		385.0	3328	31.29		

7

Appendix C.4

Method 18 Results

Gas Chromatography Runs for NMMA
Date: 4/2/97
Test No. NMMA-6-P

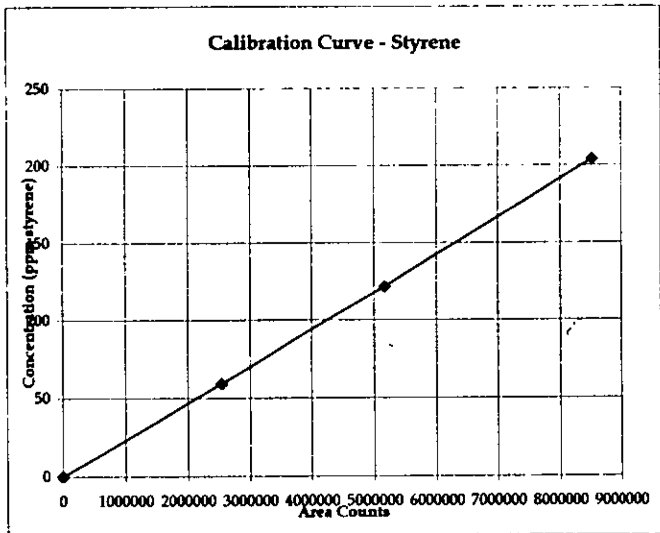
Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts		Response Factors		Calculated Conc		Equiv	Ratio
					Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Sty:MMA
29	59.2	Styrene			2570066		2.30E-05					
30	59.2	Styrene			2218362		2.67E-05					
31	59.2	Styrene			2742040		2.16E-05					
32	59.2	Styrene			2664045		2.22E-05					
33	122	Styrene			4978474		2.45E-05					
34	122	Styrene			5453738		2.24E-05					
35	122	Styrene			5064733		2.41E-05					
36	204	Styrene			8525088		2.39E-05					
37	204	Styrene			9230266		2.21E-05					
38	204	Styrene			7833027		2.60E-05					
39	204	Styrene			8275040		2.47E-05					
40	204	Styrene			8969120		2.27E-05					
41	204	Styrene			8339770		2.45E-05					
42	0402-1-1			166	3523250				83.4	0.0		
1	0402-1-2		11:35	205	4366886	829037			103.6	34.9	275.5	2.97
2	0402-1-3				4857696	924670			115.4	38.9		2.96
3	0402-1-4		11:53		2020896	333054			47.5	14.0	131.3	3.39
4	0402-1-5		11:59		1959445	269346			46.0	11.3	99.7	4.06
5	0402-1-6		12:05	85	1421529	173979			33.1	7.3	84.8	4.52
6	0402-1-7		12:15	69	1297086	170516			30.1	7.2	69.0	4.20
7	0402-1-8		12:30	53	970178	83543			22.3	3.5	52.8	6.34
8	0402-1-9		12:46	32	804367	234789			18.3	9.9	31.8	1.85
9	0402-1-10		12:55	23	534877	37589			11.9	1.6	23.1	7.51
10	0402-1-11		13:05	18	409583				8.9	0.0	17.3	
11	45.6	MMA				1135671		4.02E-05				
12	45.6	MMA				1030727		4.42E-05				3.68
13		Cal Check			3976866	564800			94.3	23.8		
14		Nitrogen										
15		Nitrogen										
16	122	Styrene			5186474		2.35E-05					
17	122	Styrene			5400253		2.26E-05					
18	204	Styrene			8045674		2.54E-05					
19	204	Styrene			8969766		2.27E-05					
20	204	Styrene			8505958		2.40E-05					
21	122	Styrene			6280586		1.94E-05					
22	122	Styrene			5732330		2.13E-05					
23	122	Styrene			6037738		2.02E-05					
24	45.6	MMA				1077927		4.23E-05				
							2.32E-05	4.22E-05				
							1.81E-06	2.05E-06				
							0.077933	0.048423				

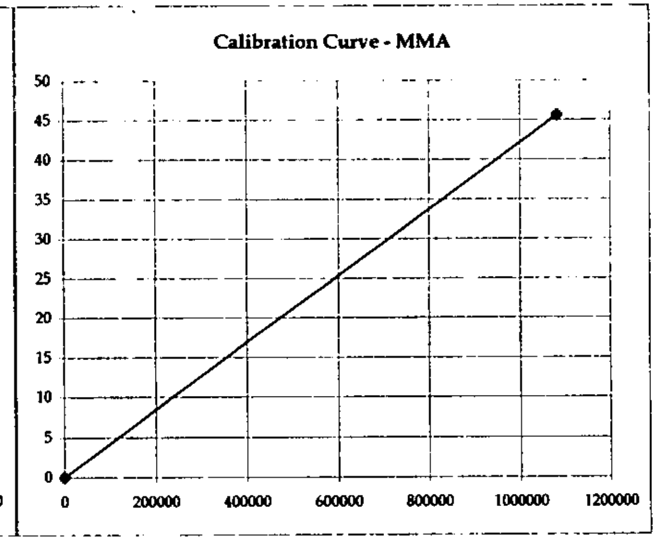
Gas Chromatography Runs for NMMA
Date: 4/2/97
Test No. NMMA-6-P

					Area Counts		Response Factors		Calculated Conc		Equiv	Ratio
Run No.	Concentration (ppmv)	Compound	Time	THC	Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Sty:MMA
Calibration Curves												
	Styrene	Initial	x	y								
			0	0								
			2548628	59.2								
			5165648	122								
			8528719	204								
			Y=MX+B									
			m	2.42E-05	2548628				59.2			
			b	-2.51167	5165648				122.6			
					8528719				204.0			
		Check										
				122	5186474				123.1	123.3		
				122	5400253				128.2	128.4		
				204	8045674				192.3	191.7		
				204	8969766				214.7	213.8		
				204	8505958				203.4	202.7		
				122	6280586				149.6	149.4		
				122	5732330				136.3	136.3		
				122	6037738				143.7	143.6		
				122		Average			136.2	136.2		
				204		Average			203.5	202.8		
			Differenc	122					-11.6%	-11.6%		
				204					0.3%	0.6%		
	MMA	Initial	x	y								
			0	0				4.22E-05				
			1083199	45.6								
			Y=MX+B									
			m	4.21E-05	0				0.0			
			b	0	1083199				0.0			
					0				0.0			
		Check										
				45.6		1077927			45.4	45.4		

Gas Chromatography Runs for NMMA
Date: 4/2/97
Test No. NMMA-6-P

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				45.6		Average			45.4	45.4		
			Differenc	45.6					0.5%	0.5%		





Gas Chromatography Runs for NMMA
Date: 4/3/97
Run: NMMA-8-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	THC	Equiv THC
25	45.6	MMA				1481299						
26	45.6	MMA				955877		4.77E-05				
27	45.6	MMA				970932		4.70E-05				
28		Nitrogen										
29		Nitrogen										
30	59.2	Styrene			2537869		1.18E-05					
31	59.2	Styrene			2526526		1.23E-05					
32	122	Styrene			4892042		6.54E-06					
33	122	Styrene			4951411		6.66E-06					
34	204	Styrene			8085232		4.21E-06					
35	204	Styrene			8096010		4.32E-06					
36		0403-1-1	10:32	125	3964414	926488			98.3	37.6	125	406
37		0403-1-2	10:40	583	9540531	2042711			239.5	77.7	583	1373
38		0403-1-3	10:46	650	8694611	1746477			218.1	67.1	650	1414
39		0403-1-4	10:52	558	5771395	1074947			144.1	42.9	558	1111
40		0403-1-5	10:57	750	11039168	1933297			277.5	73.8	750	1694
41		0403-1-6	11:04	1030	14700072	2510957			370.2	94.6	1030	2300
42		0403-1-7	11:13	520	7750589	1115115			194.2	44.4	520	1179
43		0403-1-8	11:19	490	6831213	824657			170.9	33.9	490	1082
44		0403-1-9	11:25	415	7300304	736304			182.8	30.7	415	1007
45		0403-1-10	11:32	350	6570816	609411			164.3	26.2	350	873
46		0403-1-11	11:38	300	5316333	403122			132.5	18.7	300	729
47		0403-1-12	11:44	190	4590115	331656			114.1	16.2	190	534
48		0403-1-13	11:51	190	2943453	213163			72.4	11.9	190	434
49		0403-1-14	12:00	105	1973921	106222			47.9	8.1	105	259
50		0403-1-15	12:06	84	1445722	70982			34.5	6.8	84	198
51		0403-1-16	12:14	58	1054785	110902			24.6	8.2	58	138
52		0403-1-17	12:21	44	870677	196300			19.9	11.3	44	108
53		0403-1-18	12:28	34	652957	131136			14.4	9.0	34	81
54		0403-1-19	12:35	27	496894	59982			10.5	6.4	27	62
55		0403-1-20	12:41	25	502532	21487			10.6	5.0	25	60
56		0403-1-21	12:50	15	345678	15412			6.6	4.8	15	36
57		0403-1-22	12:58	11	192203	10849			2.7	4.6	11	22
58		0403-1-23	13:04	9	182180	91268			2.5	7.5	9	18
59		0403-1-24	13:10	7	150283	8902			1.7	4.6	7	14

Gas Chromatography Runs for NMMA
Date: 4/3/97
Run: NMMA-8-1

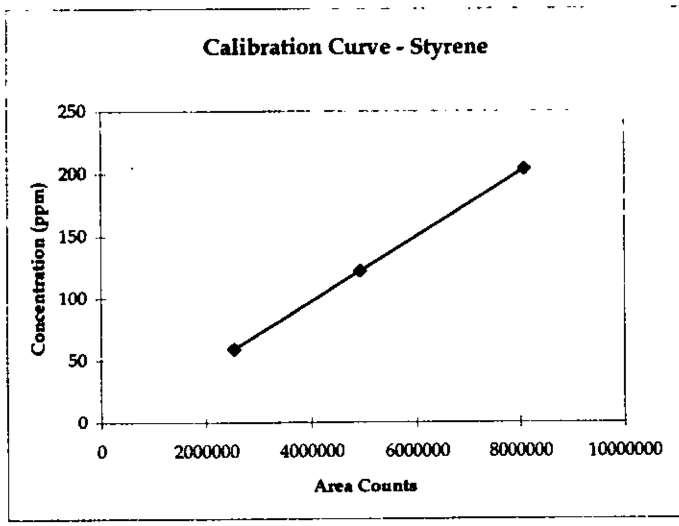
					Area Counts		Response Factors		Calculated Conc			
Run No.	Concentration (ppmv)	Compound	Time	THC	Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Equiv THC
60	96.2	MMA				2636149		3.65E-05				
61	96.2	MMA				2612728		3.68E-05				
62	204	Styrene			7712413		8.04E-06					
63	204	Styrene			10368256		6.08E-06					
64	204	Styrene			7991258		8.01E-06					

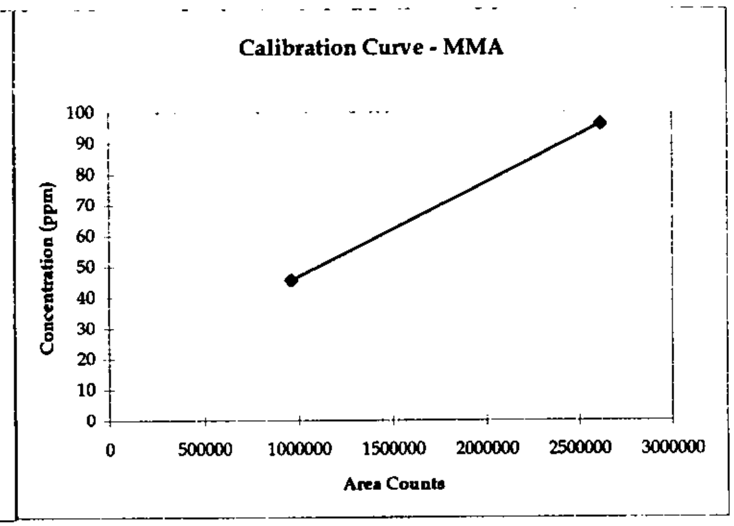
Calibration Curves

Response Factors			Average		7.55E-06	4.2E-05			
			StDev		2.88E-06	6.17E-06			
			Percent StDev		38%	15%			
					2.387	1.375			
Styrene					1.18E-05				
	x	y			1.23E-05				
	0	0			6.54E-06				
	2532198	59.2		1.20E-05	6.66E-06				
	4921727	122		6.60E-06	4.21E-06				
	8090621	204		4.26E-06	4.32E-06				
	Y=MX+B								
	m	2.61E-05	2532197.5				59.2		
	b	-6.76514	4921726.5				121.4485		
			8090621				204		
MMA									
				0	0				
				963404.5	45.6			45.6	
				2624439	96.2			96.2	
	Y=MX+B								
	m	3.05E-05							
	b	16.25185							

Gas Chromatography Runs for NMMA
Date: 4/3/97
Run: NMMA-8-1

					Area Counts		Response Factors		Calculated Conc			
Run No.	Concentration (ppmv)	Compound	Time	THC	Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Equiv THC





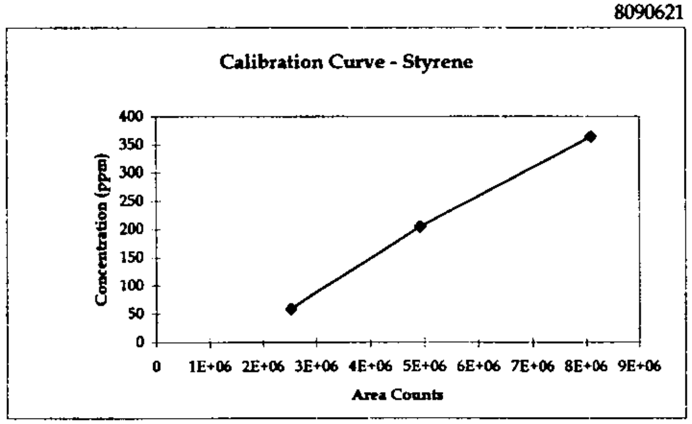
Gas Chromatography Runs for NMMA

Date: 4/3/97
Test No. NMMA-4-1

					Area Counts		Response Factors		Calculated Conc		THC
Run No.	Concentration (ppmv)	Compound	Time	THC	Styrene	MMA	Styrene	MMA	Styrene	MMA	Equiv
65		NMMA-4-1-1	14:58	107	2703189				64.4		44.8
66		NMMA-4-1-2	15:03	162	3633230				87.1		67.8
67		NMMA-4-1-3	15:10	120	2783997				66.4		50.3
68		NMMA-4-1-4	15:16	233	5028627				121.3		97.6
69		NMMA-4-1-5	15:23	137	2975566				71.0		57.4
70		NMMA-4-1-6	15:29	118	2617290				62.3		49.4
71		NMMA-4-1-7	15:34	305	6292653				152.2		127.7
72		NMMA-4-1-8	15:41	280	5592202				135.0		117.3
73		NMMA-4-1-9	15:47	250	4732771				114.0		104.7
74		NMMA-4-1-10	15:53	290	5129690				123.7		121.5
75		NMMA-4-1-11	16:01	241	4672861				112.6		100.9
76		NMMA-4-1-12	16:07	167	3490486				83.6		69.9
77		NMMA-4-1-13	16:13	120	2561261				60.9		50.3
78		NMMA-4-1-14	16:18	97	1979686				46.7		40.6
79		NMMA-4-1-15	16:24	72	1537252				35.9		30.2
80		NMMA-4-1-16	16:29	51	952722				21.6		21.4
81		NMMA-4-1-17	16:37	25	449567				9.3		10.5
82		NMMA-4-1-18	16:43	15	311497				5.9		6.3
83		NMMA-4-1-19	16:48	7.6	138130				1.7		3.2
84		NMMA-4-1-20	16:56	4.4	73190				0.1		1.8
85		NMMA-4-1-21	17:02	3.6	62627				-0.2		1.5
86	364				17261280						
87	364				14594400						
88	364				13331768						
89	204	Styrene			7464080		2.733E-05				
90	204	Styrene			7922810		2.575E-05				
91	122	Styrene			5751037		2.121E-05				
92	122	Styrene			5286512		2.308E-05				
93	122	Styrene			6186522		1.972E-05				

Gas Chromatography Runs for NMMA
Date: 4/3/97
Test No. NMMA-4-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	THC Equiv
Calibration Curves											
	Styrene		15062483	364	2.42E-05						
			7693445	204	2.65E-05						
			5741357	122	2.12E-05						
			0	0							
			Y=MX+B								
			m		2.4E-05		15062483		361.1552		
			b				5741357		137.6613		
							7693445		184.4668		
			x	y							
			2532198	59.2							
			4921727	204							
			8090621	364							
			Y=MX+B								
			m	5.48E-05	2532198				59.2		
			b	-79.6548	4921727				190.2315		
					8090621				364		



Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-7-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Sty:MMA Ratio
95		Nitrogen										
96		Nitrogen										
97	59.2	Styrene			2424858		2.44E-05					
98	59.2	Styrene			2561784		2.31E-05					
99	122	Styrene										
100	122	Styrene			4956275		2.46E-05					
101	122	Styrene										
102	122	Styrene			4937520		2.47E-05					
103	204	Styrene										
104	204	Styrene			7731267		2.64E-05					
105	204	Styrene			7649680		2.67E-05					
106	115.9	MMA										
107	115.9	MMA				2364376		4.90E-05				
108	115.9	MMA				2347678		4.94E-05				
109		NMMA-7-1	9:20	104	2146024				53.0	0.0	126.5	#######
110		NMMA-7-2	9:26	312	6499744				168.2	0.0	401.6	#######
111		NMMA-7-3	9:33	300	6237210				161.3	0.0	385.0	#######
112		NMMA-7-4	9:43	392	8282432				215.4	0.0	514.2	#######
113		NMMA-7-5	9:49	200	3772290				96.0	0.0	229.2	#######
114		NMMA-7-6	9:55	101	2256090				55.9	0.0	133.4	#######
115		NMMA-7-7	10:01	230	5446650				140.3	0.0	335.0	#######
116		NMMA-7-8	10:07	310	6013485				155.4	0.0	370.8	#######
117		NMMA-7-9	10:13	335	6616547				171.3	0.0	408.9	#######
118		NMMA-7-10	10:20	320	6532752				169.1	0.0	403.6	#######
119		NMMA-7-11	10:26	421	8488742				220.9	0.0	527.2	#######
120		NMMA-7-12	10:32	310	6401610				165.6	0.0	395.4	#######
121		NMMA-7-13	10:38	230	6297552				162.9	0.0	388.8	#######
122		NMMA-7-14	10:45	160	3189914				80.6	0.0	192.4	#######
123		NMMA-7-15	10:56	107	2726037				68.3	0.0	163.1	#######
124		NMMA-7-16	11:07	83	1768040				43.0	0.0	102.6	#######
125		NMMA-7-17	11:22	60	1154462				26.7	0.0	63.8	#######
126		NMMA-7-18	12:32	177	3301888				83.6	0.0	199.5	#######
127		NMMA-7-19	12:38	220	4213530				107.7	0.0	257.1	#######
128		NMMA-7-20	12:44	470	8607987				224.0	0.0	534.8	#######
129		NMMA-7-21	12:51	360	6776691				175.6	0.0	419.1	#######
130		NMMA-7-22	12:58	460	8250592				214.6	0.0	512.2	#######
131		NMMA-7-23	13:05	380	6506419				168.4	0.0	402.0	#######
132		NMMA-7-24	13:11	235	4900512				125.9	0.0	300.5	#######
133		NMMA-7-25	13:16	166	3396750				86.1	0.0	205.5	#######
134		NMMA-7-26	13:24	138	2012448				49.4	0.0	118.0	#######
135		NMMA-7-27	13:32	102	2181157				53.9	0.0	128.7	#######

Gas Chromatography Runs for NMMA

Date: 4/4/97
Test No: NMMA-7-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Sty:MMA Ratio
136		NMMA-7-28	13:42	68	1312078				30.9	0.0	73.8	#######
137		NMMA-7-29	13:53	315	9629830				251.1	0.0	599.3	#######
138		NMMA-7-30	14:00	422	8646016				225.0	0.0	537.2	#######
139		NMMA-7-31	14:06	349	6536980				169.2	0.0	403.9	#######
140		NMMA-7-32	14:12	520	8536339				222.1	0.0	530.2	#######
141		NMMA-7-33	14:18	277	5223779				134.4	0.0	320.9	#######
142		NMMA-7-34	14:26	148	2583584				64.6	0.0	154.1	#######
143		NMMA-7-35	14:35	110	2004485				49.2	0.0	117.5	#######
144		NMMA-7-36	14:46	76	1737152				42.2	0.0	100.6	#######
145		NMMA-7-37	14:55	57	1152829				26.7	0.0	63.7	#######
146		NMMA-7-38	15:05	26	556481				10.9	0.0	26.0	#######
147		NMMA-7-39	15:11	18	355620				5.6	0.0	13.3	#######
148		NMMA-7-40	15:22	11	256595				3.0	0.0	7.1	#######
149		NMMA-7-41	15:34	7.8	159624				0.4	0.0	0.9	#######
150	204	Styrene			6810240							
151	204	Styrene			6712224							
152	115.9	MMA				2194430						
153	115.9	MMA				2450414						

Calibration Curves

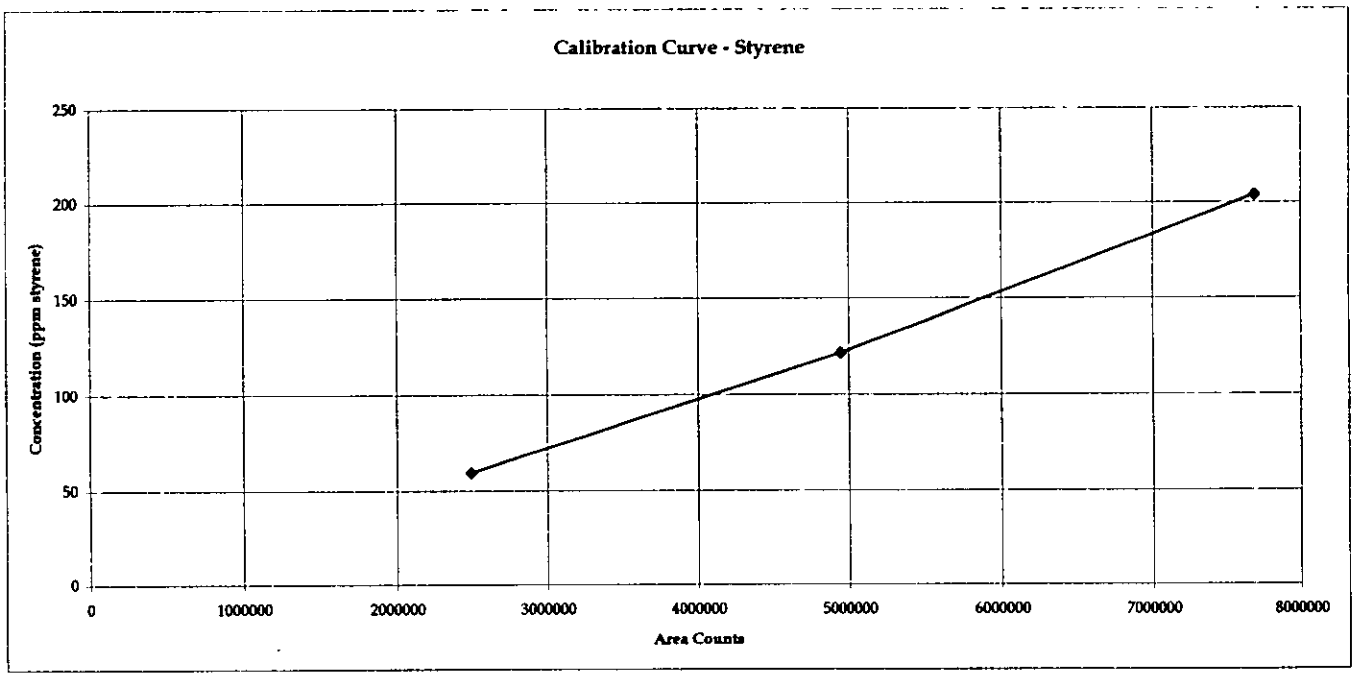
Styrene	Initial	x	y			
		0	0			
		2493321	59.2			
		4946898	122			
		7690474	204			
		Y=MX+B				
		m	2.79E-05	2493321		59.2
		b	-10.2674	4946898		127.6
				7690474		204.0
	Check					
			204	6810240		179.5
			204	6712224		176.7
			204			178.1
		Difference			12.7%	
MMA	Initial	x	y			
		0	0			
		2356027	115.9			
		m	4.92E-05			

Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-7-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Sty:MMA Ratio
			b	0								
		Check										
				115.9	2194430				108.0			
				115.9	2450414				120.5			
				115.9					114.2			
			Difference			1.4%						



Gas Chromatography Runs for NMMA

Date: 4/4/97
Test No: NMMA-3-1

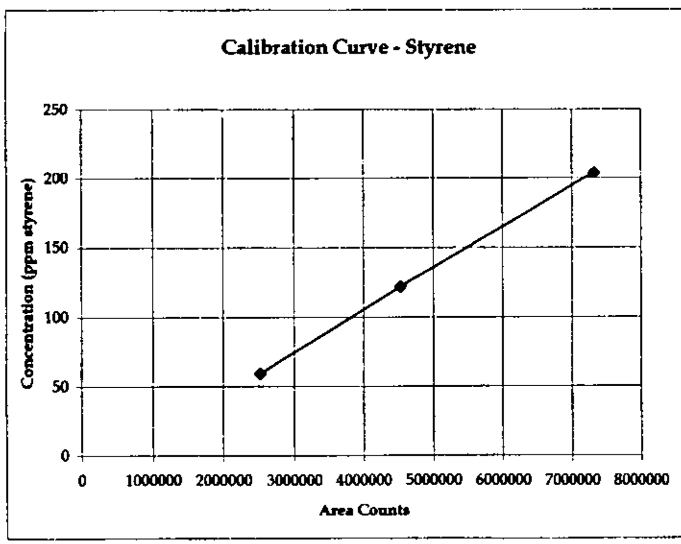
Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
154		NMMA-3-1-1	16:11	138	2027461	437095			44.3	19.5	132	2.3	
155		NMMA-3-1-2	16:17	357	5050669	1064450			135.3	53.5	397	2.5	
156		NMMA-3-1-3	16:23	457	7957434	1570449			222.8	81.0	643	2.7	
157		NMMA-3-1-4	16:30	210	3921122	736969			101.3	35.8	291	2.8	
158		NMMA-3-1-5	16:40	175	3135224	451264			77.6	20.2	213	3.8	
159		NMMA-3-1-6	16:47	145	2208101	268054			49.7	10.3	133	4.8	
160		NMMA-3-1-7	16:53	138	2408938	249787			55.8	9.3	146	6.0	
161		NMMA-3-1-8	17:01	120	2228555	192427			50.3	6.2	129	8.2	
162		NMMA-3-1-9	17:07	93	1839684	164668			38.6	4.7	99	8.3	
163		NMMA-3-1-10	17:13	83	1678298	167213			33.8	4.8	87	7.0	
164		NMMA-3-1-11	17:19	66	1302226	99426			22.4	1.1	55	20.1	
165		NMMA-3-1-12	17:28	45	1004535	42553			13.5	-2.0	29	-6.8	**
166		NMMA-3-1-13	17:38	30	580914	21483			0.7	-3.1	-3	-0.2	
167		NMMA-3-1-14	17:43	19	336092	12702			-6.7	-3.6	-21	1.9	
168		NMMA-3-1-15	17:49	14	270692	74350			-8.6	-0.2	-21	35.1	
169		NMMA-3-1-16	17:56	9	197151	6439			-10.8	-3.9	-31	2.8	
170	59.2	Styrene											
171	59.2	Styrene			2663302		2.223E-05						
172	59.2	Styrene			2299560		2.574E-05						
173	59.2	Styrene			2606960		2.271E-05						
174	122	Styrene			4357293		2.8E-05						
175	122	Styrene			4821389		2.53E-05						
176	122	Styrene			4427190		2.756E-05						
177	204	Styrene			6574317		3.103E-05						
178	204	Styrene											
179	204	Styrene			8341984		2.445E-05						
180	204	Styrene			7081792		2.881E-05						
181	115.9	MMA				2297958		5.044E-05					
182	115.9	MMA				2126528		5.45E-05					
183	58	MMA				1252769		4.63E-05					
184	58	MMA				1190454		4.872E-05					
185	12	MMA				267634		4.484E-05					
186	12	MMA				322825		3.717E-05					
187	12	MMA				308813		3.886E-05					

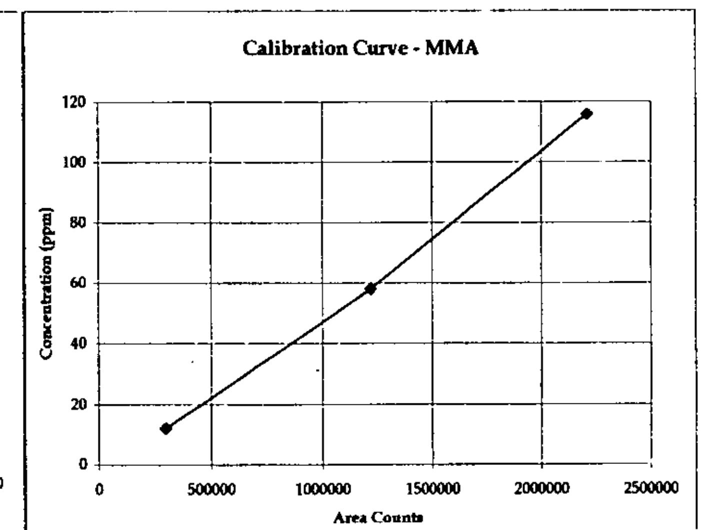
Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-3-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
Calibration Curves												
	Styrene	Initial	x	y								
			2523274	59.2								
			4535291	122								
			7332698	204								
			Y=MX+B									
			m	3.01E-05	2523274				59.2			
			b	-16.7696	4535291				119.8			
					7332698				204.0			
	MMA	Initial	x	y								
			299757.3	12				4.58E-05				
			1221612	58				4.90E-05				
			2212243	115.9								
			Y=MX+B									
			m	5.43E-05	299757.3				12.0			
			b	-4.28498	1221612				62.1			
					2212243				115.9			





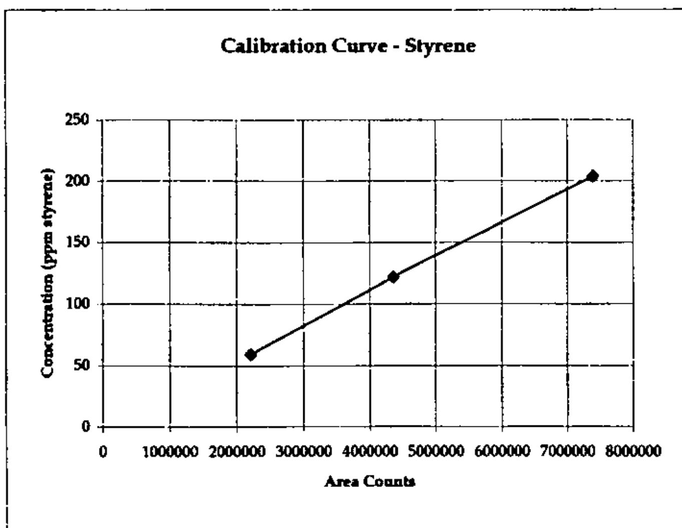
Gas Chromatography Runs for NMMA

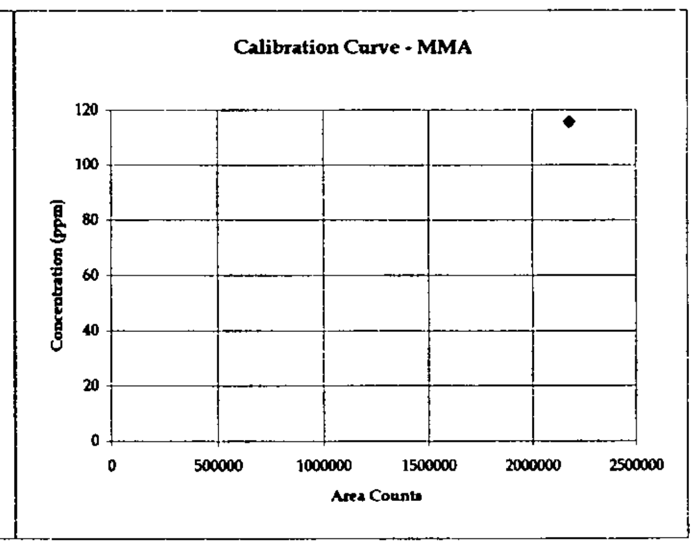
Date: 4/4/97
Test No: NMMA-8-2

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
188		Nitrogen											
189		Nitrogen											
190	59.2	Styrene			2254912		2.63E-05						
191	59.2	Styrene			2171352		2.73E-05						
192	122	Styrene			4210266		2.90E-05						
193	122	Styrene			4516435		2.70E-05						
194	59.2	Styrene											
195	204	Styrene											
196	204	Styrene			7293405		2.80E-05						
197	204	Styrene			7506915		2.72E-05						
198	115.9	MMA				2275114		5.09E-05					
199	115.9	MMA											
200	115.9	MMA		**		2080506		5.57E-05					
201		NMMA-8-2-1	8:47	170	2906960	719644			80.0	38.4	244	2.1	
202		NMMA-8-2-2	8:53	275	4835504	1129984			133.4	60.3	401	2.2	
203		NMMA-8-2-3	8:58	475	8194480	1818118			226.5	97.0	674	2.3	
204		NMMA-8-2-4	9:04	500	9359270	1950893			258.7	104.0	761	2.5	
205		NMMA-8-2-5	9:09	565	9851699	1870325			272.4	99.7	787	2.7	
206		NMMA-8-2-6	9:14	560	8345181	1482396			230.6	79.0	659	2.9	
207		NMMA-8-2-7	9:21	700	9315162	1564888			257.5	83.4	729	3.1	
208		NMMA-8-2-8	9:27		7652301	1101541			211.5	58.7	586	3.6	
209		NMMA-8-2-9	9:34	425	6359642	747716			175.7	39.9	474	4.4	
210		NMMA-8-2-10	9:42	320	6115709	589668			168.9	31.4	446	5.4	
211		NMMA-8-2-11	9:51	200	3620594	263198			99.8	14.0	258	7.1	
212		NMMA-8-2-12	10:00	182	3294266	227265			90.8	12.1	233	7.5	
213		NMMA-8-2-13	10:08	165	3189136	166422			87.9	8.9	222	9.9	
214		NMMA-8-2-14	10:15	115	2161390	138925			59.4	7.4	152	8.0	**
215		NMMA-8-2-15	10:22	89	1750519	74226			48.0	4.0	120	12.1	**
216		NMMA-8-2-16	10:27	70	1244745	120698			34.0	6.4	90	5.3	**
217		NMMA-8-2-17	10:33	60	1254234	134504			34.3	7.2	92	4.8	**
218		NMMA-8-2-18	10:42	45	1112929	101212			30.4	5.4	80	5.6	**
219		NMMA-8-2-19	10:52	31	656310	10997			17.7	0.6	43	30.2	**
220		NMMA-8-2-20	11:01	18	368616	6474			9.7	0.3	24	28.2	**
221		NMMA-8-2-21	11:08	12	218538	1401			5.6	0.1	13	74.7	**

Gas Chromatography Runs for NMMA
Date: 4/4/97
Test No: NMMA-8-2

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
Calibration Curves												
	Styrene	Initial	x	y								
			0	0								
			2213132	59.2								
			4363351	122								
			7400160	204								
			Y=MX+B									
			m	2.79E-05	2213132				59.2			
			b	-2.58133	4363351				119.2			
					7400160				204.0			
	MMA	Initial	x	y								
				12				5.33E-05				
				58								
			2177810	115.9								
			Y=MX+B									
			m	4.77E-05	0				12.0			
			b	12	0				12.0			
					2177810				115.9			





Gas Chromatography Runs for NMMA

Date: 4/5/97

Test No: NMMA-1-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
188		Nitrogen										
189		Nitrogen										
190	59.2	Styrene			2254912		2.63E-05					
191	59.2	Styrene			2171352		2.73E-05					
192	122	Styrene			4210266		2.90E-05					
193	122	Styrene			4516435		2.70E-05					
194	59.2	Styrene										
195	204	Styrene										
196	204	Styrene			7293405		2.80E-05					
197	204	Styrene			7506915		2.72E-05					
198	115.9	MMA				2275114		5.09E-05				
199	115.9	MMA										
200	115.9	MMA				2080506		5.57E-05				
222	204	Styrene										
223	204	Styrene			7807792							
224	204	Styrene			7622234							
225	115.9	MMA				2155598						
226	115.9	MMA				2078871						
227		NMMA-1-1-1	12:10	270	4599898				126.9	0.0	303	########
228		NMMA-1-1-2	12:20	110	2307045				63.4	0.0	151	########
229		NMMA-1-1-3	12:27	275	5420528				149.6	0.0	357	########
230		NMMA-1-1-4	12:32	315	6585360				181.9	0.0	434	########
231		NMMA-1-1-5	12:41	152	3353214				92.4	0.0	221	########
232		NMMA-1-1-6	12:47	107	2237333				61.5	0.0	147	########
233		NMMA-1-1-7	12:54	93	2120998				58.3	0.0	139	########
234		NMMA-1-1-8	13:01	117	2046736				56.2	0.0	134	########
235		NMMA-1-1-9	13:09	225	4591773				126.7	0.0	302	########
236		NMMA-1-1-10	13:17	240	4263264				117.6	0.0	281	########
237		NMMA-1-1-11	13:23	150	3002421				82.7	0.0	197	########
238		NMMA-1-1-12	13:32	97	1758648				48.2	0.0	115	########
239		NMMA-1-1-13	13:39	65	1401757				38.4	0.0	92	########
240		NMMA-1-1-14	13:48	165	3227858				88.9	0.0	212	########
241		NMMA-1-1-15	13:56	207	3545005				97.7	0.0	233	########
242		NMMA-1-1-16	14:01	270	4736896				130.7	0.0	312	########
243		NMMA-1-1-17	14:17	91	2103309				57.8	0.0	138	########
244		NMMA-1-1-18	14:23	66	1196392				32.7	0.0	78	########
245		NMMA-1-1-19	14:32	38	965350				26.3	0.0	63	########
246		NMMA-1-1-20	14:39	24	520505				13.9	0.0	33	########
247		NMMA-1-1-21	14:46	15	278086				7.2	0.0	17	########
248		NMMA-1-1-22	14:53	10	189523				4.8	0.0	11	########

Gas Chromatography Runs for NMMA

Date: 4/5/97
Test No: NMMA-1-1

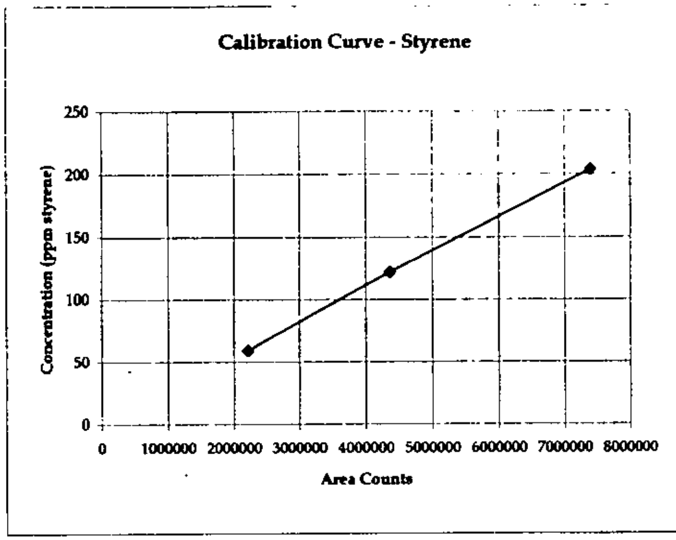
Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
Calibration Curves												
	Styrene	Initial	x	y								
			0	0								
			2213132	59.2								
			4363351	122								
			7400160	204								
			Y=MX+B									
			m	2.79E-05	2213132				59.2			
			b	-2.58133	4363351				119.2			
					7400160				204.0			
		Check										
				204	7807792				215.4			
				204	7622234				210.2			
				204					212.8			
			Difference			-4.3%						
	MMA	Initial	x	y								
				12				5.33E-05				
				58								
			2177810	115.9								
			Y=MX+B									
			m	4.77E-05	0				12.0			
			b	12	0				12.0			
					2177810				115.9			
		Check										
				115.9	2155598				114.9			
				115.9	2078871				110.9			
				115.9					112.9			
			Difference			2.6%						

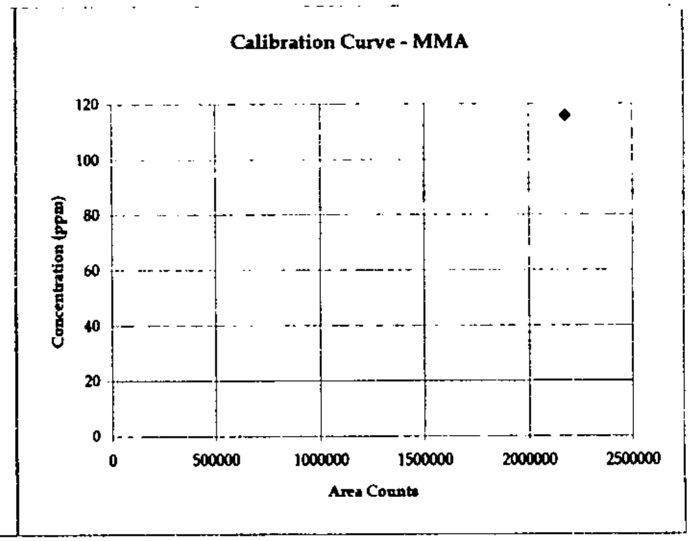
Gas Chromatography Runs for NMMA

Date: 4/5/97

Test No: NMMA-1-1

					Area Counts		Response Factors		Calculated Conc		Equiv	Ratio
Run No.	Concentration (ppmv)	Compound	Time	THC	Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Sty:MMA





Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-7-2

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA			
266		Air	7:12												
267		Air	7:25												
268	59.2	Styrene	6:11		2298784		2.575E-05								
269	59.2	Styrene	8:24		2434618		2.432E-05								
270	59.2	Styrene	8:32		2284744		2.591E-05								
271	122	Styrene	8:40		4730714		2.579E-05								
272	122	Styrene	8:49		4545787		2.684E-05								
273	204	Styrene	8:58		8126093		2.51E-05								
274	204	Styrene	9:04		7330531		2.783E-05								
275	204	Styrene	9:10		6897741		2.957E-05								
276	204	Styrene	9:17		7350531		2.775E-05								
277	204	Styrene	9:31		7350739		2.775E-05								On line @ 9:34
278		NMMA-7-2-1	9:40	320	5507040				148.9	0.0	355	########	2.15	149.6	Skin start @ 9:38
279		NMMA-7-2-2	9:45	300	5408576				146.2	0.0	349	########	2.05	146.8	
280		NMMA-7-2-3	9:51	490	6834496				185.5	0.0	443	########	2.64	187.5	
281		NMMA-7-2-4	9:57	491	9327008				254.1	0.0	607	########	1.93	258.7	First 1/2 skin done
282		NMMA-7-2-5	10:05	165	3603800				96.5	0.0	230	########	1.71	95.3	Turning tool @ 10:04
283		NMMA-7-2-6	10:12	160	3408750				91.1	0.0	217	########	1.76	89.7	
284		NMMA-7-2-7	10:19	140	2251072				59.2	0.0	141	########	2.36	56.7	Restart skin @ 10:41
285		NMMA-7-2-8	10:24	510	4202022				113.0	0.0	270	########	4.51	112.4	
286		NMMA-7-2-9	10:30	464	6760400				183.4	0.0	438	########	2.53	185.4	
287		NMMA-7-2-10	10:36	530	8444000				229.8	0.0	549	########	2.31	233.5	
288		NMMA-7-2-11	10:42	308	4619731				124.5	0.0	297	########	2.47	124.3	Skin done @ 10:41
289		NMMA-7-2-12	10:48	183	2987898				79.5	0.0	190	########	2.30	77.7	
290		NMMA-7-2-13	10:54	150	2693934				71.4	0.0	170	########	2.10	69.3	
291		NMMA-7-2-14	11:02	115	1994148				52.1	0.0	124	########	2.21	49.3	
292		NMMA-7-2-15	11:11	93	1595645				41.2	0.0	98	########	2.26	38.0	
293		NMMA-7-2-16	11:17	80	1726360				44.8	0.0	107	########	1.79	41.7	
294		NMMA-7-2-17	11:24	75	1495791				38.4	0.0	92	########	1.95	35.1	
295		NMMA-7-2-18	11:30	71	1209129				30.5	0.0	73	########	2.33	26.9	
296		NMMA-7-2-19	11:47	30	567016				12.8	0.0	31	########	2.34	8.6	
297		NMMA-7-2-20	11:54	240	3812472				102.2	0.0	244	########	2.35	101.3	
298		NMMA-7-2-21	11:59	464	7448733				202.4	0.0	483	########	2.29	205.1	
299		NMMA-7-2-22	12:05	548.1	9782944				266.7	0.0	637	########	2.06	271.7	
300		NMMA-7-2-23	12:12	600	12083496				330.1	0.0	788	########	1.82	337.4	
301		NMMA-7-2-24	12:17	390	6464352				175.3	0.0	418	########	2.22	177.0	
302		NMMA-7-2-25	12:23	233	2973750				79.1	0.0	189	########	2.94	77.3	
303		NMMA-7-2-26	12:29	180.9	2606621				69.0	0.0	165	########	2.62	66.8	
304		NMMA-7-2-27	12:35	128	2123618				55.7	0.0	133	########	2.30	53.0	
305		NMMA-7-2-28	12:40	104	1756431				45.6	0.0	109	########	2.28	42.6	
306		NMMA-7-2-29	12:46	89	1555785				40.1	0.0	96	########	2.22	36.8	

Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-7-2

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
307		NMMA-7-2-30	12:51	63	1266066				32.1	0.0	77	########	1.96	28.6
308		NMMA-7-2-31	12:57	330	5606346				151.6	0.0	362	########	2.18	152.5
309		NMMA-7-2-32	13:02	255	4216259				113.4	0.0	271	########	2.25	112.8
310		NMMA-7-2-33	13:07	380	8211418				223.4	0.0	533	########	1.70	226.8
311		NMMA-7-2-34	13:14	466	7494714				203.7	0.0	486	########	2.29	206.4
312		NMMA-7-2-35	13:20	470	8272829				225.1	0.0	537	########	2.09	228.6
313		NMMA-7-2-36	13:27	310	5127853				138.5	0.0	331	########	2.24	138.8
314		NMMA-7-2-37	13:34	160	2780098				73.8	0.0	176	########	2.17	71.8
315		NMMA-7-2-38	13:40	107	1718242				44.5	0.0	106	########	2.40	41.5
316		NMMA-7-2-39	13:46	101	1932456				50.4	0.0	120	########	2.00	47.6
317		NMMA-7-2-40	13:54	96	2154920				56.6	0.0	135	########	1.70	53.9
318		NMMA-7-2-41	14:01	76	1254608				31.8	0.0	76	########	2.39	28.2
319		NMMA-7-2-42	14:06	57	994442				24.6	0.0	59	########	2.32	20.8
320		NMMA-7-2-43	14:12	38	721293				17.1	0.0	41	########	2.23	13.0
321		NMMA-7-2-44	14:21	20	342870				6.7	0.0	16	########		2.2
322		NMMA-7-2-45	14:28	14	281333				5.0	0.0	12	########		0.4
323		NMMA-7-2-46	14:35	11	254353				4.2	0.0	10	########		-0.3
													2.25	

Calibration Curves

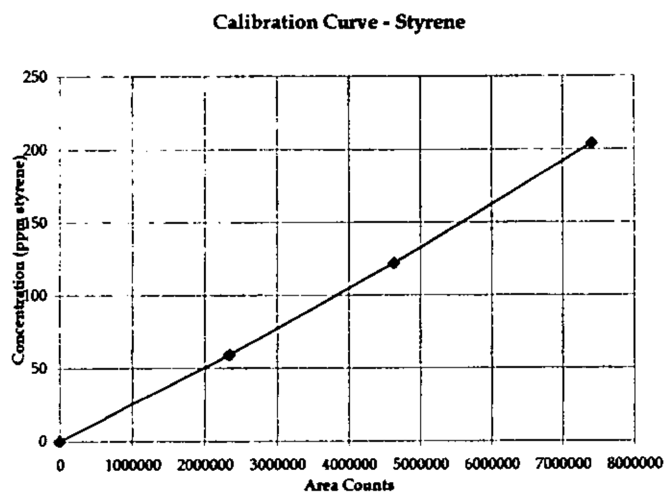
Styrene	Initial	x	y			
		0	0			
		2339382	59.2			
		4638251	122			
		7411127	204			
		Y=MX+B				
		m	2.86E-05	2339382		59.2
		b	-7.59013	4638251		124.8
				7411127		204.0
MMA	Initial	x	y			
		#REF!	12		#REF!	
		#REF!	58		#REF!	
		#REF!	115.9			
		Y=MX+B				
		m	#REF!	#REF!		#REF!
		b	#REF!	#REF!		#REF!
				#REF!		#REF!

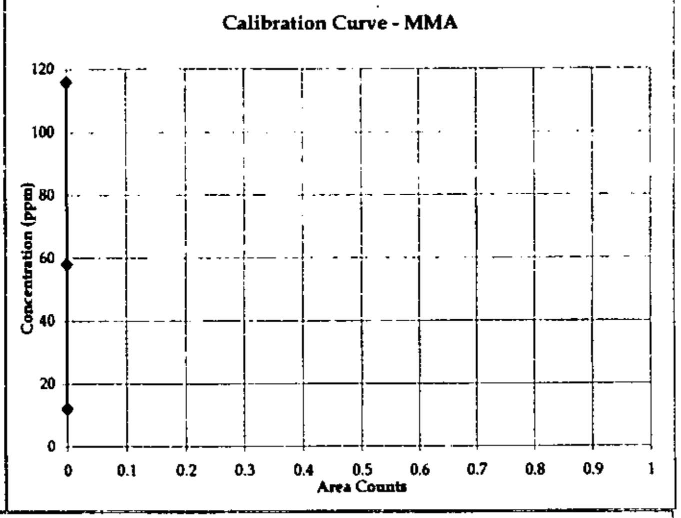
Gas Chromatography Runs for NMMA

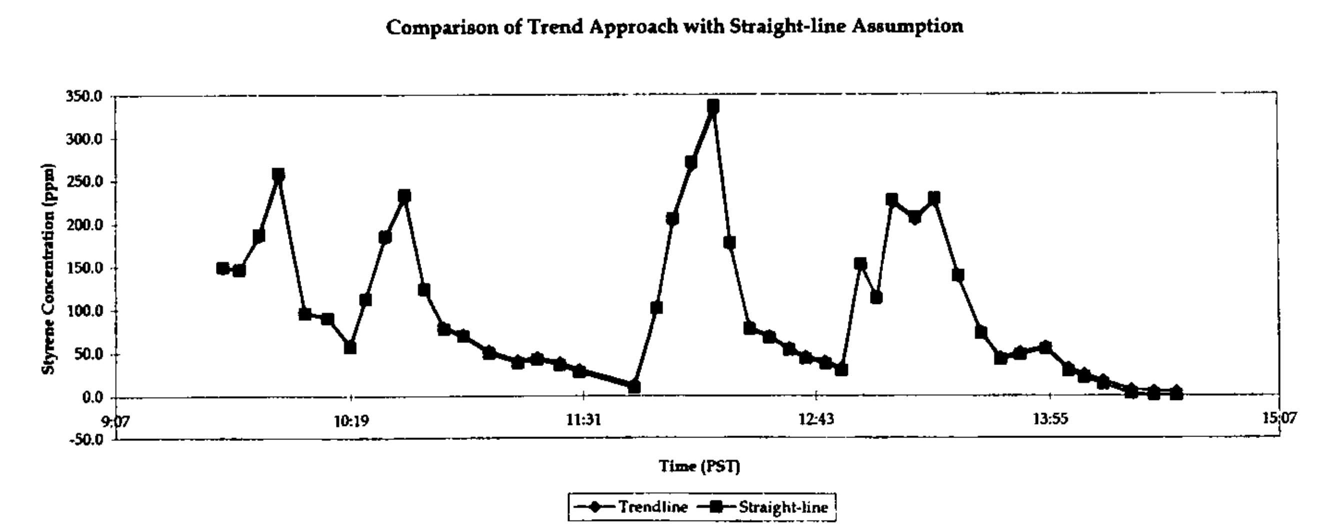
Date: 4/4/97

Test No: NMMA-7-2

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA







Gas Chromatography Runs for NMMA

Date: 4/8/97

Test No: NMMA-6-1 [-3-2, -4-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
341		Zero Air	7:17									
342		Zero Air	7:23									
343	138	MMA	7:38			2432546		5.67E-05				
344	138	MMA	7:43			2665533		5.18E-05				
345	138	MMA	7:46			2161474		6.38E-05				
346	138	MMA	7:51			2814342		4.90E-05				
347	138	MMA	7:58	**		3026870		4.56E-05				
348	82.8	MMA	8:07			1542307		5.37E-05				
349	82.8	MMA	8:11			1395949		5.93E-05				
350	138	MMA	8:17	**		3078986		4.48E-05				
351	82.8	MMA	8:21			1586068		5.22E-05				
352	82.8	MMA	8:25			1283152		6.45E-05				
353	82.8	MMA	8:28			1623835		5.10E-05				
354	41.4	MMA	8:32			860340		4.81E-05				
355	41.4	MMA	8:36			643010		6.44E-05				
356	41.4	MMA	8:40			1011674		4.09E-05				
357	59.2	Styrene	8:44		2009927		2.95E-05					
358	59.2	Styrene	8:53		1905652		3.11E-05					
359	122	Styrene	9:01		2735709		4.46E-05					
360	122	Styrene	9:07		2905496		4.20E-05					
361	122	Styrene	9:13		3588410		3.40E-05					
362	122	Styrene	9:22		3106942		3.93E-05					
363	204	Styrene	9:28	**	5244394		3.89E-05					
364	204	Styrene	9:33	**	5346765		3.82E-05					
365		NMMA-6-1-1	9:40	51	2906960	196930			109.0	10.8	275	10.1
366		NMMA-6-1-2	9:45	94	4835504	399552			184.8	21.3	470	8.7
367		NMMA-6-1-3	9:50	239	8194480	776781			316.9	40.8	813	7.8
368		NMMA-6-1-4	9:57	190	9359270	453842			362.7	24.1	899	15.1
369		NMMA-6-1-5	10:02	265	9851699	565842			382.1	29.9	953	12.8
370		NMMA-6-1-6	10:08	176	8345181	741704			322.8	39.0	824	8.3
371		NMMA-6-1-7	10:13	130	9315162	347179			361.0	18.6	887	19.4
372		NMMA-6-1-8	10:19	89	7652301	229255			295.6	12.5	723	23.7
373		NMMA-6-1-9	10:24	89	6359642	213855			244.8	11.7	600	21.0
374		NMMA-6-1-10	10:30	79	6115709	179574			235.2	9.9	575	23.8
375		NMMA-6-1-11	10:37	54	3620594	184606			137.0	10.2	341	13.5
376		NMMA-6-1-12	10:44	45	3294266	112927			124.2	6.4	305	19.3
377		NMMA-6-1-13	10:50	36	3189136	93578			120.1	5.4	294	22.1
378		NMMA-6-1-14	10:56	31	2161390	88707			79.7	5.2	197	15.3
379		NMMA-6-1-15	11:03	28	1750519	48960			63.5	3.1	156	20.2
380		NMMA-6-1-16	11:09	24	1244745	74701			43.6	4.5	110	9.8
381		NMMA-6-1-17	11:15	21	1254234	82106			44.0	4.9	112	9.1
382		NMMA-6-1-18	11:23	20	1112929	79810			38.4	4.7	98	8.1

Gas Chromatography Runs for NMMA

Date: 4/8/97

Test No: NMMA-6-1 [-3-2, -4-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
383	122	Styrene	11:28		3977982									
384	122	Styrene	11:34		5986944									
385	122	Styrene	11:40		3566944									
386	59.2	Styrene	11:49		2208619									
387	138	MMA	11:55			1943838								
388		NMMA-3-2-1	12:02	129	1752420	456869			63.6	24.2	185	2.6		
389		NMMA-3-2-2	12:07	380	5012445	1047798			191.8	54.8	533	3.5		
390		NMMA-3-2-3	12:13	488	6699485	1282238			258.1	66.9	708	3.9		
391		NMMA-3-2-4	12:19	255	4105082	813083			156.1	42.7	431	3.7		
392		NMMA-3-2-5	12:30	167	2135806	351598			78.7	18.8	214	4.2		
393		NMMA-3-2-6	12:35	130	2434256	388178			90.4	20.7	244	4.4		
394		NMMA-3-2-7	12:41	113	1370966	201650			48.6	11.0	131	4.4		
395		NMMA-3-2-8	12:49	103	1838883	197604			67.0	10.8	175	6.2		
396		NMMA-3-2-9	12:56	76	2159629	213578			79.6	11.7	206	6.8		
397		NMMA-3-2-10	13:01	81	973926	125305			33.0	7.1	88	4.7		
398		NMMA-3-2-11	13:06	65	1257564	170693			44.1	9.4	118	4.7		
399		NMMA-3-2-12	13:11	57	928055	197256			31.2	10.8	89	2.9	**	
400		NMMA-3-2-13	13:19	43	745968	56604			24.0	3.5	62	6.8		
401		NMMA-3-2-14	13:27	34	638651	98805			19.8	5.7	55	3.5	**	
402		NMMA-3-2-15	13:36	19	579303	53743			17.5	3.4	46	5.2	**	
403		NMMA-3-2-16	13:41	14	228759	12418			3.7	1.2	10	2.9	**	
404		NMMA-3-2-17	13:47	10	436729	76366			11.8	4.6	35	2.6	**	
405		Zero Air	13:53											
406	59.2	Styrene	13:58		1744087									low
407	59.2	Styrene	14:04		1979082									
408	122	Styrene	14:13		3190493									
409	122	Styrene	14:19		3722392									
410	138	MMA	14:28			1870897								
411	138	MMA	14:37			2588950								
412		NMMA-4-2-1	14:46	160	2130403				78.4	0.0		########		
413		NMMA-4-2-2	14:51	181	2912462				109.2	0.0		########		
414		NMMA-4-2-3	14:55	260	3796434				144.0	0.0		########		
415		NMMA-4-2-4	15:01	157	2991454				112.3	0.0		########		
416		NMMA-4-2-5	15:06	113	2524680				94.0	0.0		########		
417		NMMA-4-2-6	15:12	94	1455733				51.9	0.0		########		
418		NMMA-4-2-7	15:16	71	1105396				38.1	0.0		########		
419		NMMA-4-2-8	15:21	54	855882				28.3	0.0		########		
420		NMMA-4-2-9	15:27	55	957207				32.3	0.0		########		
421		NMMA-4-2-10	15:33	45	666229				20.9	0.0		########		
422		NMMA-4-2-11	15:42	100	1490351				53.3	0.0		########		
423		NMMA-4-2-12	15:47	206	2954728				110.9	0.0		########		
424		NMMA-4-2-13	15:52	310	6096154				234.4	0.0		########		

Gas Chromatography Runs for NMMA

Date: 4/8/97

Test No: NMMA-6-1 [-3-2, -4-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
425		NMMA-4-2-14	15:58	185	2727650				101.9	0.0		########
426		NMMA-4-2-15	16:04	208	2845392				106.6	0.0		########
427		NMMA-4-2-16	16:13	120	1484244				53.0	0.0		########
428		NMMA-4-2-17	16:19	97	1453124				51.8	0.0		########
429		NMMA-4-2-18	16:24	78	1338082				47.3	0.0		########
430		NMMA-4-2-19	16:33	49	626620				19.3	0.0		########
431		NMMA-4-2-20	16:40	30	229460				3.7	0.0		########
432		NMMA-4-2-21	16:48	15	293845				6.2	0.0		########
433		NMMA-4-2-22	16:53	10	134077				-0.1	0.0		########
434	122	Styrene	17:08		3510616							
435	122	Styrene	17:13		3658506							
436	59.2	Styrene	17:22		1540804							
437	59.2	Styrene	17:27		1859333							
438	204	Styrene	17:37		4631290							
439	204	Styrene	17:43		4745581							
440	Poor injection - aborted											
441	138	MMA	18:01			1526752						
442	138	MMA	18:07			1901698						
443	138	MMA	18:12			1932713						
444	69	MMA	18:18			914921						
445	69	MMA	18:24			1053810						
446		Zero Air	18:25									

Calibration Curves

Styrene	Initial	x	y		
		0	0		
		1957790	59.2		
		3084139	122		
		5295580	204		
		Y=MX+B			
		m	4.34E-05	1957790	59.2
		b	-25.7328	3084139	108.1
				5295580	204.0
	Check				
			122	3977982	146.8
			122	5986944	234.0
			122	3566944	129.0
			59.2	2208619	70.1
			59.2	1744087	49.9
			59.2	1979082	60.1

Gas Chromatography Runs for NMMA

Date: 4/8/97
Test No: NMMA-6-1 [-3-2, -4-2]

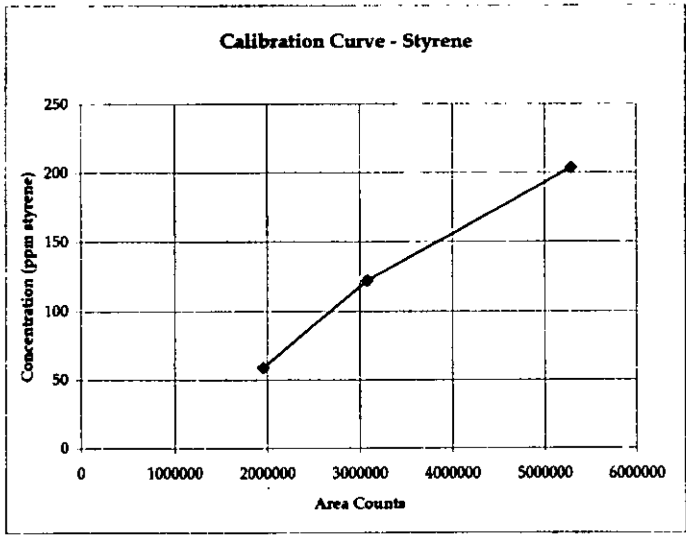
Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				122	3190493				112.7			
				122	3722392				135.8			
				122	3510616				126.6			
				122	3658506				133.0			
				59.2	1540804				41.1			
				59.2	1859333				54.9			
				204	4631290				175.2			
				204	4745581				180.1			
				59.2		Average			55.2			
				122		Average			145.4			
				204		Average			177.7			
			Differenc	59.2			6.7%					
				122			-19.2%					
				204			12.9%					
	MMA	Initial	x	y								
			0	0								
			838341.3	41.4				6.03E-05				
			1486262	82.8								
			2696625	138								
			Y=MX+B									
			m	5.2E-05	838341.3				41.4			
			b	-2.17987	1486262				75.1			
					2696625				138.0			
		Check										
				138	1943838				98.9			
				138	1870897				95.1			
				138	2588950				132.4			
				138	1526752				77.2			
				138	1901698				96.7			
				138	1932713				98.3			
				69	914921				45.4			
				69	1053810				52.6			
				138		Average			99.7			
				69		Average			49.0			
			Differenc	138			27.7%					
				69			29.0%					

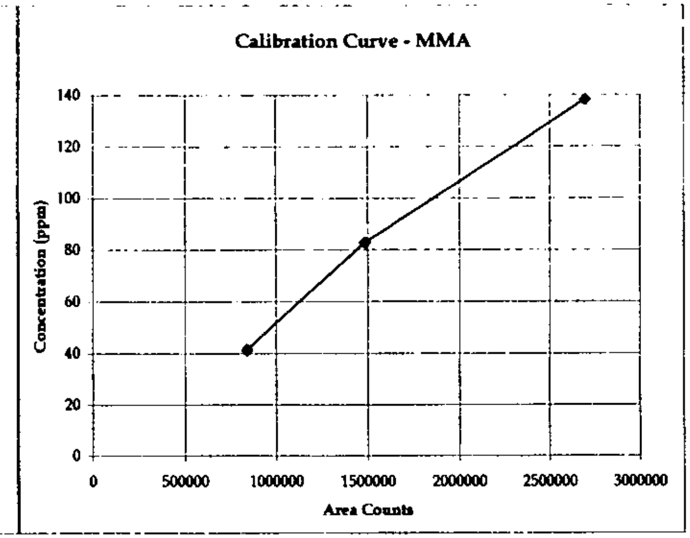
Gas Chromatography Runs for NMMA

Date: 4/8/97

Test No: NMMA-6-1 [-3-2, -4-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA





Gas Chromatography Runs for NMMA
Date: 4/4/97
Test No: NMMA-1-2 [-11-1, 11-1R]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
447		Zero Air	7:23									
448		Zero Air	7:29									
449	138	MMA	7:38			1792969		7.70E-05				
450	138	MMA	7:44			2116642		6.52E-05				
451	138	MMA	7:49			1770000		7.80E-05				
452	59.2	Styrene	7:56		1200810		4.93E-05					
453	59.2	Styrene	8:02		1977894		2.99E-05					
454	59.2	Styrene	8:07		1852249		3.20E-05					
455	122	Styrene	8:15		3120594		3.91E-05					
456	122	Styrene	8:21		2989200		4.08E-05					
457	122	Styrene	8:27		4716783		2.59E-05					
458	122	Styrene	8:34		3923266		3.11E-05					
459	122	Styrene	8:39		3073312		3.97E-05					
460	204	Styrene	8:46		5126154		3.98E-05					
461	204	Styrene	8:51		5370304		3.80E-05					
462		NMMA-1-2-1	9:55	238	3133270				113.8	0.0		########
463		NMMA-1-2-2	10:02	156	1811931				62.6	0.0		########
464		NMMA-1-2-3	10:06	219	3613341				132.3	0.0		########
465		NMMA-1-2-4	10:12	286	5067021				188.5	0.0		########
466		NMMA-1-2-5	10:17	178	3731293				136.9	0.0		########
467		NMMA-1-2-6	10:21	132	2324694				82.5	0.0		########
468		NMMA-1-2-7	10:27	88	1920083				66.8	0.0		########
469		NMMA-1-2-8	10:32	79	1362342				45.3	0.0		########
470		NMMA-1-2-9	10:37	65	865232				26.0	0.0		########
471		NMMA-1-2-10	10:43	53	713419				20.2	0.0		########
472		NMMA-1-2-11	10:49		4253606				157.1	0.0		########
473		NMMA-1-2-12	10:58	233	3344534				121.9	0.0		########
474		NMMA-1-2-13	11:04	125	1685221				57.7	0.0		########
475		NMMA-1-2-14	11:10	88	1782483				61.5	0.0		########
476		NMMA-1-2-15	11:16	70	1273704				41.8	0.0		########
477		NMMA-1-2-16	11:23	297	3737442				137.1	0.0		########
478		NMMA-1-2-17	11:29	253	3368774				122.9	0.0		########
479		NMMA-1-2-18	11:36	152	2435699				86.8	0.0		########
480		NMMA-1-2-19	11:42	86	1323075				43.7	0.0		########
481		NMMA-1-2-20	11:50	52	855991				25.7	0.0		########
482		NMMA-1-2-21	12:03	24	376746				7.1	0.0		########
483		NMMA-1-2-22	12:08	17	290008				3.8	0.0		########
484		NMMA-1-2-23	12:14	12	190411				-0.1	0.0		########
485	204	Styrene	12:20		6047334							
486	204	Styrene	12:30		7178914							
487	204	Styrene	12:41		5592954							
488	122	Styrene	12:49		3599598							

Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-1-2 [-11-1, 11-1R]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
489	122	Styrene	12:56		5009738								
490	138	MMA	13:07		1590112								
491	138	MMA	13:12		901657								
492		NMMA-11-1-1	13:21	110	1229537	219655			40.1	16.1		2.5	
493		NMMA-11-1-2	13:27	70	802141	127716			23.6	9.4		2.5	
494		NMMA-11-1-3	13:34	36	484481	39620			11.3	2.9		3.9	
495		NMMA-11-1-4	13:43	20	251206	106130			2.3	7.8		0.3	
496		NMMA-11-1-5	13:49		120633	91916			-2.8	6.7		-0.4	
497	138	MMA	14:05			1396787							
498		NMMA-11-1R-1	14:22	86	963478				29.8	0.0		########	
499		NMMA-11-1R-2	14:28	54	812727				24.0	0.0		########	
500		NMMA-11-1R-3	14:36	29	271584				3.1	0.0		########	
501		NMMA-11-1R-4	14:43	20	315506				4.8	0.0		########	
502		NMMA-11-1R-5	14:51	14	186096				-0.2	0.0		########	
503		NMMA-11-1R-6	14:59	8	125022				-2.6	0.0		########	
504	59.2	Styrene	15:31		1685064								
505	59.2	Styrene	15:43		1747079								
506	122	Styrene	15:53		4422576								
507	122	Styrene	16:01		3689314								
508	122	Styrene	16:10		5092669								low
509	122	Styrene	16:19		3326622								
510	122	Styrene	16:27		3280230								
511	122	Styrene	16:35		4567085								
512	122	Styrene	16:40		3034922								
513	122	Styrene	16:50		4775210								
514	204	Styrene	17:01		7759987								
515	204	Styrene	17:06										Poor injection
516	204	Styrene	17:12		8444409								
517	204	Styrene	17:18		6681344								
518	204	Styrene	17:24		9284096								
519	138	MMA	17:33			1943851							
520	138	MMA	17:43			1918447							

Calibration Curves

		x	y
Styrene	Initial		
		0	0
		1915072	59.2
		3564631	122
		5248229	204

Y=MX+B

Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-1-2 [-11-1, 11-1R]

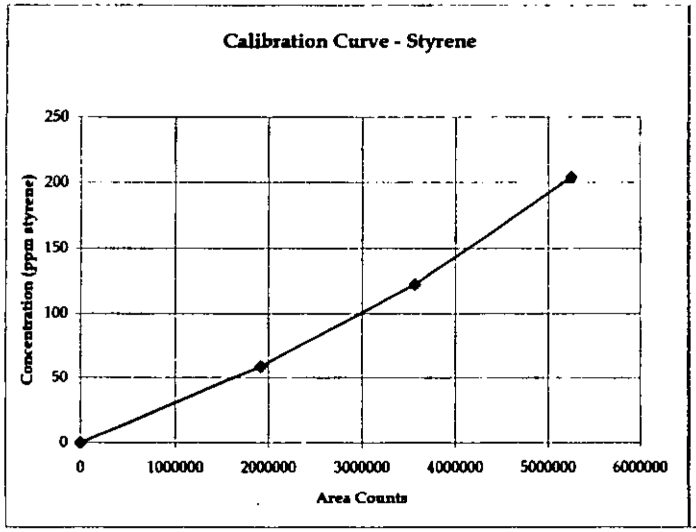
Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
			m	4.34E-05	1915072				59.2			
			b	-23.9951	3564631				130.9			
					5248229				204.0			
		Check										
				204	6047334				238.7			
				204	7178914				287.9			
				204	5592954				219.0			
				122	3599598				132.4			
				122.0	5092669				197.2			
				122	3326622				120.5			
				122	3280230				118.5			
				122	4567085				174.4			
				122		Average			150.0			
				204		Average			207.7			
				0		Average			#DIV/0!			
			Differenc	122			-23.0%					
				204			-1.8%					
				0			#DIV/0!					
	MMA	Initial	x	y								
			0	0				7.34E-05				
			138	1781485								
			Y=MX+B									
			m	7.34E-05	0				0.0			
			b	0	138				0.0			
					0				0.0			
		Check										
				122	0				0.0			
				122	0				0.0			
				122		Average			0.0			
				0		Average			#DIV/0!			
			Differenc	122			100.0%					
				0			#DIV/0!					

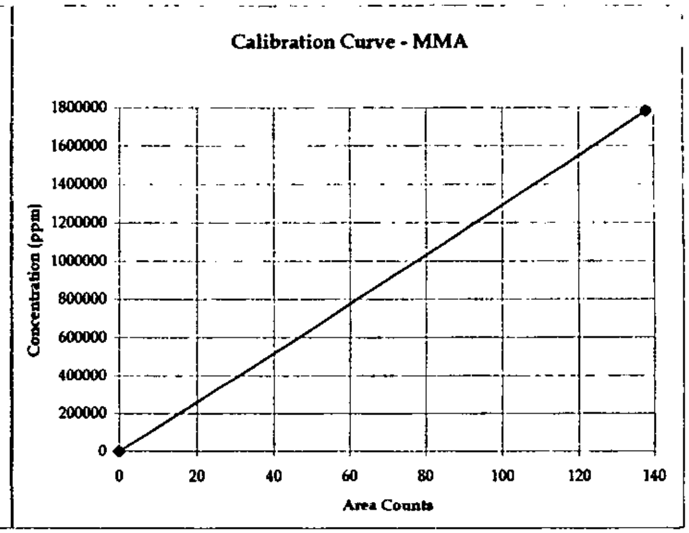
Gas Chromatography Runs for NMMA

Date: 4/4/97

Test No: NMMA-1-2 [-11-1, 11-1R]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA





Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
521		Zero Air	6:33		377636								styrene contamination
522		Zero Air	6:43		0								
523		Zero Air	6:49		0								
524	59.2	Styrene	7:00		2048349		2.89E-05						
525	59.2	Styrene	7:07		1874339		3.16E-05						
526	59.2	Styrene	7:15		2149910		2.75E-05						
527	59.2	Styrene	7:22		2035419		2.91E-05						
528	122	Styrene	7:32		5309578		2.30E-05						
529	122	Styrene	7:38		5565696		2.19E-05						
530	122	Styrene	7:45		6680784		1.83E-05						
531	204	Styrene	7:52		10263232		1.99E-05						
532	204	Styrene	8:03		9437779		2.16E-05						
533	204	Styrene	8:10		9078930		2.25E-05						End CALs
534	204	Styrene	8:19		6918595		2.95E-05						Method check
535	204	Styrene	8:28		8357315		2.44E-05						Method check
536		NMMA-14-1-1	9:19	18	200747				10.9	0.0		########	
537		NMMA-14-1-2	9:26	76	1445060				36.4	0.0		########	
538		NMMA-14-1-3	9:32	160	2702733				62.2	0.0		########	
539		NMMA-14-1-4	9:38	137	2158397				51.0	0.0		########	
540		NMMA-14-1-5	9:50	86	943564				26.1	0.0		########	
541		NMMA-14-1-6	9:58	71	1122084				29.8	0.0		########	
542		NMMA-14-1-7	10:08	55	954876				26.3	0.0		########	
543		NMMA-14-1-8	10:16	121	2443541				56.8	0.0		########	
544		NMMA-14-1-9	10:28	229	3420389				76.9	0.0		########	
545		NMMA-14-1-10	10:37	161	2382866				55.6	0.0		########	
546		NMMA-14-1-11	10:51	85	1486246				37.2	0.0		########	
547		NMMA-14-1-12	11:00	40	605843				19.2	0.0		########	
548		NMMA-14-1-13	11:11	13	198041				10.8	0.0		########	
549	204	Styrene	11:22		9849523								
550	204	Styrene	11:31		8442106								
551	204	Styrene	11:39		2656904								
552	204	Styrene	11:47		2773917								
553		Background air	12:33		27062								
554		NMMA-13-1-1	12:44	58	411718				15.2	0.0		########	
555		NMMA-13-1-2	12:51	127	1074503				28.8	0.0		########	
556		NMMA-13-1-3	13:00	195	1269243				32.8	0.0		########	
557		NMMA-13-1-4	13:10	158	1645091				40.5	0.0		########	
558		NMMA-13-1-5	13:18	103	480482				16.6	0.0		########	
559		NMMA-13-1-6	13:28	58	627157				19.6	0.0		########	
560		NMMA-13-1-7	13:36	135	1477083				37.0	0.0		########	
561		NMMA-13-1-8	13:45	160	1199743				31.3	0.0		########	

Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
562		NMMA-13-1-9	13:54	187	1086164				29.0	0.0		########	
563		NMMA-13-1-10	14:02	75	1031904				27.9	0.0		########	
564		NMMA-13-1-11	14:12	94	814661				23.5	0.0		########	
565		NMMA-13-1-12	14:20	179	1294772				33.3	0.0		########	
566		NMMA-13-1-13	14:32	97	853037				24.2	0.0		########	
567		NMMA-13-1-14	14:42	57	415997				15.3	0.0		########	
568		NMMA-13-1-15	14:50	34	3905232				86.8	0.0		########	
569		NMMA-13-1-16	14:58		274275				12.4	0.0		########	
570		NMMA-13-1-17	15:05	10	106215				8.9	0.0		########	
571	59.2	Styrene	15:20		2682264								
572	59.2	Styrene	15:29		2293570								
573		NMMA-11-2-1	15:48	157	2528589				58.6	0.0		########	
574		NMMA-11-2-2	15:54	106	1840643				44.5	0.0		########	Slow start
575		NMMA-11-2-3	16:03	63	1153821				30.4	0.0		########	
576		NMMA-11-2-4	16:13	34.5	574046				18.5	0.0		########	
577		NMMA-11-2-5	16:23	24	373127				14.4	0.0		########	
578		NMMA-11-2-6	16:32	17	237757				11.6	0.0		########	
579		NMMA-11-2-7	16:49	9.4	142841				9.7	0.0		########	
580	59.2	Styrene	17:07		2791952								
581	59.2	Styrene	17:14		2179318								
582	59.2	Styrene			2123979								
583	122	Styrene			6257792								
584	122	Styrene			4894480								
585	122	Styrene			4594032								

Calibration Curves

Styrene	Initial	x	y				
		0	0				
		2027004	59.2				
		5852019	122				
		9593314	204				
		Y=MX+B					
		m	1.91E-05	2027004		59.2	
		b	20.40827	5852019		132.4	
				9593314		204.0	
	Check						
		8:19	204	6918595		152.8	148.6
		8:28	204	8357315		180.3	178.1
		11:22	204	9849523		208.9	208.7

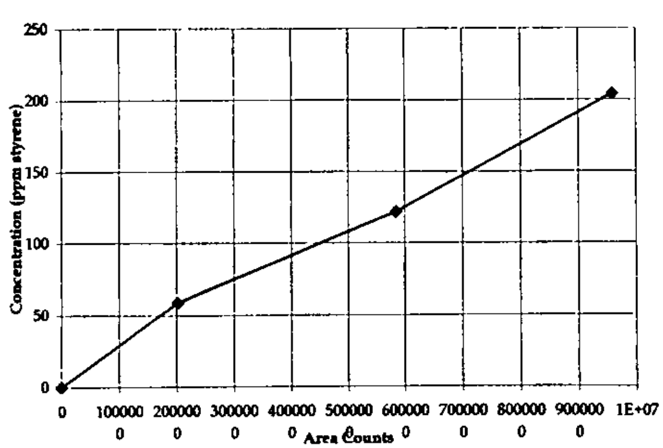
Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
			11:31	204	8442106				182.0	179.8		
			11:39	204	2656904				71.3	61.2		
			11:47	204	2773917				73.5	63.6		
			15:20	59.2	2682264				71.7	61.7		
			15:29	59.2	2293570				64.3	53.8		
			17:07	59.2	2791952				73.8	64.0		
			17:14	59.2	2179318				62.1	51.4		
			0:00	59.2	2123979				61.1	50.3		
			0:00	122	6257792				140.2	135.0		
			0:00	122	4894480				114.1	107.1		
			0:00	122	4594032				108.3	100.9		
				204		Average			190.4	188.9		
				122		Average			128.8	122.9		
				59.2		Average			68.3	58.0		
			Differenc	204					6.7%	7.4%		
				122					-5.6%	-0.7%		
				59.2					-15.3%	2.0%		

Calibration Curve - Styrene



Calibration Curve - MMA

Gas Chromatography Runs for NMMA
Date: 4/10/97
Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
586		Zero Air	6:40		4384	0							
587		Zero Air	6:48		0	0							
588	59.2	Styrene	6:57		2820046		2.10E-05						
589	59.2	Styrene	7:06		2237206		2.65E-05						
590	59.2	Styrene	7:14		2099254		2.82E-05						
591	59.2	Styrene	7:21		2040209		2.90E-05						
592	122	Styrene	7:35		4475104		2.73E-05						
593	122	Styrene	7:42		4154650		2.94E-05						
594	122	Styrene	7:49		4408144		2.77E-05						
595	204	Styrene	8:00										Low cal gas flow
596	204	Styrene	8:12		8655443		2.36E-05						
597	204	Styrene	8:17		9614995		2.12E-05						
598	204	Styrene	8:25		7316999		2.79E-05						
599	144	MMA	8:33										Not quantified
600	144	MMA	8:42			2138958		6.73E-05					
601	144	MMA	8:46			2316325		6.22E-05					
602	144	MMA	8:49			2947989		4.88E-05					
603	144	MMA	8:53			2280293		6.31E-05					
604	201	MMA	8:57			3439466		5.84E-05					
605	201	MMA	9:00			3424949		5.87E-05					End CALs
606		NMMA-6-2-1	9:07	61	805147	153657			24.5	9.4		2.6	
607		NMMA-6-2-2	9:13	122	1755053	296644			47.4	17.8		2.7	
608		NMMA-6-2-3	9:19	177		391461			0.0	23.4		0.0	
609		NMMA-6-2-4	9:24	194	2775766	474404			71.9	28.3		2.5	
610		NMMA-6-2-5	9:30	256	2636046	417537			68.5	24.9		2.7	
611		NMMA-6-2-6	9:37	150	1951795	270070			52.1	16.3		3.2	Average THC
612		NMMA-6-2-7	9:46	94	1282790	164648			36.0	10.1		3.6	
613		NMMA-6-2-8	9:53	85	1211623	134940			34.3	8.3		4.1	
614		NMMA-6-2-9	10:00	59	678585	60247			21.5	4.0		5.4	
615		NMMA-6-2-10	10:06	48	991871	85775			29.0	5.5		5.3	
616		NMMA-6-2-11	10:12	38	498320	39581			17.2	2.7		6.3	
617		NMMA-6-2-12	10:18	27	406113	35981			15.0	2.5		5.9	
618		NMMA-6-2-13	10:24	22	385003	35522			14.5	2.5		5.8	
619		NMMA-6-2-14	10:31	18	269613	46268			11.7	3.1		3.7	
620		NMMA-6-2-15	10:38	14	160342	18530			9.1	1.5		6.0	
621		NMMA-6-2-16	10:45	12	200407	36336			10.0	2.5		3.9	
622		NMMA-6-2-17	10:52	10.2	147080	38484			8.7	2.7		3.3	
623		NMMA-6-2-18	10:58	10	150887	24848			8.8	1.9		4.7	
624	204	Styrene	11:11		8687578								Post QC
625	204	Styrene	11:18		8380506								
626	201	MMA	11:26										Bad injection

Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
627	201	MMA	11:31			2786350							
628	201	MMA	11:35			2858120							
629	201	MMA	11:39			2885094							
630	144	MMA	11:42			2281989							
631	144	MMA	11:46										Pressurized
632	59.2	Styrene	11:49		2826430								
633	59.2	Styrene	11:55		1834818								Post QC
634		NMMA-14-2-1	12:02	94	1375428				38.2	0.0		########	
635		NMMA-14-2-2	12:10	182	2878278				74.3	0.0		########	
636		NMMA-14-2-3	12:17	121	1574102				43.0	0.0		########	
637		NMMA-14-2-4	12:24	94	1363780				38.0	0.0		########	
638		NMMA-14-2-5	12:30		1186089				33.7	0.0		########	
639		NMMA-14-2-6	12:46	51	680259				21.5	0.0		########	
640		NMMA-14-2-7	12:52	43	485239				16.9	0.0		########	
641		NMMA-14-2-8	12:59	111	962450				28.3	0.0		########	
642		NMMA-14-2-9	13:07	145	2120477				56.1	0.0		########	
643		NMMA-14-2-10	13:13	252	3013517				77.6	0.0		########	
644		NMMA-14-2-11	13:19	185	3121786				80.2	0.0		########	
645		NMMA-14-2-12	13:28	112	1763050				47.5	0.0		########	
646		NMMA-14-2-13	13:35	93	1555117				42.6	0.0		########	
647		NMMA-14-2-14	13:46	59	799358				24.4	0.0		########	
648		NMMA-14-2-15	13:56	31	371345				14.1	0.0		########	
649		NMMA-14-2-16	14:06	16	304924				12.5	0.0		########	Not vented
650		NMMA-14-2-17	14:13	11	128618				8.3	0.0		########	
651	59.2	Styrene	14:30		2421373								Post CAL
652	59.2	Styrene	14:38		2315500								Post CAL
653		NMMA-13-2-1	15:44	28	458349				16.2	0.0		########	
654		NMMA-13-2-2	15:53	157	2842381				73.5	0.0		########	
655		NMMA-13-2-3	15:59	233	3056024				78.6	0.0		########	
656		NMMA-13-2-4	16:05	158	2511288				65.5	0.0		########	
657		NMMA-13-2-5	16:11	110	1162455				33.1	0.0		########	
658		NMMA-13-2-6	16:22	83	1436378				39.7	0.0		########	
659		NMMA-13-2-7	16:28	145	2067983				54.9	0.0		########	
660		NMMA-13-2-8	16:37	225	2840077				73.4	0.0		########	
661		NMMA-13-2-9	16:45	141	2281424				60.0	0.0		########	
662		NMMA-13-2-10	16:52	90	1449514				40.0	0.0		########	
663		NMMA-13-2-11	17:01	209	2791864				72.2	0.0		########	
664		NMMA-13-2-12	17:16	96	1456317				40.2	0.0		########	
665		NMMA-13-2-13	17:24	72	935083				27.7	0.0		########	
666		NMMA-13-2-14	17:32	48	596809				19.5	0.0		########	
667		NMMA-13-2-15	17:40	30	450379				16.0	0.0		########	

Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
668		NMMA-13-2-16	17:48	18	296181				12.3	0.0		########	
669		NMMA-13-2-17	17:56	12	124443				8.2	0.0		########	
670	59.2	Styrene			1873879								Post CAL
671	59.2	Styrene			2468186								Post CAL
672	59.2	Styrene			2570333								Post CAL
673	122	Styrene			3828302								Post CAL
674	122	Styrene			5809104								Post CAL
675	122	Styrene											Post CAL
676	122	Styrene			5616218								Post CAL
677	204	Styrene			8177760								Post CAL
678	204	Styrene			8528410								Post CAL
679	144	MMA				3063480							Post CAL
680	144	MMA				2640364							Post CAL
681	144	MMA				2450941							Post CAL
682	144	MMA				2748472							Post CAL
683	144	MMA				2034586							Post CAL
684	144	MMA				2023973							Post CAL
685	144	MMA				1898571							Post CAL
686	201	MMA				4870781							Post CAL
687	201	MMA				3410517							Post CAL
688	201	MMA				4755005							Post CAL

Calibration Curves

Styrene	Initial	x	y			
		0	0			
		2299179	59.2			
		4345966	122			
		8529146	204			
		Y=MX+B				
		m	2.32E-05	2299179	59.2	
		b	5.76134	4345966	106.8	
				8529146	204.0	
	Check					
		11:11	204	8687578	207.7	213.8
		11:18	204	8380506	200.5	206.4
		11:49	59.2	2826430	71.5	73.1
		11:55	59.2	1834818	48.4	49.3
		14:30	59.2	2421373	62.0	63.4
		14:38	59.2	2315500	59.6	60.8
			59.2	1873879	49.3	50.2

Gas Chromatography Runs for NMMA

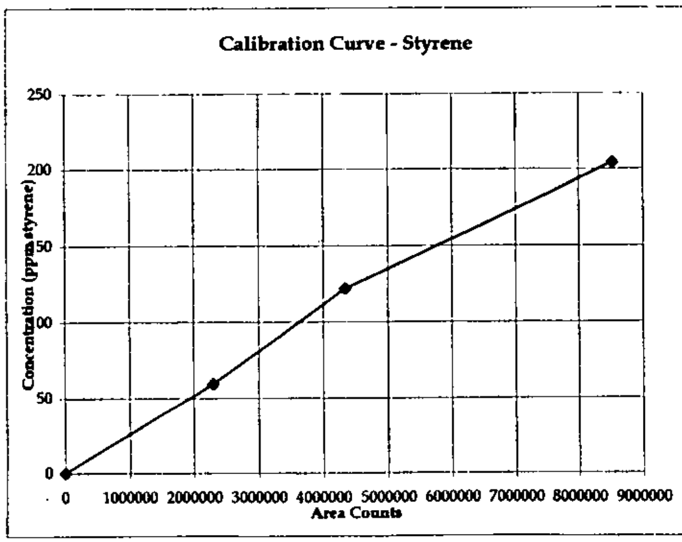
Date: 4/10/97

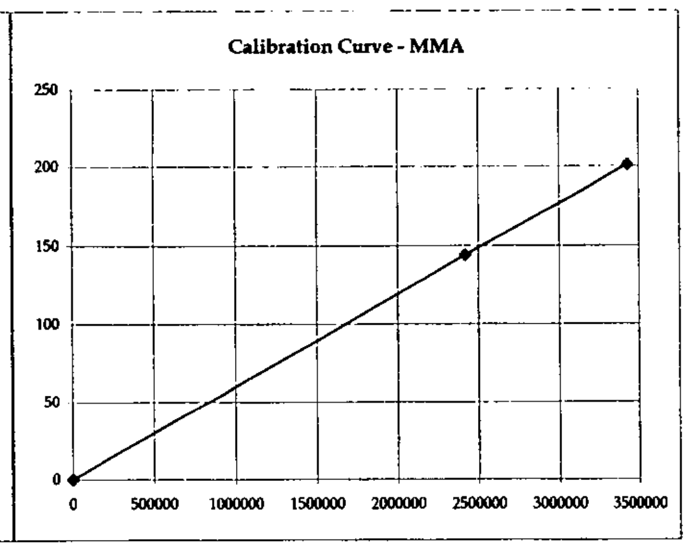
Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				59.2	2468186				63.1	64.5		
				59.2	2570333				65.5	66.9		
				122	3828302				94.7	97.1		
				122	5809104				140.8	144.7		
				122								
				122	5616218				136.3	140.1		
				204	8177760				195.8	201.6		
				204	8528410				204.0	210.0		
				204		Average			202.0	208.0		
				59.2		Average			59.9	61.2		
				122		Average			123.9	127.3		
			Differenc	204					1.0%	-1.9%		
				59.2					-1.2%	-3.3%		
				122					-1.6%	-4.3%		
	MMA	Initial	x	y								
			0	0				6.47E-05				
			2420891	144								
			3432208	201								
			Y=MX+B									
			m	5.64E-05	0				7.6			
			b	7.553264	2420891				144.0			
					3432208				201.0			
		Check										
			11:26	201					0.0			
			11:31	201		2786350			164.1			
			11:35	201		2858120			168.3			
			11:39	201		2885094			169.9			
			11:42	144		2281989			134.4			
			11:46	144					0.0			
				144		3063480			180.3			
				144		2640364			155.5			
				144		2450941			144.4			
				144		2748472			161.8			
				144		2034586			119.9			
				144		2023973			119.3			

Gas Chromatography Runs for NMMA
Date: 4/10/97
Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				144		1898571			111.9			
				201		4870781			286.5			
				201		3410517			200.7			
				201		4755005			279.7			
				201		Average			211.5			
				144		Average			140.9			
			Differenc	201					-5.2%			
				144					2.1%			





Gas Chromatography Runs for NMMA
Date: 4/10/97
Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
689		Zero Air	6:40		1556	0							AM CAL
690		Zero Air	6:52		0	0							AM CAL
691	59.2	Styrene	7:03		1908233		3.10E-05						AM CAL
692	59.2	Styrene	7:10		2243662		2.64E-05						AM CAL
693	59.2	Styrene	7:16		2623016		2.26E-05						AM CAL
694	59.2	Styrene	7:23		1826433		3.24E-05						AM CAL
695	59.2	Styrene	7:30		2702613		2.19E-05						AM CAL
696	122	Styrene	7:39		4756570		2.56E-05						AM CAL
697	122	Styrene	7:46		5123603		2.38E-05						AM CAL
698	122	Styrene	7:52		4157261		2.93E-05						AM CAL
699	204	Styrene	7:59		7274077		2.80E-05						AM CAL
700	204	Styrene	8:04		6650445		3.07E-05						AM CAL
701		NMMA-11-3-1	8:17	200	4407430				123.3	0.0		########	
702		NMMA-11-3-2	8:24	117	1808522				48.0	0.0		########	
703		NMMA-11-3-3	8:30	69	959705				23.5	0.0		########	
704		NMMA-11-3-4	8:39	41	517587				10.7	0.0		########	
705		NMMA-11-3-5	8:46	38	471339				9.3	0.0		########	
706		NMMA-11-3-6	8:57	18	277848				3.7	0.0		########	
707		NMMA-11-3-7	9:05	12	178566				0.9	0.0		########	
708	204	Styrene	9:17		8134685								
709	204	Styrene			3596384								
710	59.2	Styrene	9:54		1709808								
711	59.2	Styrene			1514022								
712	59.2	Styrene			883179								
713	59.2	Styrene			5971597								Changed gas sampling valve
714	59.2	Styrene			6009331								
715		NMMA-5-1-1	11:40	110					0.0	0.0		########	
716		NMMA-5-1-2	11:49	90.7					0.0	0.0		########	
717		NMMA-5-1-3	11:52	190	5387181				151.6	0.0		########	
718		NMMA-5-1-4	11:59		18033760				517.7	0.0		########	
719		NMMA-5-1-5	12:06	584	17177888				492.9	0.0		########	
720		NMMA-5-1-6	12:12	400	12032696				344.0	0.0		########	
721		NMMA-5-1-7	12:21	204	6380976				180.4	0.0		########	
722		NMMA-5-1-8	12:30	182	5560259				156.6	0.0		########	
723		NMMA-5-1-9	12:36	152	4986021				140.0	0.0		########	
724		NMMA-5-1-10	12:47	80	2355536				63.9	0.0		########	
725		NMMA-5-1-11	12:56	41	1339824				34.5	0.0		########	
726		NMMA-5-1-12	13:04	23	651145				14.5	0.0		########	
727		NMMA-5-1-13	13:11	17	535507				11.2	0.0		########	
728		NMMA-5-1-14	13:21	12	345829				5.7	0.0		########	
729	59.2	Styrene			5958909								

Gas Chromatography Runs for NMMA
Date: 4/10/97
Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
730	59.2	Styrene			6291424							
731	59.2	Styrene			6429882							
732	122	Styrene			10977608							
733	122	Styrene			11837000							
734	204	Styrene			16097608							
735	204	Styrene			19421208							
736	204	Styrene			21264480							
737	204	Styrene			19247328							
738	204	Styrene			19026992							
739		NMMA-2-1-1	15:15	170	5879133				165.9	0.0		########
740		NMMA-2-1-2	15:25	221	2987443				82.2	0.0		########
741		NMMA-2-1-3	15:31	888	27243904				784.3	0.0		########
742		NMMA-2-1-4	15:38	257	9444307				269.1	0.0		########
743		NMMA-2-1-5	15:46	170	5140301				144.5	0.0		########
744		NMMA-2-1-6	15:57	121	3865266				107.6	0.0		########
745		NMMA-2-1-7	16:05	460	14387944				412.2	0.0		########
746		NMMA-2-1-8	16:11	710	21751264				625.3	0.0		########
747		NMMA-2-1-9	16:18	295	11422000				326.3	0.0		########
748		NMMA-2-1-10	16:28	450	3746736				104.1	0.0		########
749		NMMA-2-1-11	16:36	160	5256288				147.8	0.0		########
750		NMMA-2-1-12	16:43	520	16205192				464.8	0.0		########
751		NMMA-2-1-13	16:49	430	11481928				328.1	0.0		########
752		NMMA-2-1-14	17:03	116	3457654				95.8	0.0		########
753		NMMA-2-1-15	17:15	88	2677034				73.2	0.0		########
754		NMMA-2-1-16	17:25	44	1404304				36.3	0.0		########
755		NMMA-2-1-17	17:34	27	852964				20.4	0.0		########
756		NMMA-2-1-18	17:46	19	568054				12.1	0.0		########
757		NMMA-2-1-19	17:52	15	405837				7.4	0.0		########
758		NMMA-2-1-20	18:01	12	381358				6.7	0.0		########
759	59.2	Styrene			5525818				155.6	0.0		########
760	59.2	Styrene			5744490				162.0	0.0		########
761	122	Styrene			11881808				339.6	0.0		########
762	122	Styrene			10853096				309.9	0.0		########
763		Audit (42)			12705496				363.5	0.0		########
764		Audit (42)			3053941				84.1	0.0		########
765		Audit (42)			5943861				167.7	0.0		########
766		Audit (42)			3917018				109.1	0.0		########
767		Audit (42)			3856778				107.3	0.0		########

Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

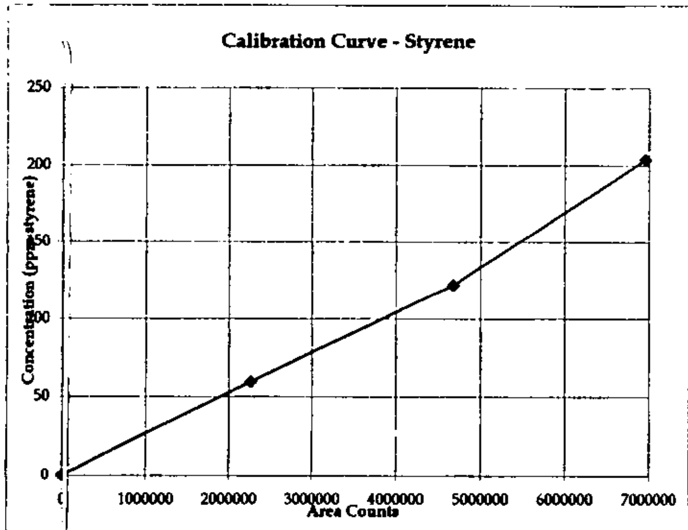
Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
Calibration Curves												
	Styrene	Initial	x	y								
			0	0								
			2260791	59.2								
			4679145	122								
			6962261	204								
			Y=MX+B									
			m	3.08E-05	2260791				59.2			
			b	-10.4298	4679145				133.7			
					6962261				204.0			
		Check										
				204	8134685				240.1	231.2		
				204	3596384				100.3	99.8		
				59.2	1709808				42.2	45.2		
				59.2	1514022				36.2	39.5		
				59.2	883179				16.8	21.3		
				59.2	5971597				173.5	168.6		
				59.2	6009331				174.7	169.6		
				59.2	5958909				173.1	168.2		
				59.2	6291424				183.3	177.8		
				59.2	6429882				187.6	181.8		
				122	10977608				327.7	313.5		
				122	11837000				354.1	338.3		
				204	16097608				485.4	461.7		
				204	19421208				587.7	557.9		
				204	21264480				644.5	611.2		
				204	19247328				582.4	552.8		
				204	19026992				575.6	546.5		
				59.2	5525818				159.8	155.6		
				59.2	5744490				166.5	162.0		
				122	11881808				355.5	339.6		
				122	10853096				323.8	309.9		
									-10.4	######		
									-10.4	######		
									-10.4	######		
				204		Average			459.4	437.3		
				122		Average			340.3	325.3		
				59.2		Average			131.4	129.0		

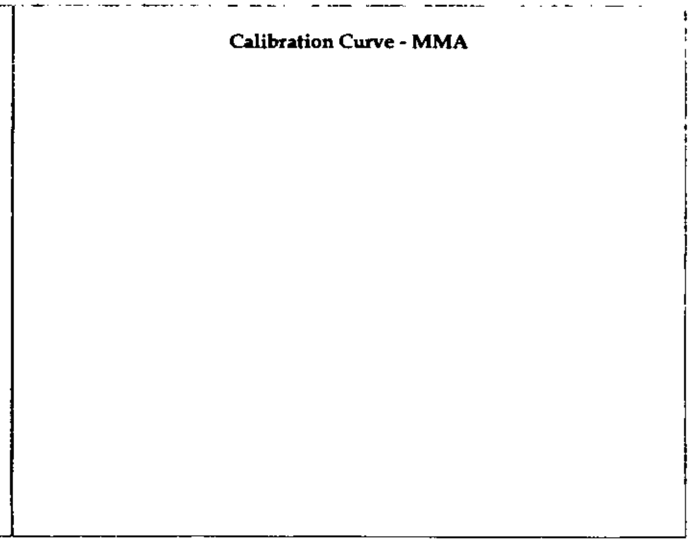
Gas Chromatography Runs for NMMA

Date: 4/10/97

Test No: NMMA-14-1 [-13-1, 11-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
			Differenc	204					-125.2%	-114.4%		
				122					-178.9%	-166.7%		
				59.2					-121.9%	-117.8%		





Gas Chromatography Runs for NMMA

Date: 4/14/97
Test No: NMMA-5-2 [-2-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
768		Zero Air	6:50		352952	0							AM CAL
769		Zero Air	7:00		203009	0							AM CAL
770	59.2	Styrene	7:10		4755664		1.24E-05						AM CAL
771	59.2	Styrene	7:22		4167498		1.42E-05						AM CAL
772	59.2	Styrene	7:29		4384538		1.35E-05						AM CAL
773	122	Styrene	7:37		9403558		1.30E-05						AM CAL
774	122	Styrene	7:43		8547834		1.43E-05						AM CAL
775	122	Styrene	7:48		8905798		1.37E-05						AM CAL
776	204	Styrene	7:58		16823296		1.21E-05						AM CAL
777	204	Styrene	8:04		16883072		1.21E-05						AM CAL
778	204	Styrene	8:10		17030400		1.20E-05						AM CAL
779		NMMA-5-2-1	9:40	52	1785250				26.4	0.0		########	
780		NMMA-5-2-2	9:46	260	6617882				84.7	0.0		########	
781		NMMA-5-2-3	9:52	470	11096048				138.8	0.0		########	
782		NMMA-5-2-4	10:01	334	5074253				66.1	0.0		########	
783		NMMA-5-2-5	10:09	161	3876808				51.7	0.0		########	
784		NMMA-5-2-6	10:16	127	3225021				43.8	0.0		########	
785		NMMA-5-2-7	10:24	108	2559440				35.8	0.0		########	
786		NMMA-5-2-8	10:31	90	2209029				31.5	0.0		########	
787		NMMA-5-2-9	10:38	470	11530448				144.0	0.0		########	
788		NMMA-5-2-10	10:48	825	18091048				223.2	0.0		########	
789		NMMA-5-2-11	10:54	421	9953050				125.0	0.0		########	
790		NMMA-5-2-12	11:05	221	6049504				77.9	0.0		########	
791		NMMA-5-2-13	11:12	170	4419344				58.2	0.0		########	
792		NMMA-5-2-14	11:19	134	3660850				49.0	0.0		########	
793?		NMMA-5-2-15	11:36	49	1876744				27.5	0.0		########	
794		NMMA-5-2-16	11:48	20.6	516467				11.1	0.0		########	
795		NMMA-5-2-17	12:03	10	243757				7.8	0.0		########	
796	204	Styrene			17182512				212.3	0.0		########	
797	204	Styrene			16327544				202.0	0.0		########	
798	204	Styrene			16256032				201.1	0.0		########	
799		NMMA-2-2-1	13:42	135	3605650				48.4	0.0		########	
800		NMMA-2-2-2	13:48	333	8010685				101.6	0.0		########	
801		NMMA-2-2-3	13:54	504	11811864				147.4	0.0		########	
802		NMMA-2-2-4	14:00	340	8118000				102.9	0.0		########	
803		NMMA-2-2-5	14:08	190	5035171				65.6	0.0		########	
804		NMMA-2-2-6	14:15	156	3933746				52.3	0.0		########	
805		NMMA-2-2-7	14:22	137	3575354				48.0	0.0		########	
806		NMMA-2-2-8	14:28	300	6971277				89.0	0.0		########	
807		NMMA-2-2-9	14:39	134	8199200				103.8	0.0		########	
808		NMMA-2-2-10	14:47	187	4430733				58.3	0.0		########	Attenuation=8

Gas Chromatography Runs for NMMA

Date: 4/14/97

Test No: NMMA-5-2 [-2-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
809		NMMA-2-2-11	14:53	130	3347350				45.3	0.0		########	Attenuation=5
810		NMMA-2-2-12	15:03	81	1928095				28.1	0.0		########	Attenuation=7
811		NMMA-2-2-13	15:09	65	1539519				23.4	0.0		########	
812		NMMA-2-2-14	15:16	410	10703672				134.1	0.0		########	
813		NMMA-2-2-15	15:25	338	9611174				120.9	0.0		########	
814		NMMA-2-2-16	15:43	88	2370269				33.5	0.0		########	
815		NMMA-2-2-17	15:49	61	1575250				23.9	0.0		########	
816		NMMA-2-2-18	15:58	31	826720				14.8	0.0		########	
817		NMMA-2-2-19	16:11	12	354579				9.1	0.0		########	
818	204	Styrene	16:19		17429680								
819○	204	Styrene			16991360								
820	59.2	Styrene			5021901								
821	59.2	Styrene			5041053								
822		Zero Air			1187860								
823		Zero Air											
824		Zero Air											

Calibration Curves

Styrene	Initial	x	y				
		0	0				
		4435900	59.2				
		8952397	122				
		16912256	204				
		Y=MX+B					
		m	1.16E-05	4435900		59.2	
		b	7.717154	8952397		111.6	
				16912256		204.0	
	Check						
			204	17182512		207.1	212.3
			204	16327544		197.2	202.0
			204	16256032		196.4	201.1
			204	17429680		210.0	215.3
			204	16991360		204.9	210.0
			59.2	5021901		66.0	65.5
			59.2	5041053		66.2	65.7
			204		Average	203.1	208.1
			59.2		Average	66.1	65.6
		Differenc	204			0.4%	-2.0%
			59.2			-11.7%	-10.8%

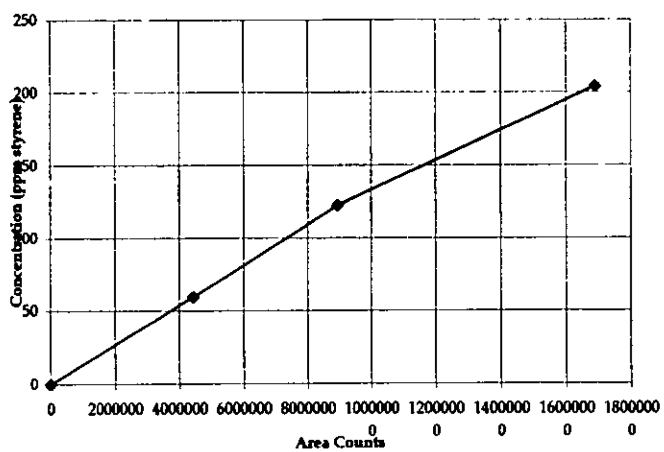
Gas Chromatography Runs for NMMA

Date: 4/14/97

Test No: NMMA-5-2 [-2-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts		Response Factors		Calculated Conc		Equiv	Ratio
					Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Sty:MMA

Calibration Curve - Styrene



Calibration Curve - MMA

Gas Chromatography Runs for NMMA

Date: 4/15/97
Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
825		Zero Air			1239071								AM CAL
826		Zero Air			176395								AM CAL
827		Zero Air			213703								AM CAL
828	59.2	Styrene			4360042		1.36E-05						AM CAL
829	59.2	Styrene			3346936		1.77E-05						AM CAL
830	59.2	Styrene			4179248		1.42E-05						AM CAL
831	59.2	Styrene			5030979		1.18E-05						AM CAL
832	122	Styrene			9615066		1.27E-05						AM CAL
833	122	Styrene			9712975		1.26E-05						AM CAL
834	204	Styrene			17192032		1.19E-05						AM CAL
835	204	Styrene			16329160		1.25E-05						AM CAL
836		NMMA-16-1-1	9:51	40	1283739				19.4	0.0		########	
837		NMMA-16-1-2	9:57	130	2849688				38.3	0.0		########	
838		NMMA-16-1-3	10:08	182	5175330				66.3	0.0		########	
839		NMMA-16-1-4	10:18	121	3053062				40.7	0.0		########	
840		NMMA-16-1-5	10:26	107	2581154				35.0	0.0		########	
841		NMMA-16-1-6	10:36	96	2614952				35.4	0.0		########	
842		NMMA-16-1-7	10:44	94	3672360				48.2	0.0		########	
843		NMMA-16-1-X	10:51	245					0.0	0.0		########	Failed to inject
844		NMMA-16-1-8	11:00	340	9195730				114.8	0.0		########	
845		NMMA-16-1-9	11:06	253	5991587				76.1	0.0		########	
846		NMMA-16-1-10	11:15	170	4736778				61.0	0.0		########	
847		NMMA-16-1-11	11:22	150	4231245				54.9	0.0		########	
848		NMMA-16-1-12	11:29	136	3369664				44.5	0.0		########	
849		NMMA-16-1-13	11:38	99	2470118				33.7	0.0		########	
850		NMMA-16-1-14	11:49	48	1381485				20.5	0.0		########	
851		NMMA-16-1-15	11:55	27	869409				14.4	0.0		########	
852		NMMA-16-1-16	12:06	12	338874				8.0	0.0		########	
853		NMMA-16-1-17	12:13	8	211325				6.4	0.0		########	
854	204	Styrene			17244432				211.8	0.0		########	
855	59.2	Styrene			4923560				63.3	0.0		########	
856		NMMA-15-1-1	14:07	140	3033627				40.5	0.0		########	
857		NMMA-15-1-2	14:14	186	5384074				68.8	0.0		########	
858		NMMA-15-1-3	14:21	250	7477741				94.1	0.0		########	
859		NMMA-15-1-4	14:32	145	3587285				47.1	0.0		########	
860		NMMA-15-1-5	14:42	115	3067045				40.9	0.0		########	
861		NMMA-15-1-6	14:54	160	3819214				49.9	0.0		########	
862		NMMA-15-1-7	15:00	230	5637917				71.9	0.0		########	
863		NMMA-15-1-8	15:07	242	5660490				72.1	0.0		########	
864		NMMA-15-1-9	15:15	176	4797546				61.7	0.0		########	
865		NMMA-15-1-10	15:22	124	3159824				42.0	0.0		########	

Gas Chromatography Runs for NMMA
Date: 4/15/97
Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
866		NMMA-15-1-11	15:30	87	2212590				30.6	0.0		########
867		NMMA-15-1-12	15:42	147	3121314				41.5	0.0		########
868		NMMA-15-1-13	15:49	232	5720275				72.9	0.0		########
869		NMMA-15-1-14	16:00	130	3509638				46.2	0.0		########
870		NMMA-15-1-15	16:13	63	1858754				26.3	0.0		########
871		NMMA-15-1-16	16:28	27	826362				13.9	0.0		########
872		NMMA-15-1-17	16:35	17	499927				9.9	0.0		########
873		NMMA-15-1-18	16:42	12	311104				7.6	0.0		########
874		NMMA-15-1-19	16:49	9	234774				6.7	0.0		########
875	59.2	Styrene			4928013				63.3	0.0		########
876	59.2	Styrene			4053978							
877	59.2	Styrene			4739386							
878	204	Styrene			17330048							

Calibration Curves

Styrene	Initial	x	y					
		0	0					
		4229301	59.2					
		9664021	122					
		16760596	204					
		Y=MX+B						
		m	1.16E-05	4229301			59.2	54.9
		b	10.33012	9664021			122.0	120.4
				16760596			204.0	206.0
	Check						y=mx+b	Trend
			204	17244432			209.6	211.8
			59.2	4923560			67.2	63.3
			59.2	4928013			67.3	63.3
			59.2	4053978			57.2	52.8
			59.2	4739386			65.1	61.0
			204	17330048			210.6	212.9
			204		Average		210.1	212.3
			59.2		Average		64.2	60.1
		Differenc	204				-3.0%	-4.1%
			59.2				-8.4%	-1.5%

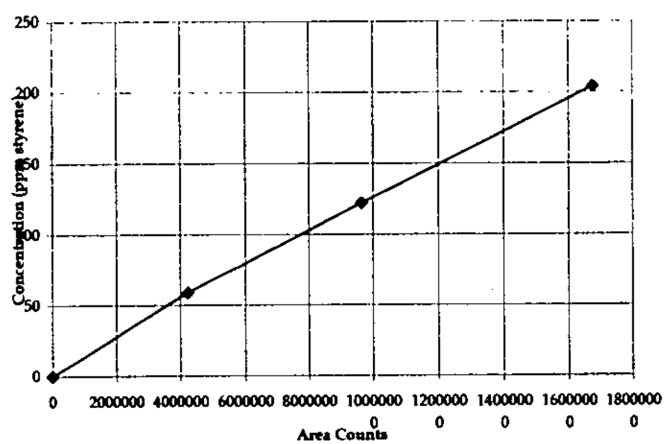
Gas Chromatography Runs for NMMA

Date: 4/15/97

Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA

Calibration Curve - Styrene



Calibration Curve - MMA

Gas Chromatography Runs for NMMA

Date: 4/15/97

Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
879		Zero Air	6:50										AM CAL
880		Zero Air	7:00										AM CAL
881	59.2	Styrene	7:20		4915139		1.20E-05						AM CAL
882	59.2	Styrene	7:30		4863680		1.22E-05						AM CAL
883	122	Styrene	7:42		10776440		1.13E-05						AM CAL
884	122	Styrene	7:48		9171008		1.33E-05						AM CAL
885	122	Styrene	7:58		10341320		1.18E-05						AM CAL
886	122	Styrene	8:12		10572206		1.15E-05						AM CAL
887		NMMA-16-2-1	9:35	82	2250389				27.1	0.0		########	
888		NMMA-16-2-2	9:43	233	7025261				84.1	0.0		########	
889		NMMA-16-2-3	9:54	194	4967896				59.6	0.0		########	
890		NMMA-16-2-4	10:14	125	4328362				51.9	0.0		########	
891		NMMA-16-2-5	10:23	93	3327666				40.0	0.0		########	
892		NMMA-16-2-6	10:35	223	2804912				33.8	0.0		########	
893		NMMA-16-2-7	10:41	368	6735869				80.6	0.0		########	
894		NMMA-16-2-8	10:47	267	9537888				114.1	0.0		########	
895		NMMA-16-2-9	10:54	205	6764320				81.0	0.0		########	
896		NMMA-16-2-10	11:03	162	5089930				61.0	0.0		########	
897		NMMA-16-2-11	11:11	123					0.0	0.0		########	
898		NMMA-16-2-12	11:18	76	4044436				48.5	0.0		########	
899		NMMA-16-2-13	11:25	43	2881882				34.7	0.0		########	
900		NMMA-16-2-14	11:31	29	1333417				16.2	0.0		########	
901		NMMA-16-2-15	11:38	26	777327				9.6	0.0		########	
902		NMMA-16-2-16	11:46	17	482342				6.1	0.0		########	
903		NMMA-16-2-17	11:53	11	289824				3.8	0.0		########	
904		NMMA-16-2-18	12:00	8	204834				2.7	0.0		########	
905	59.2	Styrene			4956816								
906	59.2	Styrene			4888835								
907	122	Styrene			9990438								
908	122	Styrene			14172152								Poor injection?
909	122	Styrene			11932992								
910		Zero Air			660				0.3	0.0		########	
911	122	Styrene			11027728								
912	122	Styrene	13:24		10367112								
913		NMMA-15-2-1	13:36	2.7	65781				1.1	0.0		########	
914		NMMA-15-2-2	13:42	104	2897704				34.9	0.0		########	
915		NMMA-15-2-3	13:50		4461978				53.5	0.0		########	
916		NMMA-15-2-4	13:56	234	6706013				80.3	0.0		########	
917		NMMA-15-2-5	14:03	143	3824701				45.9	0.0		########	
918		NMMA-15-2-6	14:15	120	2074794				25.0	0.0		########	
919		NMMA-15-2-7	14:21	101	3010485				36.2	0.0		########	

Gas Chromatography Runs for NMMA

Date: 4/15/97

Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
920		NMMA-15-2-8	14:28	184	5310560				63.6	0.0		########
921		NMMA-15-2-9	14:34	290	7218458				86.4	0.0		########
922		NMMA-15-2-10	14:40	170	3705642				44.5	0.0		########
923		NMMA-15-2-11	14:55	143	4085200				49.0	0.0		########
924		NMMA-15-2-12	15:01	256	6429536				77.0	0.0		########
925		NMMA-15-2-13	15:09	209	4903136				58.8	0.0		########
926		NMMA-15-2-14	15:19	149	4334771				52.0	0.0		########
927		NMMA-15-2-15	15:26	104	2799413				33.7	0.0		########
928		NMMA-15-2-16	15:35	69	1686089				20.4	0.0		########
929		NMMA-15-2-17	15:41	36	1059186				12.9	0.0		########
930		NMMA-15-2-18	15:48	22	627335				7.8	0.0		########
931		NMMA-15-2-19	15:58	15	423460				5.4	0.0		########
932		NMMA-15-2-20	16:06	10	234399				3.1	0.0		########
933		Zero Air			3379				0.3	0.0		########
934		Zero Air										
935	122	Styrene			10505456							
936	122	Styrene			10076096							
937	59.2	Styrene			4985315							
938	59.2	Styrene			5178906							

Calibration Curves

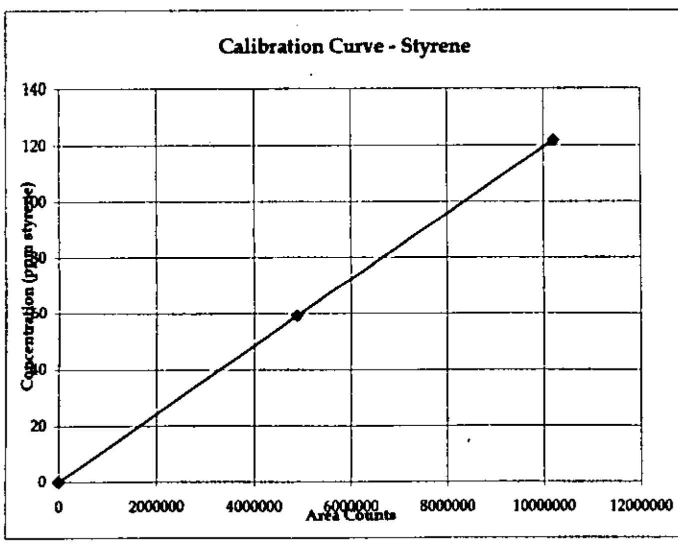
Styrene	Initial	x	y			
		0	0			
		4889410	59.2			
		10215244	122			
		10215244	122			
		Y=MX+B				
		m	1.18E-05	4889410	59.2	58.6
		b	1.546135	10215244	122.0	122.1
				10215244	122.0	122.1
	Check				y=mx+b	Trend
			59.2	4956816	60.0	59.4
			59.2	4888835	59.2	58.6
			122	9990438	119.3	119.5
			122	14172152	168.7	169.3
			122	11932992	142.3	142.6
			0	660	1.6	0.3
			122	11027728	131.6	131.8
			122	10367112	123.8	124.0

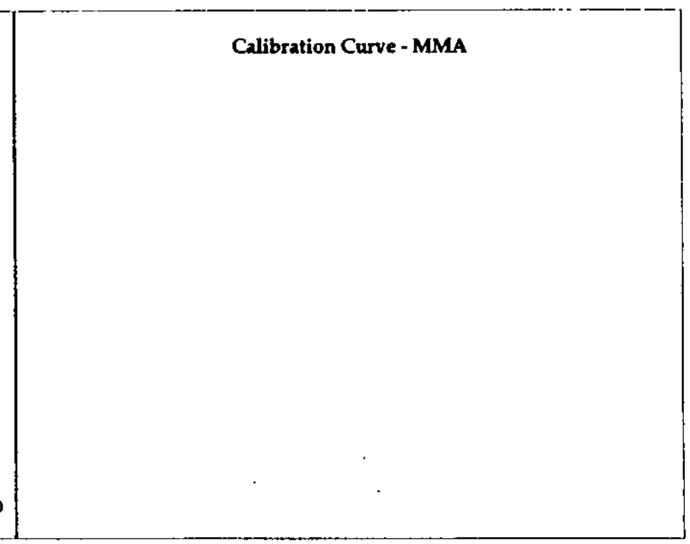
Gas Chromatography Runs for NMMA

Date: 4/15/97

Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				0	3379				1.6	0.3		
				0	0				1.5	0.3		
				122	10505456				125.4	125.6		
				122	10076096				120.4	120.5		
				59.2	4985315				60.3	59.8		
				59.2	5178906				62.6	62.1		
				59.2		Average			60.5	60.0		
				122		Average			133.1	133.3		All
				122		Average			124.1	124.3		Without poor injections
			Differenc	59.2					-2.3%	-1.3%		
				122					-9.1%	-9.3%		All
				122					-1.7%	-1.9%		Without poor injections





Gas Chromatography Runs for NMMA

Date: 4/15/97

Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
939		Zero Air											AM CAL	
940		Zero Air			2044								AM CAL	
941	59.2	Styrene			4324157		1.37E-05						AM CAL	
942	59.2	Styrene			4536176		1.31E-05						AM CAL	
943	59.2	Styrene			4768189		1.24E-05						AM CAL	
944	122	Styrene			10597432		1.15E-05						AM CAL	
945	122	Styrene			9772608		1.25E-05						AM CAL	
946	122	Styrene			11477432		1.06E-05						AM CAL	Poor injection technique
947	122	Styrene			9540512		1.28E-05						AM CAL	
948		NMMA-12-1-1	8:32	2	44133				3.4	0.0		########	AM CAL	
949		NMMA-12-1-2	8:40	115	2778440				35.6	0.0		########	AM CAL	
950		NMMA-12-1-3	8:52	57	1517226				20.7	0.0		########		
951		NMMA-12-1-4	8:59	39	992900				14.6	0.0		########		
952		NMMA-12-1-5	9:06	26	710933				11.2	0.0		########		
953		NMMA-12-1-6	9:14	23	689455				11.0	0.0		########		
954		NMMA-12-1-7	9:19	23	577031				9.7	0.0		########		
955		NMMA-12-1-8	9:25	21	708349				11.2	0.0		########		
956		NMMA-12-1-9	9:34	16	504677				8.8	0.0		########		
957		NMMA-12-1-10	9:41	13	387596				7.4	0.0		########		
958		NMMA-12-1-11	9:51	9	305040				6.5	0.0		########		
959	204	Styrene			15753016									
960	204	Styrene			17712032									
961	204	Styrene			18269232									
962	122	Styrene			10231520									
963	59.2	Styrene			5499240									
964	59.2	Styrene			5894784									

Calibration Curves

Styrene	Initial	x	y			
		0	0			
		4542841	59.2			
		9970184	122			
		17244760	204			
		Y=MX+B				
		m	1.14E-05	4542841	59.2	56.3
		b	7.412289	9970184	121.1	120.2
				17244760	204.0	205.8
	Check				y=mx+b	Trend
			122	10231520	124.1	123.3

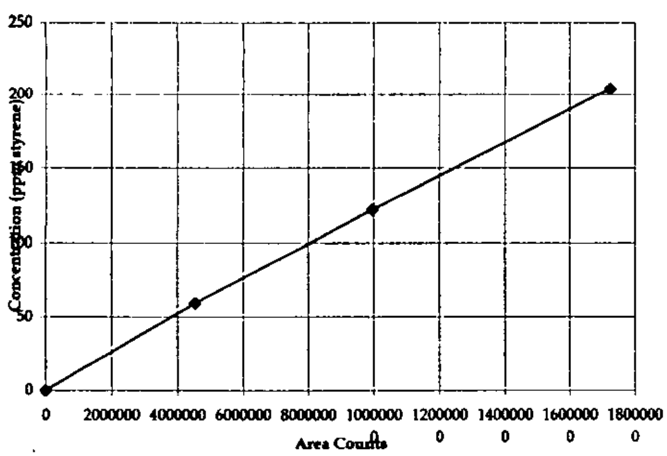
Gas Chromatography Runs for NMMA

Date: 4/15/97

Test No: NMMA-16-1 [-15-1]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				59.2	5499240				70.1	67.6		
				59.2	5894784				74.6	72.2		
				122		Average			124.1	123.3		
				59.2		Average			72.4	69.9		
			Differenc	122					-1.7%	-1.0%		
				59.2					-22.2%	-18.1%		

Calibration Curve - Styrene



Calibration Curve - MMA

Gas Chromatography Runs for NMMA

Date: 4/18/97
Test No: NMMA-9-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
978		Zero Air			1915								AM CAL
979		Zero Air			3089								AM CAL
980	59.2	Styrene			5035434		1.18E-05						AM CAL
981	59.2	Styrene			4730973		1.25E-05						AM CAL Low
982	59.2	Styrene			5181651		1.14E-05						AM CAL
983	204	Styrene			19345334		1.05E-05						AM CAL
984	204	Styrene			18797024		1.09E-05						AM CAL
985		NMMA-9-1-1	7:58	311	10084736				109.9	0.0		########	
986		NMMA-9-1-2	8:10	174	6702595				74.0	0.0		########	
987		NMMA-9-1-3	8:18	290	10389824				113.1	0.0		########	
988		NMMA-9-1-4	8:27	330	10715224				116.6	0.0		########	
989		NMMA-9-1-5	8:36	127	4638685				52.2	0.0		########	
990		NMMA-9-1-6	8:48	107	4050910				45.9	0.0		########	
991		NMMA-9-1-7	8:58	100	4094269				46.4	0.0		########	
992		NMMA-9-1-8	9:21	616	19671680				211.5	0.0		########	
993		NMMA-9-1-9	9:34	520	10794992				117.4	0.0		########	
994		NMMA-9-1-10	9:47	139	5416029				60.4	0.0		########	
995		NMMA-9-1-11	10:00	105	3707136				42.3	0.0		########	
996		NMMA-9-1-12	10:13	99	3523238				40.3	0.0		########	
997		NMMA-9-1-13	10:31	430	15497008				167.2	0.0		########	
998		NMMA-9-1-14	10:39	600	20079317				215.8	0.0		########	
999		NMMA-9-1-15	10:52	565	17458832				188.0	0.0		########	
1000		NMMA-9-1-16	11:06	163	6133602				68.0	0.0		########	
1001		NMMA-9-1-17	11:19	129	4844813				54.3	0.0		########	
1002		NMMA-9-1-18	11:35	103	3703840				42.3	0.0		########	
1003		NMMA-9-1-19	11:48	65	2315698				27.5	0.0		########	
1004		NMMA-9-1-20	12:08	29	4385025				49.5	0.0		########	
1005		NMMA-9-1-21	12:14	540	17945536				193.2	0.0		########	
1006		NMMA-9-1-22	12:28	630	22707728				243.6	0.0		########	
1007		NMMA-9-1-23	12:36	267	9086290				99.3	0.0		########	
1008		NMMA-9-1-24	12:45	131	4644509				52.2	0.0		########	
1009		NMMA-9-1-25	12:55	101	3398800				39.0	0.0		########	
1010		NMMA-9-1-26	13:07	99	3656178				41.8	0.0		########	
1011		NMMA-9-1-27	13:24	81	3019537				35.0	0.0		########	
1012		NMMA-9-1-28	13:44	42	1536858				19.3	0.0		########	
1013		NMMA-9-1-29	14:02	30	997987				13.6	0.0		########	
1014		NMMA-9-1-30	14:14	27	845051				12.0	0.0		########	
1015		NMMA-9-1-31	14:22	25	782915				11.3	0.0		########	
1016		NMMA-9-1-32	14:31	20	638408				9.8	0.0		########	
1017		NMMA-9-1-33	14:44	16	565348				9.0	0.0		########	
1018	204	Styrene			18110944								

Gas Chromatography Runs for NMMA

Date: 4/18/97
Test No: NMMA-9-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
1019	204	Styrene			16396168								
1020	204	Styrene			19007808								
1021	59.2	Styrene			5687642								High
1022		NMMA-12-2-1	15:53	106	3376958				38.8	0.0		########	
1023		NMMA-12-2-2	16:01	73	2429792				28.8	0.0		########	
1024		NMMA-12-2-3	16:07	50	1608175				20.1	0.0		########	
1025		NMMA-12-2-4	16:13	34	1212638				15.9	0.0		########	
1026		NMMA-12-2-5	16:20	26	909559				12.6	0.0		########	
1027		NMMA-12-2-6	16:29	22	718457				10.6	0.0		########	
1028		NMMA-12-2-7	16:43	13	381869				7.1	0.0		########	
1029	59.2	Styrene			4999213								
1030	59.2	Styrene			4573312								
1031	122	Styrene			11345776								
1032	122	Styrene			10561088								
1033	204	Styrene			18060768								
1034	204	Styrene			18431840								

Calibration Curves

Styrene — Initial

x	y
0	0
5108543	59.2
5108543	59.2
19071179	204

Y=MX+B

m	1.04E-05	5108543	59.2	57.1
b	6.221685	5108543	59.2	57.1
		19071179	204.0	205.1

Check

		y=mx+b	Trend
204	18110944	194.0	194.9
204	16396168	176.3	176.8
204	19007808	203.3	204.4
59.2	5687642	65.2	63.3
59.2	4999213	58.1	56.0
59.2	4573312	53.6	51.5
122	11345776	123.9	123.2
122	10561088	115.7	114.9
204	18060768	193.5	194.4
204	18431840	197.4	198.3

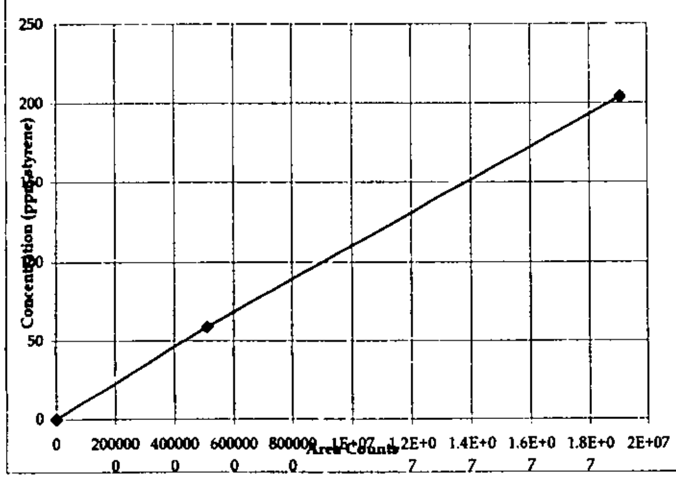
STELLING ENGINEERING, P.A.
Air-Tech Environmental LLC

Gas Chromatography Runs for NMMA

Date: 4/18/97
Test No: NMMA-9-1

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA
				204		Average			192.9	193.8		
				122		Average			119.8	119.1		
				59.2		Average			59.0	56.9		
			Differenc	204					5.4%	5.0%		
				122					1.8%	2.4%		
				59.2					0.4%	3.9%		

Calibration Curve - Styrene



Calibration Curve - MMA

STELLING ENGINEERING, P.A.
Air-Tech Environmental LLC

Gas Chromatography Runs for NMMA
Date: 4/19/97
Test No: NMMA-9-2 [Towel-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts		Response Factors		Calculated Conc		Equiv	Ratio	
					Styrene	MMA	Styrene	MMA	Styrene	MMA	THC	Sty:MMA	
1035	59.2	Styrene			4908355		1.21E-05						AM CAL
1036	59.2	Styrene			4736861		1.25E-05						AM CAL
1037	204	Styrene			18883424		1.08E-05						AM CAL
1038	204	Styrene			19033904		1.07E-05						AM CAL
1039		NMMA-9-2-1	7:40		79164				4.3	0.0	0	########	TTE Background
1040		NMMA-9-2-2	7:50	244	8462029				93.2	0.0	582	########	
1041		NMMA-9-2-3	7:59	811	27239728				292.4	0.0	1936	########	
1042		NMMA-9-2-4	8:11	202	7715888				85.3	0.0	482	########	
1043		NMMA-9-2-5	8:23	129	4569920				51.9	0.0	308	########	
1044		NMMA-9-2-6	8:34	95	3308221				38.5	0.0	227	########	
1045		NMMA-9-2-7	8:45	745	24461856				263.0	0.0	1778	########	
1046		NMMA-9-2-8	8:57	790	25658512				275.7	0.0	1886	########	
1047		NMMA-9-2-9	9:09	259	9079418				99.8	0.0	618	########	
1048		NMMA-9-2-10	9:20	157	5377642				60.5	0.0	375	########	
1049		NMMA-9-2-11	9:32	105	3892938				44.7	0.0	251	########	
1050		NMMA-9-2-12	9:44	116	3902208				44.8	0.0	277	########	
1051		NMMA-9-2-13	9:59	540	17776080				192.0	0.0	1289	########	
1052		NMMA-9-2-14	10:07	750	27690432				297.2	0.0	1790	########	Not vented, late start
1053		NMMA-9-2-15	10:21	240	8271664				91.2	0.0	573	########	
1054		NMMA-9-2-16	10:33	161	5583706				62.7	0.0	384	########	
1055		NMMA-9-2-17	10:44	105	3983896				45.7	0.0	251	########	
1056		NMMA-9-2-18	10:55	500	16651976				180.1	0.0	1194	########	
1057		NMMA-9-2-19	11:07	678	23305888				250.7	0.0	1618	########	
1058		NMMA-9-2-20	11:18	300	10110896				110.7	0.0	716	########	
1059		NMMA-9-2-21	11:30	166	5610685				63.0	0.0	396	########	
1060		NMMA-9-2-22	11:41	141	5072877				57.3	0.0	337	########	
1061		NMMA-9-2-23	11:53	88	3295432				38.4	0.0	210	########	
1062		NMMA-9-2-24	12:07	52	1826305				22.8	0.0	124	########	
1063		NMMA-9-2-25	12:18	33	1147214				15.6	0.0	79	########	
1064		NMMA-9-2-26	12:32	26	865464				12.6	0.0	62	########	
1065		NMMA-9-2-27	12:45	20	697320				10.8	0.0	48	########	
1066		NMMA-9-2-28	12:57	17	602814				9.8	0.0	41	########	
1067		NMMA-9-2-29	13:09	14	514712				8.9	0.0	33	########	
1068		NMMA-9-2-30	13:24	12	430509				8.0	0.0	29	########	
1069		NMMA-9-2-31	13:40	10	354940				7.2	0.0	24	########	
1070	204	Styrene			18327536		1.113E-05						Post Test QC
1071	204	Styrene			18467392		1.105E-05						Post Test QC
1072	122	Styrene			11046080		1.104E-05						Post Test QC
1073	122	Styrene			10864040		1.123E-05						Post Test QC
1074	122	Styrene			11025512		1.107E-05						Post Test QC
1075	59.2	Styrene			5985747		9.890E-06						Post Test QC

Gas Chromatography Runs for NMMA

Date: 4/19/97
Test No: NMMA-9-2 [Towel-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
1076	59.2	Styrene			5700285		1.039E-05						Post Test QC
1077	59.2	Styrene			5780963		1.024E-05						Post Test QC
1078	139.6	MMA				6148867		2.270E-05					
1079	139.6	MMA				6176253		2.260E-05					

Calibration Curves

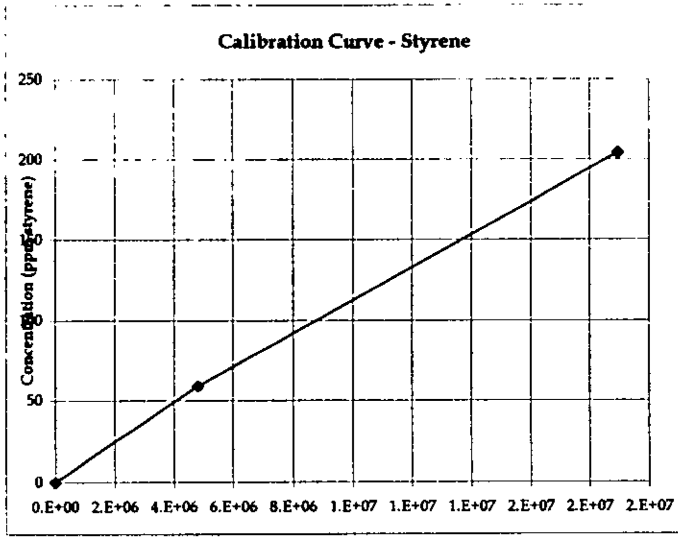
Styrene	Initial	x	y					
		0	0					
		4822608	59.2					
		18958664	204					
		18958664	204					
		Y=MX+B						
		m	1.02E-05	4822608			59.2	54.6
		b	9.800533	18958664			204.0	204.6
				18958664			204.0	204.6
	Check						y=mx+b	Trend
			204	18327536			197.5	197.9
			204	18467392			199.0	199.4
			122	11046080			122.9	120.6
			122	10864040			121.1	118.7
			122	11025512			122.7	120.4
			59.2	5985747			71.1	66.9
			59.2	5700285			68.2	63.9
			59.2	5780963			69.0	64.8
			204		Average		198.3	198.6
			122		Average		122.3	119.9
			59.2		Average		69.4	65.2
		Differenc	204				2.8%	2.6%
			122				-0.2%	1.7%
			59.2				-17.3%	-10.1%
MMA	Initial	x	y					
		0	0			#DIV/0!		
		6162560	139.6					

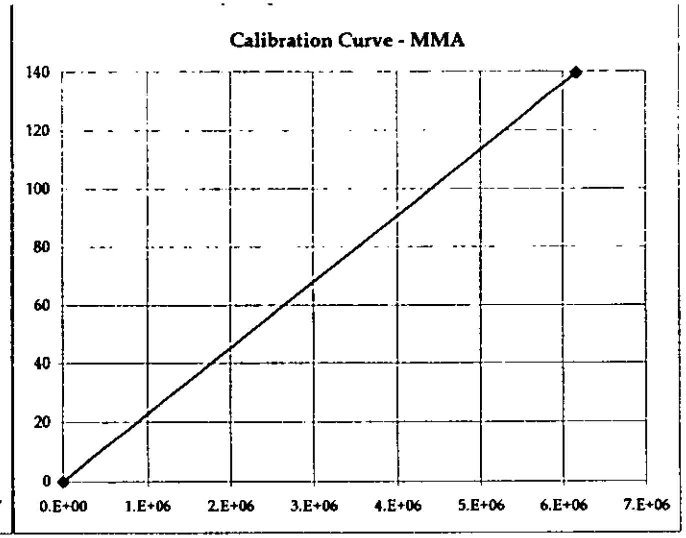
Gas Chromatography Runs for NMMA

Date: 4/19/97

Test No: NMMA-9-2 [Towel-2]

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA





Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
29	59.2	Styrene			2570066		2.3E-05							402
30	59.2	Styrene			2218362		2.67E-05							402
31	59.2	Styrene			2742040		2.16E-05							402
32	59.2	Styrene			2664045		2.22E-05							402
33	122	Styrene			4978474		2.45E-05							402
34	122	Styrene			5453738		2.24E-05							402
35	122	Styrene			5064733		2.41E-05							402
36	204	Styrene			8525088		2.39E-05							402
37	204	Styrene			9230266		2.21E-05							402
38	204	Styrene			7833027		2.6E-05							402
39	204	Styrene			8275040		2.47E-05							402
40	204	Styrene			8969120		2.27E-05							402
41	204	Styrene			8339770		2.45E-05							402
42	0402-1-1			166	3523250				83.4	0.0				402
1	0402-1-2		11:35	205	4366886	829037			103.6	34.9	275.5	3.0	24.0	402
2	0402-1-3				4857696	924670			115.4	38.9		3.0		402
3	0402-1-4		11:53		2020896	333054			47.5	14.0	131.3	3.4	18.0	402
4	0402-1-5		11:59		1959445	269346			46.0	11.3	99.7	4.1	6.0	402
5	0402-1-6		12:05	85	1421529	173979			33.1	7.3	84.8	4.5	6.0	402
6	0402-1-7		12:15	69	1297086	170516			30.1	7.2	69.0	4.2	10.0	402
7	0402-1-8		12:30	53	970178	83543			22.3	3.5	52.8	6.3	15.0	402
8	0402-1-9		12:46	32	804367	234789			18.3	9.9	31.8	1.9	16.0	402
9	0402-1-10		12:55	23	534877	37589			11.9	1.6	23.1	7.5	9.0	402
10	0402-1-11		13:05	18	409583				8.9	0.0	17.3		10.0	402
11	45.6	MMA				1135671		4.02E-05					22.0	402
12	45.6	MMA				1030727		4.42E-05				3.7		402
13		Cal Check			3976866	564800			94.3	23.8			136.0	402
14		Nitrogen												402
15		Nitrogen												402
16	122	Styrene			5186474		2.35E-05							402
17	122	Styrene			5400253		2.26E-05							402
18	204	Styrene			8045674		2.54E-05							402
19	204	Styrene			8969766		2.27E-05							402
20	204	Styrene			8505958		2.4E-05							402
21	122	Styrene			6280586		1.94E-05							402
22	122	Styrene			5732330		2.13E-05							402
23	122	Styrene			6037738		2.02E-05							402
24	45.6	MMA				1077927		4.23E-05						402
25	45.6	MMA				1481299								403-1
26	45.6	MMA				955877		4.77E-05						403-1
27	45.6	MMA				970932		4.7E-05						403-1

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
28		Nitrogen											403-1
29		Nitrogen											403-1
30	59.2	Styrene			2537869		1.18E-05						403-1
31	59.2	Styrene			2526526		1.23E-05						403-1
32	122	Styrene			4892042		6.54E-06						403-1
33	122	Styrene			4951411		6.66E-06						403-1
34	204	Styrene			8085232		4.21E-06						403-1
35	204	Styrene			8096010		4.32E-06						403-1
36		0403-1-1	10:32	125	3964414	926488			98.3	37.6	125.0	406.5	403-1
37		0403-1-2	10:40	583	9540531	2042711			239.5	77.7	583.0	1373.4	403-1
38		0403-1-3	10:46	650	8694611	1746477			218.1	67.1	650.0	1414.3	403-1
39		0403-1-4	10:52	558	5771395	1074947			144.1	42.9	558.0	1111.1	403-1
40		0403-1-5	10:57	750	11039168	1933297			277.5	73.8	750.0	1693.6	403-1
41		0403-1-6	11:04	1030	14700072	2510957			370.2	94.6	1030.0	2300.0	403-1
42		0403-1-7	11:13	520	7750589	1115115			194.2	44.4	520.0	1178.5	403-1
43		0403-1-8	11:19	490	6831213	824657			170.9	33.9	490.0	1081.7	403-1
44		0403-1-9	11:25	415	7300304	736304			182.8	30.7	415.0	1006.9	403-1
45		0403-1-10	11:32	350	6570816	609411			164.3	26.2	350.0	873.4	403-1
46		0403-1-11	11:38	300	5316333	403122			132.5	18.7	300.0	728.8	403-1
47		0403-1-12	11:44	190	4590115	331656			114.1	16.2	190.0	533.7	403-1
48		0403-1-13	11:51	190	2943453	213163			72.4	11.9	190.0	434.1	403-1
49		0403-1-14	12:00	105	1973921	106222			47.9	8.1	105.0	258.6	403-1
50		0403-1-15	12:06	84	1445722	70982			34.5	6.8	84.0	197.8	403-1
51		0403-1-16	12:14	58	1054785	110902			24.6	8.2	58.0	138.4	403-1
52		0403-1-17	12:21	44	870677	196300			19.9	11.3	44.0	108.0	403-1
53		0403-1-18	12:28	34	652957	131136			14.4	9.0	34.0	81.1	403-1
54		0403-1-19	12:35	27	496894	59982			10.5	6.4	27.0	62.1	403-1
55		0403-1-20	12:41	25	502532	21487			10.6	5.0	25.0	59.7	403-1
56		0403-1-21	12:50	15	345678	15412			6.6	4.8	15.0	36.4	403-1
57		0403-1-22	12:58	11	192203	10849			2.7	4.6	11.0	21.6	403-1
58		0403-1-23	13:04	9	182180	91268			2.5	7.5	9.0	18.3	403-1
59		0403-1-24	13:10	7	150283	8902			1.7	4.6	7.0	13.6	403-1
60	96.2	MMA				2636149		3.65E-05					403-1
61	96.2	MMA				2612728		3.68E-05					403-1
62	204	Styrene			7712413		8.04E-06						403-1
63	204	Styrene			10368256		6.08E-06						403-1
64	204	Styrene			7991258		8.01E-06						403-1
65		NMMA-4-1-1	14:58	107	2703189				64.4		44.8		403-2
66		NMMA-4-1-2	15:03	162	3633230				87.1		67.8		403-2
67		NMMA-4-1-3	15:10	120	2783997				66.4		50.3		403-2
68		NMMA-4-1-4	15:16	233	5028627				121.3		97.6		403-2

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
69		NMMA-4-1-5	15:23	137	2975566				71.0		57.4		403-2
70		NMMA-4-1-6	15:29	118	2617290				62.3		49.4		403-2
71		NMMA-4-1-7	15:34	305	6292653				152.2		127.7		403-2
72		NMMA-4-1-8	15:41	280	5592202				135.0		117.3		403-2
73		NMMA-4-1-9	15:47	250	4732771				114.0		104.7		403-2
74		NMMA-4-1-10	15:53	290	5129690				123.7		121.5		403-2
75		NMMA-4-1-11	16:01	241	4672861				112.6		100.9		403-2
76		NMMA-4-1-12	16:07	167	3490486				83.6		69.9		403-2
77		NMMA-4-1-13	16:13	120	2561261				60.9		50.3		403-2
78		NMMA-4-1-14	16:18	97	1979686				46.7		40.6		403-2
79		NMMA-4-1-15	16:24	72	1537252				35.9		30.2		403-2
80		NMMA-4-1-16	16:29	51	952722				21.6		21.4		403-2
81		NMMA-4-1-17	16:37	25	449567				9.3		10.5		403-2
82		NMMA-4-1-18	16:43	15	311497				5.9		6.3		403-2
83		NMMA-4-1-19	16:48	7.6	138130				1.7		3.2		403-2
84		NMMA-4-1-20	16:56	4.4	73190				0.1		1.8		403-2
85		NMMA-4-1-21	17:02	3.6	62627				-0.2		1.5		403-2
86	364				17261280								403-2
87	364				14594400								403-2
88	364				13331768								403-2
89	204	Styrene			7464080		2.73E-05						403-2
90	204	Styrene			7922810		2.57E-05						403-2
91	122	Styrene			5751037		2.12E-05						403-2
92	122	Styrene			5286512		2.31E-05						403-2
93	122	Styrene			6186522		1.97E-05						403-2
95		Nitrogen											404-1R
96		Nitrogen											404-1R
97	59.2	Styrene			2424858		2.44E-05						404-1R
98	59.2	Styrene			2561784		2.31E-05						404-1R
99	122	Styrene											404-1R
100	122	Styrene			4956275		2.46E-05						404-1R
101	122	Styrene											404-1R
102	122	Styrene			4937520		2.47E-05						404-1R
103	204	Styrene											404-1R
104	204	Styrene			7731267		2.64E-05						404-1R
105	204	Styrene			7649680		2.67E-05						404-1R
106	115.9	MMA											404-1R
107	115.9	MMA				2364376		4.9E-05					404-1R
108	115.9	MMA				2347678		4.94E-05					404-1R
109		NMMA-7-1	9:20	104	2146024				53.0	0.0	126.5	######	404-1R

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
110		NMMA-7-2	9:26	312	6499744				168.2	0.0	401.6	######	404-1R
111		NMMA-7-3	9:33	300	6237210				161.3	0.0	385.0	######	404-1R
112		NMMA-7-4	9:43	392	8282432				215.4	0.0	514.2	######	404-1R
113		NMMA-7-5	9:49	200	3772290				96.0	0.0	229.2	######	404-1R
114		NMMA-7-6	9:55	101	2256090				55.9	0.0	133.4	######	404-1R
115		NMMA-7-7	10:01	230	5446650				140.3	0.0	335.0	######	404-1R
116		NMMA-7-8	10:07	310	6013485				155.4	0.0	370.8	######	404-1R
117		NMMA-7-9	10:13	335	6616547				171.3	0.0	408.9	######	404-1R
118		NMMA-7-10	10:20	320	6532752				169.1	0.0	403.6	######	404-1R
119		NMMA-7-11	10:26	421	8488742				220.9	0.0	527.2	######	404-1R
120		NMMA-7-12	10:32	310	6401610				165.6	0.0	395.4	######	404-1R
121		NMMA-7-13	10:38	230	6297552				162.9	0.0	388.8	######	404-1R
122		NMMA-7-14	10:45	160	3189914				80.6	0.0	192.4	######	404-1R
123		NMMA-7-15	10:56	107	2726037				68.3	0.0	163.1	######	404-1R
124		NMMA-7-16	11:07	83	1768040				43.0	0.0	102.6	######	404-1R
125		NMMA-7-17	11:22	60	1154462				26.7	0.0	63.8	######	404-1R
126		NMMA-7-18	12:32	177	3301888				83.6	0.0	199.5	######	404-1R
127		NMMA-7-19	12:38	220	4213530				107.7	0.0	257.1	######	404-1R
128		NMMA-7-20	12:44	470	8607987				224.0	0.0	534.8	######	404-1R
129		NMMA-7-21	12:51	360	6776691				175.6	0.0	419.1	######	404-1R
130		NMMA-7-22	12:58	460	8250592				214.6	0.0	512.2	######	404-1R
131		NMMA-7-23	13:05	380	6506419				168.4	0.0	402.0	######	404-1R
132		NMMA-7-24	13:11	235	4900512				125.9	0.0	300.5	######	404-1R
133		NMMA-7-25	13:16	166	3396750				86.1	0.0	205.5	######	404-1R
134		NMMA-7-26	13:24	138	2012448				49.4	0.0	118.0	######	404-1R
135		NMMA-7-27	13:32	102	2181157				53.9	0.0	128.7	######	404-1R
136		NMMA-7-28	13:42	68	1312078				30.9	0.0	73.8	######	404-1R
137		NMMA-7-29	13:53	315	9629830				251.1	0.0	599.3	######	404-1R
138		NMMA-7-30	14:00	422	8646016				225.0	0.0	537.2	######	404-1R
139		NMMA-7-31	14:06	349	6536980				169.2	0.0	403.9	######	404-1R
140		NMMA-7-32	14:12	520	8536339				222.1	0.0	530.2	######	404-1R
141		NMMA-7-33	14:18	277	5223779				134.4	0.0	320.9	######	404-1R
142		NMMA-7-34	14:26	148	2583584				64.6	0.0	154.1	######	404-1R
143		NMMA-7-35	14:35	110	2004485				49.2	0.0	117.5	######	404-1R
144		NMMA-7-36	14:46	76	1737152				42.2	0.0	100.6	######	404-1R
145		NMMA-7-37	14:55	57	1152829				26.7	0.0	63.7	######	404-1R
146		NMMA-7-38	15:05	26	556481				10.9	0.0	26.0	######	404-1R
147		NMMA-7-39	15:11	18	355620				5.6	0.0	13.3	######	404-1R
148		NMMA-7-40	15:22	11	256595				3.0	0.0	7.1	######	404-1R
149		NMMA-7-41	15:34	7.8	159624				0.4	0.0	0.9	######	404-1R
150	204	Styrene			6810240								404-1R

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
151	204	Styrene			6712224								404-1R
152	115.9	MMA				2194430							404-1R
153	115.9	MMA				2450414							404-1R
154		NMMA-3-1-1	16:11	138	2027461	437095			44.3	19.5	132.4	2.3	404-2
155		NMMA-3-1-2	16:17	357	5050669	1064450			135.3	53.5	396.6	2.5	404-2
156		NMMA-3-1-3	16:23	457	7957434	1570449			222.8	81.0	643.3	2.7	404-2
157		NMMA-3-1-4	16:30	210	3921122	736969			101.3	35.8	290.9	2.8	404-2
158		NMMA-3-1-5	16:40	175	3135224	451264			77.6	20.2	213.1	3.8	404-2
159		NMMA-3-1-6	16:47	145	2208101	268054			49.7	10.3	132.8	4.8	404-2
160		NMMA-3-1-7	16:53	138	2408938	249787			55.8	9.3	145.9	6.0	404-2
161		NMMA-3-1-8	17:01	120	2228555	192427			50.3	6.2	128.6	8.2	404-2
162		NMMA-3-1-9	17:07	93	1839684	164668			38.6	4.7	98.6	8.3	404-2
163		NMMA-3-1-10	17:13	83	1678298	167213			33.8	4.8	87.2	7.0	404-2
164		NMMA-3-1-11	17:19	66	1302226	99426			22.4	1.1	55.1	20.1	404-2
165		NMMA-3-1-12	17:28	45	1004535	42553			13.5	-2.0	29.5	-6.8	404-2
166		NMMA-3-1-13	17:38	30	580914	21483			0.7	-3.1	-2.6	-0.2	404-2
167		NMMA-3-1-14	17:43	19	336092	12702			-6.7	-3.6	-20.8	1.9	404-2
168		NMMA-3-1-15	17:49	14	270692	74350			-8.6	-0.2	-20.9	35.1	404-2
169		NMMA-3-1-16	17:56	9	197151	6439			-10.8	-3.9	-31.3	2.8	404-2
170	59.2	Styrene											404-2
171	59.2	Styrene			2663302		2.22E-05						404-2
172	59.2	Styrene			2299560		2.57E-05						404-2
173	59.2	Styrene			2606960		2.27E-05						404-2
174	122	Styrene			4357293		2.8E-05						404-2
175	122	Styrene			4821389		2.53E-05						404-2
176	122	Styrene			4427190		2.76E-05						404-2
177	204	Styrene			6574317		3.1E-05						404-2
178	204	Styrene											404-2
179	204	Styrene			8341984		2.45E-05						404-2
180	204	Styrene			7081792		2.88E-05						404-2
181	115.9	MMA				2297958		5.04E-05					404-2
182	115.9	MMA				2126528		5.45E-05					404-2
183	58	MMA				1252769		4.63E-05					404-2
184	58	MMA				1190454		4.87E-05					404-2
185	12	MMA				267634		4.48E-05					404-2
186	12	MMA				322825		3.72E-05					404-2
187	12	MMA				308813		3.89E-05					404-2
188		Nitrogen											405-1
189		Nitrogen											405-1
190	59.2	Styrene			2254912		2.63E-05						405-1
191	59.2	Styrene			2171352		2.73E-05						405-1

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
192	122	Styrene			4210266		2.9E-05						405-1
193	122	Styrene			4516435		2.7E-05						405-1
194	59.2	Styrene											405-1
195	204	Styrene											405-1
196	204	Styrene			7293405		2.8E-05						405-1
197	204	Styrene			7506915		2.72E-05						405-1
198	115.9	MMA				2275114		5.09E-05					405-1
199	115.9	MMA											405-1
200	115.9	MMA		**		2080506		5.57E-05					405-1
201		NMMA-8-2-1	8:47	170	2906960	719644			80.0	38.4	243.8	2.1	405-1
202		NMMA-8-2-2	8:53	275	4835504	1129984			133.4	60.3	401.4	2.2	405-1
203		NMMA-8-2-3	8:58	475	8194480	1818118			226.5	97.0	673.9	2.3	405-1
204		NMMA-8-2-4	9:04	500	9359270	1950893			258.7	104.0	760.6	2.5	405-1
205		NMMA-8-2-5	9:09	565	9851699	1870325			272.4	99.7	787.3	2.7	405-1
206		NMMA-8-2-6	9:14	560	8345181	1482396			230.6	79.0	659.2	2.9	405-1
207		NMMA-8-2-7	9:21	700	9315162	1564888			257.5	83.4	729.4	3.1	405-1
208		NMMA-8-2-8	9:27		7652301	1101541			211.5	58.7	585.5	3.6	405-1
209		NMMA-8-2-9	9:34	425	6359642	747716			175.7	39.9	474.1	4.4	405-1
210		NMMA-8-2-10	9:42	320	6115709	589668			168.9	31.4	446.4	5.4	405-1
211		NMMA-8-2-11	9:51	200	3620594	263198			99.8	14.0	257.5	7.1	405-1
212		NMMA-8-2-12	10:00	182	3294266	227265			90.8	12.1	233.3	7.5	405-1
213		NMMA-8-2-13	10:08	165	3189136	166422			87.9	8.9	221.9	9.9	405-1
214		NMMA-8-2-14	10:15	115	2161390	138925			59.4	7.4	151.9	8.0	405-1
215		NMMA-8-2-15	10:22	89	1750519	74226			48.0	4.0	120.0	12.1	405-1
216		NMMA-8-2-16	10:27	70	1244745	120698			34.0	6.4	90.0	5.3	405-1
217		NMMA-8-2-17	10:33	60	1254234	134504			34.3	7.2	91.7	4.8	405-1
218		NMMA-8-2-18	10:42	45	1112929	101212			30.4	5.4	79.9	5.6	405-1
219		NMMA-8-2-19	10:52	31	656310	10997			17.7	0.6	43.1	30.2	405-1
220		NMMA-8-2-20	11:01	18	368616	6474			9.7	0.3	23.7	28.2	405-1
221		NMMA-8-2-21	11:08	12	218538	1401			5.6	0.1	13.4	74.7	405-1
222	204	Styrene											405-2
223	204	Styrene			7807792								405-2
224	204	Styrene			7622234								405-2
225	115.9	MMA				2155598							405-2
226	115.9	MMA				2078871							405-2
227		NMMA-1-1-1	12:10	270	4599898				126.9	0.0	303.0	######	405-2
228		NMMA-1-1-2	12:20	110	2307045				63.4	0.0	151.4	######	405-2
229		NMMA-1-1-3	12:27	275	5420528				149.6	0.0	357.2	######	405-2
230		NMMA-1-1-4	12:32	315	6585360				181.9	0.0	434.2	######	405-2
231		NMMA-1-1-5	12:41	152	3353214				92.4	0.0	220.6	######	405-2
232		NMMA-1-1-6	12:47	107	2237333				61.5	0.0	146.8	######	405-2

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
233		NMMA-1-1-7	12:54	93	2120998				58.3	0.0	139.1	######	405-2
234		NMMA-1-1-8	13:01	117	2046736				56.2	0.0	134.2	######	405-2
235		NMMA-1-1-9	13:09	225	4591773				126.7	0.0	302.4	######	405-2
236		NMMA-1-1-10	13:17	240	4263264				117.6	0.0	280.7	######	405-2
237		NMMA-1-1-11	13:23	150	3002421				82.7	0.0	197.4	######	405-2
238		NMMA-1-1-12	13:32	97	1758648				48.2	0.0	115.1	######	405-2
239		NMMA-1-1-13	13:39	65	1401757				38.4	0.0	91.5	######	405-2
240		NMMA-1-1-14	13:48	165	3227858				88.9	0.0	212.3	######	405-2
241		NMMA-1-1-15	13:56	207	3545005				97.7	0.0	233.2	######	405-2
242		NMMA-1-1-16	14:01	270	4736896				130.7	0.0	312.0	######	405-2
243		NMMA-1-1-17	14:17	91	2103309				57.8	0.0	137.9	######	405-2
244		NMMA-1-1-18	14:23	66	1196392				32.7	0.0	78.0	######	405-2
245		NMMA-1-1-19	14:32	38	965350				26.3	0.0	62.7	######	405-2
246		NMMA-1-1-20	14:39	24	520505				13.9	0.0	33.3	######	405-2
247		NMMA-1-1-21	14:46	15	278086				7.2	0.0	17.3	######	405-2
248		NMMA-1-1-22	14:53	10	189523				4.8	0.0	11.4	######	405-2
266		Air	7:12										407
267		Air	7:25										407
268	59.2	Styrene	6:11		2298784		2.58E-05						407
269	59.2	Styrene	8:24		2434618		2.43E-05						407
270	59.2	Styrene	8:32		2284744		2.59E-05						407
271	122	Styrene	8:40		4730714		2.58E-05						407
272	122	Styrene	8:49		4545787		2.68E-05						407
273	204	Styrene	8:58		8126093		2.51E-05						407
274	204	Styrene	9:04		7330531		2.78E-05						407
275	204	Styrene	9:10		6897741		2.96E-05						407
276	204	Styrene	9:17		7350531		2.78E-05						407
277	204	Styrene	9:31		7350739		2.78E-05						407
278		NMMA-7-2-1	9:40	320	5507040				148.9	0.0	355.4	######	407
279		NMMA-7-2-2	9:45	300	5408576				146.2	0.0	349.0	######	407
280		NMMA-7-2-3	9:51	490	6834496				185.5	0.0	442.7	######	407
281		NMMA-7-2-4	9:57	491	9327008				254.1	0.0	606.6	######	407
282		NMMA-7-2-5	10:05	165	3603800				96.5	0.0	230.3	######	407
283		NMMA-7-2-6	10:12	160	3408750				91.1	0.0	217.5	######	407
284		NMMA-7-2-7	10:19	140	2251072				59.2	0.0	141.4	######	407
285		NMMA-7-2-8	10:24	510	4202022				113.0	0.0	269.6	######	407
286		NMMA-7-2-9	10:30	464	6760400				183.4	0.0	437.9	######	407
287		NMMA-7-2-10	10:36	530	8444000				229.8	0.0	548.6	######	407
288		NMMA-7-2-11	10:42	308	4619731				124.5	0.0	297.1	######	407
289		NMMA-7-2-12	10:48	183	2987898				79.5	0.0	189.8	######	407

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
290		NMMA-7-2-13	10:54	150	2693934				71.4	0.0	170.5	######	407
291		NMMA-7-2-14	11:02	115	1994148				52.1	0.0	124.5	######	407
292		NMMA-7-2-15	11:11	93	1595645				41.2	0.0	98.3	######	407
293		NMMA-7-2-16	11:17	80	1726360				44.8	0.0	106.9	######	407
294		NMMA-7-2-17	11:24	75	1495791				38.4	0.0	91.7	######	407
295		NMMA-7-2-18	11:30	71	1209129				30.5	0.0	72.8	######	407
296		NMMA-7-2-19	11:47	30	567016				12.8	0.0	30.6	######	407
297		NMMA-7-2-20	11:54	240	3812472				102.2	0.0	244.0	######	407
298		NMMA-7-2-21	11:59	464	7448733				202.4	0.0	483.1	######	407
299		NMMA-7-2-22	12:05	548.1052	9782944				266.7	0.0	636.6	######	407
300		NMMA-7-2-23	12:12	600	12083496				330.1	0.0	787.9	######	407
301		NMMA-7-2-24	12:17	390	6464352				175.3	0.0	418.4	######	407
302		NMMA-7-2-25	12:23	233	2973750				79.1	0.0	188.9	######	407
303		NMMA-7-2-26	12:29	180.8957	2606621				69.0	0.0	164.7	######	407
304		NMMA-7-2-27	12:35	128	2123618				55.7	0.0	133.0	######	407
305		NMMA-7-2-28	12:40	104	1756431				45.6	0.0	108.8	######	407
306		NMMA-7-2-29	12:46	89	1555785				40.1	0.0	95.6	######	407
307		NMMA-7-2-30	12:51	63	1266066				32.1	0.0	76.6	######	407
308		NMMA-7-2-31	12:57	330	5606346				151.6	0.0	362.0	######	407
309		NMMA-7-2-32	13:02	255	4216259				113.4	0.0	270.6	######	407
310		NMMA-7-2-33	13:07	380	8211418				223.4	0.0	533.3	######	407
311		NMMA-7-2-34	13:14	466	7494714				203.7	0.0	486.1	######	407
312		NMMA-7-2-35	13:20	470	8272829				225.1	0.0	537.3	######	407
313		NMMA-7-2-36	13:27	310	5127853				138.5	0.0	330.5	######	407
314		NMMA-7-2-37	13:34	160	2780098				73.8	0.0	176.1	######	407
315		NMMA-7-2-38	13:40	107	1718242				44.5	0.0	106.3	######	407
316		NMMA-7-2-39	13:46	101	1932456				50.4	0.0	120.4	######	407
317		NMMA-7-2-40	13:54	96	2154920				56.6	0.0	135.0	######	407
318		NMMA-7-2-41	14:01	76	1254608				31.8	0.0	75.8	######	407
319		NMMA-7-2-42	14:06	57	994442				24.6	0.0	58.7	######	407
320		NMMA-7-2-43	14:12	38	721293				17.1	0.0	40.8	######	407
321		NMMA-7-2-44	14:21	20	342870				6.7	0.0	15.9	######	407
322		NMMA-7-2-45	14:28	14	281333				5.0	0.0	11.8	######	407
323		NMMA-7-2-46	14:35	11	254353				4.2	0.0	10.1	######	407
341		Zero Air	7:17										408-1R
342		Zero Air	7:23										408-1R
343	138	MMA	7:38			2432546		5.67E-05					408-1R
344	138	MMA	7:43			2665533		5.18E-05					408-1R
345	138	MMA	7:46			2161474		6.38E-05					408-1R
346	138	MMA	7:51			2814342		4.9E-05					408-1R

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
347	138	MMA	7:58	**		3026870		4.56E-05					408-1R
348	82.8	MMA	8:07			1542307		5.37E-05					408-1R
349	82.8	MMA	8:11			1395949		5.93E-05					408-1R
350	138	MMA	8:17	**		3078986		4.48E-05					408-1R
351	82.8	MMA	8:21			1586068		5.22E-05					408-1R
352	82.8	MMA	8:25			1283152		6.45E-05					408-1R
353	82.8	MMA	8:28			1623835		5.1E-05					408-1R
354	41.4	MMA	8:32			860340		4.81E-05					408-1R
355	41.4	MMA	8:36			643010		6.44E-05					408-1R
356	41.4	MMA	8:40			1011674		4.09E-05					408-1R
357	59.2	Styrene	8:44		2009927		2.95E-05						408-1R
358	59.2	Styrene	8:53		1905652		3.11E-05						408-1R
359	122	Styrene	9:01		2735709		4.46E-05						408-1R
360	122	Styrene	9:07		2905496		4.2E-05						408-1R
361	122	Styrene	9:13		3588410		3.4E-05						408-1R
362	122	Styrene	9:22		3106942		3.93E-05						408-1R
363	204	Styrene	9:28	**	5244394		3.89E-05						408-1R
364	204	Styrene	9:33	**	5346765		3.82E-05						408-1R
365		NMMA-6-1-1	9:40	51	2906960	196930			109.0	10.8	275.0	10.1	408-1R
366		NMMA-6-1-2	9:45	94	4835504	399552			184.8	21.3	470.4	8.7	408-1R
367		NMMA-6-1-3	9:50	239	8194480	776781			316.9	40.8	812.6	7.8	408-1R
368		NMMA-6-1-4	9:57	190	9359270	453842			362.7	24.1	898.9	15.1	408-1R
369		NMMA-6-1-5	10:02	265	9851699	565842			382.1	29.9	953.1	12.8	408-1R
370		NMMA-6-1-6	10:08	176	8345181	741704			322.8	39.0	824.2	8.3	408-1R
371		NMMA-6-1-7	10:13	130	9315162	347179			361.0	18.6	887.2	19.4	408-1R
372		NMMA-6-1-8	10:19	89	7652301	229255			295.6	12.5	722.7	23.7	408-1R
373		NMMA-6-1-9	10:24	89	6359642	213855			244.8	11.7	600.3	21.0	408-1R
374		NMMA-6-1-10	10:30	79	6115709	179574			235.2	9.9	574.9	23.8	408-1R
375		NMMA-6-1-11	10:37	54	3620594	184606			137.0	10.2	341.1	13.5	408-1R
376		NMMA-6-1-12	10:44	45	3294266	112927			124.2	6.4	305.4	19.3	408-1R
377		NMMA-6-1-13	10:50	36	3189136	93578			120.1	5.4	294.1	22.1	408-1R
378		NMMA-6-1-14	10:56	31	2161390	88707			79.7	5.2	197.3	15.3	408-1R
379		NMMA-6-1-15	11:03	28	1750519	48960			63.5	3.1	155.9	20.2	408-1R
380		NMMA-6-1-16	11:09	24	1244745	74701			43.6	4.5	110.3	9.8	408-1R
381		NMMA-6-1-17	11:15	21	1254234	82106			44.0	4.9	111.7	9.1	408-1R
382		NMMA-6-1-18	11:23	20	1112929	79810			38.4	4.7	98.3	8.1	408-1R
383	122	Styrene	11:28		3977982								408-1R
384	122	Styrene	11:34		5986944								408-1R
385	122	Styrene	11:40		3566944								408-1R
386	59.2	Styrene	11:49		2208619								408-1R
387	138	MMA	11:55			1943838							408-1R

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
388		NMMA-3-2-1	12:02	129	1752420	456869			63.6	24.2	185.1	2.6		408-1R
389		NMMA-3-2-2	12:07	380	5012445	1047798			191.8	54.8	533.2	3.5		408-1R
390		NMMA-3-2-3	12:13	488	6699485	1282238			258.1	66.9	708.2	3.9		408-1R
391		NMMA-3-2-4	12:19	255	4105082	813083			156.1	42.7	431.3	3.7		408-1R
392		NMMA-3-2-5	12:30	167	2135806	351598			78.7	18.8	213.6	4.2		408-1R
393		NMMA-3-2-6	12:35	130	2434256	388178			90.4	20.7	244.2	4.4		408-1R
394		NMMA-3-2-7	12:41	113	1370966	201650			48.6	11.0	131.1	4.4		408-1R
395		NMMA-3-2-8	12:49	103	1838883	197604			67.0	10.8	174.8	6.2		408-1R
396		NMMA-3-2-9	12:56	76	2159629	213578			79.6	11.7	206.0	6.8		408-1R
397		NMMA-3-2-10	13:01	81	973926	125305			33.0	7.1	88.4	4.7		408-1R
398		NMMA-3-2-11	13:06	65	1257564	170693			44.1	9.4	118.3	4.7		408-1R
399		NMMA-3-2-12	13:11	57	928055	197256			31.2	10.8	89.3	2.9		408-1R
400		NMMA-3-2-13	13:19	43	745968	56604			24.0	3.5	62.2	6.8		408-1R
401		NMMA-3-2-14	13:27	34	638651	98805			19.8	5.7	55.1	3.5		408-1R
402		NMMA-3-2-15	13:36	19	579303	53743			17.5	3.4	46.3	5.2		408-1R
403		NMMA-3-2-16	13:41	14	228759	12418			3.7	1.2	10.5	2.9		408-1R
404		NMMA-3-2-17	13:47	10	436729	76366			11.8	4.6	34.5	2.6		408-1R
405		Zero Air	13:53											408-1R
406	59.2	Styrene	13:58		1744087								low	408-1R
407	59.2	Styrene	14:04		1979082									408-1R
408	122	Styrene	14:13		3190493									408-1R
409	122	Styrene	14:19		3722392									408-1R
410	138	MMA	14:28			1870897								408-1R
411	138	MMA	14:37			2588950								408-1R
412		NMMA-4-2-1	14:46	160	2130403				78.4	0.0		######		408-1R
413		NMMA-4-2-2	14:51	181	2912462				109.2	0.0		######		408-1R
414		NMMA-4-2-3	14:55	260	3796434				144.0	0.0		######		408-1R
415		NMMA-4-2-4	15:01	157	2991454				112.3	0.0		######		408-1R
416		NMMA-4-2-5	15:06	113	2524680				94.0	0.0		######		408-1R
417		NMMA-4-2-6	15:12	94	1455733				51.9	0.0		######		408-1R
418		NMMA-4-2-7	15:16	71	1105396				38.1	0.0		######		408-1R
419		NMMA-4-2-8	15:21	54	855882				28.3	0.0		######		408-1R
420		NMMA-4-2-9	15:27	55	957207				32.3	0.0		######		408-1R
421		NMMA-4-2-10	15:33	45	666229				20.9	0.0		######		408-1R
422		NMMA-4-2-11	15:42	100	1490351				53.3	0.0		######		408-1R
423		NMMA-4-2-12	15:47	206	2954728				110.9	0.0		######		408-1R
424		NMMA-4-2-13	15:52	310	6096154				234.4	0.0		######		408-1R
425		NMMA-4-2-14	15:58	185	2727650				101.9	0.0		######		408-1R
426		NMMA-4-2-15	16:04	208	2845392				106.6	0.0		######		408-1R
427		NMMA-4-2-16	16:13	120	1484244				53.0	0.0		######		408-1R
428		NMMA-4-2-17	16:19	97	1453124				51.8	0.0		######		408-1R

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
429		NMMA-4-2-18	16:24	78	1338082				47.3	0.0		######		408-1R
430		NMMA-4-2-19	16:33	49	626620				19.3	0.0		######		408-1R
431		NMMA-4-2-20	16:40	30	229460				3.7	0.0		######		408-1R
432		NMMA-4-2-21	16:48	15	293845				6.2	0.0		######		408-1R
433		NMMA-4-2-22	16:53	10	134077				-0.1	0.0		######		408-1R
434	122	Styrene	17:08		3510616									408-1R
435	122	Styrene	17:13		3658506									408-1R
436	59.2	Styrene	17:22		1540804									408-1R
437	59.2	Styrene	17:27		1859333									408-1R
438	204	Styrene	17:37		4631290									408-1R
439	204	Styrene	17:43		4745581									408-1R
440	Poor injection - aborted													408-1R
441	138	MMA	18:01			1526752								408-1R
442	138	MMA	18:07			1901698								408-1R
443	138	MMA	18:12			1932713								408-1R
444	69	MMA	18:18			914921								408-1R
445	69	MMA	18:24			1053810								408-1R
446		Zero Air	18:25											408-1R
447		Zero Air	7:23											409
448		Zero Air	7:29											409
449	138	MMA	7:38			1792969		7.7E-05						409
450	138	MMA	7:44			2116642		6.52E-05					high	409
451	138	MMA	7:49			1770000		7.8E-05						409
452	59.2	Styrene	7:56		1200810		4.93E-05						low	409
453	59.2	Styrene	8:02		1977894		2.99E-05							409
454	59.2	Styrene	8:07		1852249		3.2E-05							409
455	122	Styrene	8:15		3120594		3.91E-05							409
456	122	Styrene	8:21		2989200		4.08E-05							409
457	122	Styrene	8:27		4716783		2.59E-05							409
458	122	Styrene	8:34		3923266		3.11E-05							409
459	122	Styrene	8:39		3073312		3.97E-05							409
460	204	Styrene	8:46		5126154		3.98E-05							409
461	204	Styrene	8:51		5370304		3.8E-05							409
462		NMMA-1-2-1	9:55	238	3133270				113.8	0.0		######		409
463		NMMA-1-2-2	10:02	156	1811931				62.6	0.0		######		409
464		NMMA-1-2-3	10:06	219	3613341				132.3	0.0		######		409
465		NMMA-1-2-4	10:12	286	5067021				188.5	0.0		######		409
466		NMMA-1-2-5	10:17	178	3731293				136.9	0.0		######		409
467		NMMA-1-2-6	10:21	132	2324694				82.5	0.0		######		409
468		NMMA-1-2-7	10:27	88	1920083				66.8	0.0		######		409
469		NMMA-1-2-8	10:32	79	1362342				45.3	0.0		######		409

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
470		NMMA-1-2-9	10:37	65	865232				26.0	0.0		######		409
471		NMMA-1-2-10	10:43	53	713419				20.2	0.0		######		409
472		NMMA-1-2-11	10:49		4253606				157.1	0.0		######		409
473		NMMA-1-2-12	10:58	233	3344534				121.9	0.0		######		409
474		NMMA-1-2-13	11:04	125	1685221				57.7	0.0		######		409
475		NMMA-1-2-14	11:10	88	1782483				61.5	0.0		######		409
476		NMMA-1-2-15	11:16	70	1273704				41.8	0.0		######		409
477		NMMA-1-2-16	11:23	297	3737442				137.1	0.0		######		409
478		NMMA-1-2-17	11:29	253	3368774				122.9	0.0		######		409
479		NMMA-1-2-18	11:36	152	2435699				86.8	0.0		######		409
480		NMMA-1-2-19	11:42	86	1323075				43.7	0.0		######		409
481		NMMA-1-2-20	11:50	52	855991				25.7	0.0		######		409
482		NMMA-1-2-21	12:03	24	376746				7.1	0.0		######		409
483		NMMA-1-2-22	12:08	17	290008				3.8	0.0		######		409
484		NMMA-1-2-23	12:14	12	190411				-0.1	0.0		######		409
485	204	Styrene	12:20		6047334									409
486	204	Styrene	12:30		7178914									409
487	204	Styrene	12:41		5592954									409
488	122	Styrene	12:49		3599598									409
489	122	Styrene	12:56		5009738									409
490	138	MMA	13:07		1590112									409
491	138	MMA	13:12		901657									409
492		NMMA-11-1-1	13:21	110	1229537	219655			40.1	16.1		2.5		409
493		NMMA-11-1-2	13:27	70	802141	127716			23.6	9.4		2.5		409
494		NMMA-11-1-3	13:34	36	484481	39620			11.3	2.9		3.9		409
495		NMMA-11-1-4	13:43	20	251206	106130			2.3	7.8		0.3		409
496		NMMA-11-1-5	13:49		120633	91916			-2.8	6.7		-0.4		409
497	138	MMA	14:05			1396787								409
498		NMMA-11-1R-1	14:22	86	963478				29.8	0.0		######		409
499		NMMA-11-1R-2	14:28	54	812727				24.0	0.0		######		409
500		NMMA-11-1R-3	14:36	29	271584				3.1	0.0		######		409
501		NMMA-11-1R-4	14:43	20	315506				4.8	0.0		######		409
502		NMMA-11-1R-5	14:51	14	186096				-0.2	0.0		######		409
503		NMMA-11-1R-6	14:59	8	125022				-2.6	0.0		######		409
504	59.2	Styrene	15:31		1685064									409
505	59.2	Styrene	15:43		1747079									409
506	122	Styrene	15:53		4422576									409
507	122	Styrene	16:01		3689314									409
508	122	Styrene	16:10		5092669								low	409
509	122	Styrene	16:19		3326622									409
510	122	Styrene	16:27		3280230									

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
511	122	Styrene	16:35		4567085									409
512	122	Styrene	16:40		3034922									409
513	122	Styrene	16:50		4775210									409
514	204	Styrene	17:01		7759987									409
515	204	Styrene	17:06										Poor injection	409
516	204	Styrene	17:12		8444409									409
517	204	Styrene	17:18		6681344									409
518	204	Styrene	17:24		9284096									409
519	138	MMA	17:33			1943851								409
520	138	MMA	17:43			1918447								409
521		Zero Air	6:33		377636								styrene	410
522		Zero Air	6:43		0									410
523		Zero Air	6:49		0									410
524	59.2	Styrene	7:00		2048349		2.89E-05							410
525	59.2	Styrene	7:07		1874339		3.16E-05							410
526	59.2	Styrene	7:15		2149910		2.75E-05							410
527	59.2	Styrene	7:22		2035419		2.91E-05							410
528	122	Styrene	7:32		5309578		2.3E-05							410
529	122	Styrene	7:38		5565696		2.19E-05							410
530	122	Styrene	7:45		6680784		1.83E-05							410
531	204	Styrene	7:52		10263232		1.99E-05							410
532	204	Styrene	8:03		9437779		2.16E-05							410
533	204	Styrene	8:10		9078930		2.25E-05						End CALs	410
534	204	Styrene	8:19		6918595		2.95E-05						Method check	410
535	204	Styrene	8:28		8357315		2.44E-05						Method check	410
536		NMMA-14-1-1	9:19	18	200747				10.9	0.0		######		410
537		NMMA-14-1-2	9:26	76	1445060				36.4	0.0		######		410
538		NMMA-14-1-3	9:32	160	2702733				62.2	0.0		######		410
539		NMMA-14-1-4	9:38	137	2158397				51.0	0.0		######		410
540		NMMA-14-1-5	9:50	86	943564				26.1	0.0		######		410
541		NMMA-14-1-6	9:58	71	1122084				29.8	0.0		######		410
542		NMMA-14-1-7	10:08	55	954876				26.3	0.0		######		410
543		NMMA-14-1-8	10:16	121	2443541				56.8	0.0		######		410
544		NMMA-14-1-9	10:28	229	3420389				76.9	0.0		######		410
545		NMMA-14-1-10	10:37	161	2382866				55.6	0.0		######		410
546		NMMA-14-1-11	10:51	85	1486246				37.2	0.0		######		410
547		NMMA-14-1-12	11:00	40	605843				19.2	0.0		######		410
548		NMMA-14-1-13	11:11	13	198041				10.8	0.0		######		410
549	204	Styrene	11:22		9849523									410
550	204	Styrene	11:31		8442106									410
551	204	Styrene	11:39		2656904									410

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
552	204	Styrene	11:47		2773917									410
553		Background air	12:33		27062									410
554		NMMA-13-1-1	12:44	58	411718				15.2	0.0		######		410
555		NMMA-13-1-2	12:51	127	1074503				28.8	0.0		######		410
556		NMMA-13-1-3	13:00	195	1269243				32.8	0.0		######		410
557		NMMA-13-1-4	13:10	158	1645091				40.5	0.0		######		410
558		NMMA-13-1-5	13:18	103	480482				16.6	0.0		######		410
559		NMMA-13-1-6	13:28	58	627157				19.6	0.0		######		410
560		NMMA-13-1-7	13:36	135	1477083				37.0	0.0		######		410
561		NMMA-13-1-8	13:45	160	1199743				31.3	0.0		######		410
562		NMMA-13-1-9	13:54	187	1086164				29.0	0.0		######		410
563		NMMA-13-1-10	14:02	75	1031904				27.9	0.0		######		410
564		NMMA-13-1-11	14:12	94	814661				23.5	0.0		######		410
565		NMMA-13-1-12	14:20	179	1294772				33.3	0.0		######		410
566		NMMA-13-1-13	14:32	97	853037				24.2	0.0		######		410
567		NMMA-13-1-14	14:42	57	415997				15.3	0.0		######		410
568		NMMA-13-1-15	14:50	34	3905232				86.8	0.0		######		410
569		NMMA-13-1-16	14:58		274275				12.4	0.0		######		410
570		NMMA-13-1-17	15:05	10	106215				8.9	0.0		######		410
571	59.2	Styrene	15:20		2682264									410
572	59.2	Styrene	15:29		2293570									410
573		NMMA-11-2-1	15:48	157	2528589				58.6	0.0		######		410
574		NMMA-11-2-2	15:54	106	1840643				44.5	0.0		######	Slow start	410
575		NMMA-11-2-3	16:03	63	1153821				30.4	0.0		######		410
576		NMMA-11-2-4	16:13	34.5	574046				18.5	0.0		######		410
577		NMMA-11-2-5	16:23	24	373127				14.4	0.0		######		410
578		NMMA-11-2-6	16:32	17	237757				11.6	0.0		######		410
579		NMMA-11-2-7	16:49	9.4	142841				9.7	0.0		######		410
580	59.2	Styrene	17:07		2791952									410
581	59.2	Styrene	17:14		2179318									410
582	59.2	Styrene			2123979									410
583	122	Styrene			6257792									410
584	122	Styrene			4894480									410
585	122	Styrene			4594032									410
586		Zero Air	6:40		4384	0								411
587		Zero Air	6:48		0	0								411
588	59.2	Styrene	6:57		2820046		2.1E-05							411
589	59.2	Styrene	7:06		2237206		2.65E-05							411
590	59.2	Styrene	7:14		2099254		2.82E-05							411
591	59.2	Styrene	7:21		2040209		2.9E-05							411
592	122	Styrene	7:35		4475104		2.73E-05							411

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
593	122	Styrene	7:42		4154650		2.94E-05							411
594	122	Styrene	7:49		4408144		2.77E-05							411
595	204	Styrene	8:00										Low cal gas flow	411
596	204	Styrene	8:12		8655443		2.36E-05							411
597	204	Styrene	8:17		9614995		2.12E-05							411
598	204	Styrene	8:25		7316999		2.79E-05							411
599	144	MMA	8:33										Not quantified	411
600	144	MMA	8:42			2138958		6.73E-05						411
601	144	MMA	8:46			2316325		6.22E-05						411
602	144	MMA	8:49			2947989		4.88E-05						411
603	144	MMA	8:53			2280293		6.31E-05						411
604	201	MMA	8:57			3439466		5.84E-05						411
605	201	MMA	9:00			3424949		5.87E-05					End CALs	411
606		NMMA-6-2-1	9:07	61	805147	153657			24.5	9.4		2.6		411
607		NMMA-6-2-2	9:13	122	1755053	296644			47.4	17.8		2.7		411
608		NMMA-6-2-3	9:19	177		391461			0.0	23.4		0.0		411
609		NMMA-6-2-4	9:24	194	2775766	474404			71.9	28.3		2.5		411
610		NMMA-6-2-5	9:30	256	2636046	417537			68.5	24.9		2.7		411
611		NMMA-6-2-6	9:37	150	1951795	270070			52.1	16.3		3.2	Average THC	411
612		NMMA-6-2-7	9:46	94	1282790	164648			36.0	10.1		3.6		411
613		NMMA-6-2-8	9:53	85	1211623	134940			34.3	8.3		4.1		411
614		NMMA-6-2-9	10:00	59	678585	60247			21.5	4.0		5.4		411
615		NMMA-6-2-10	10:06	48	991871	85775			29.0	5.5		5.3		411
616		NMMA-6-2-11	10:12	38	498320	39581			17.2	2.7		6.3		411
617		NMMA-6-2-12	10:18	27	406113	35981			15.0	2.5		5.9		411
618		NMMA-6-2-13	10:24	22	385003	35522			14.5	2.5		5.8		411
619		NMMA-6-2-14	10:31	18	269613	46268			11.7	3.1		3.7		411
620		NMMA-6-2-15	10:38	14	160342	18530			9.1	1.5		6.0		411
621		NMMA-6-2-16	10:45	12	200407	36336			10.0	2.5		3.9		411
622		NMMA-6-2-17	10:52	10.2	147080	38484			8.7	2.7		3.3		411
623		NMMA-6-2-18	10:58	10	150887	24848			8.8	1.9		4.7		411
624	204	Styrene	11:11		8687578								Post QC	411
625	204	Styrene	11:18		8380506									411
626	201	MMA	11:26										Bad injection	411
627	201	MMA	11:31			2786350								411
628	201	MMA	11:35			2858120								411
629	201	MMA	11:39			2885094								411
630	144	MMA	11:42			2281989								411
631	144	MMA	11:46										Pressurized	411
632	59.2	Styrene	11:49		2826430									411
633	59.2	Styrene	11:55		1834818								Post QC	411

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
634		NMMA-14-2-1	12:02	94	1375428				38.2	0.0		######		411
635		NMMA-14-2-2	12:10	182	2878278				74.3	0.0		######		411
636		NMMA-14-2-3	12:17	121	1574102				43.0	0.0		######		411
637		NMMA-14-2-4	12:24	94	1363780				38.0	0.0		######		411
638		NMMA-14-2-5	12:30		1186089				33.7	0.0		######		411
639		NMMA-14-2-6	12:46	51	680259				21.5	0.0		######		411
640		NMMA-14-2-7	12:52	43	485239				16.9	0.0		######		411
641		NMMA-14-2-8	12:59	111	962450				28.3	0.0		######		411
642		NMMA-14-2-9	13:07	145	2120477				56.1	0.0		######		411
643		NMMA-14-2-10	13:13	252	3013517				77.6	0.0		######		411
644		NMMA-14-2-11	13:19	185	3121786				80.2	0.0		######		411
645		NMMA-14-2-12	13:28	112	1763050				47.5	0.0		######		411
646		NMMA-14-2-13	13:35	93	1555117				42.6	0.0		######		411
647		NMMA-14-2-14	13:46	59	799358				24.4	0.0		######		411
648		NMMA-14-2-15	13:56	31	371345				14.1	0.0		######		411
649		NMMA-14-2-16	14:06	16	304924				12.5	0.0		######	Not vented	411
650		NMMA-14-2-17	14:13	11	128618				8.3	0.0		######		411
651	59.2	Styrene	14:30		2421373								Post CAL	411
652	59.2	Styrene	14:38		2315500								Post CAL	411
653		NMMA-13-2-1	15:44	28	458349				16.2	0.0		######		411
654		NMMA-13-2-2	15:53	157	2842381				73.5	0.0		######		411
655		NMMA-13-2-3	15:59	233	3056024				78.6	0.0		######		411
656		NMMA-13-2-4	16:05	158	2511288				65.5	0.0		######		411
657		NMMA-13-2-5	16:11	110	1162455				33.1	0.0		######		411
658		NMMA-13-2-6	16:22	83	1436378				39.7	0.0		######		411
659		NMMA-13-2-7	16:28	145	2067983				54.9	0.0		######		411
660		NMMA-13-2-8	16:37	225	2840077				73.4	0.0		######		411
661		NMMA-13-2-9	16:45	141	2281424				60.0	0.0		######		411
662		NMMA-13-2-10	16:52	90	1449514				40.0	0.0		######		411
663		NMMA-13-2-11	17:01	209	2791864				72.2	0.0		######		411
664		NMMA-13-2-12	17:16	96	1456317				40.2	0.0		######		411
665		NMMA-13-2-13	17:24	72	935083				27.7	0.0		######		411
666		NMMA-13-2-14	17:32	48	596809				19.5	0.0		######		411
667		NMMA-13-2-15	17:40	30	450379				16.0	0.0		######		411
668		NMMA-13-2-16	17:48	18	296181				12.3	0.0		######		411
669		NMMA-13-2-17	17:56	12	124443				8.2	0.0		######		411
670	59.2	Styrene			1873879								Post CAL	411
671	59.2	Styrene			2468186								Post CAL	411
672	59.2	Styrene			2570333								Post CAL	411
673	122	Styrene			3828302								Post CAL	411
674	122	Styrene			5809104								Post CAL	411

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
675	122	Styrene											Post CAL	411
676	122	Styrene			5616218								Post CAL	411
677	204	Styrene			8177760								Post CAL	411
678	204	Styrene			8528410								Post CAL	411
679	144	MMA				3063480							Post CAL	411
680	144	MMA				2640364							Post CAL	411
681	144	MMA				2450941							Post CAL	411
682	144	MMA				2748472							Post CAL	411
683	144	MMA				2034586							Post CAL	411
684	144	MMA				2023973							Post CAL	411
685	144	MMA				1898571							Post CAL	411
686	201	MMA				4870781							Post CAL	411
687	201	MMA				3410517							Post CAL	411
688	201	MMA				4755005							Post CAL	411
689		Zero Air	6:40		1556	0							AM CAL	412
690		Zero Air	6:52		0	0							AM CAL	412
691	59.2	Styrene	7:03		1908233		3.1E-05						AM CAL	412
692	59.2	Styrene	7:10		2243662		2.64E-05						AM CAL	412
693	59.2	Styrene	7:16		2623016		2.26E-05						AM CAL	412
694	59.2	Styrene	7:23		1826433		3.24E-05						AM CAL	412
695	59.2	Styrene	7:30		2702613		2.19E-05						AM CAL	412
696	122	Styrene	7:39		4756570		2.56E-05						AM CAL	412
697	122	Styrene	7:46		5123603		2.38E-05						AM CAL	412
698	122	Styrene	7:52		4157261		2.93E-05						AM CAL	412
699	204	Styrene	7:59		7274077		2.8E-05						AM CAL	412
700	204	Styrene	8:04		6650445		3.07E-05						AM CAL	412
701		NMMA-11-3-1	8:17	200	4407430				123.3	0.0		######		412
702		NMMA-11-3-2	8:24	117	1808522				48.0	0.0		######		412
703		NMMA-11-3-3	8:30	69	959705				23.5	0.0		######		412
704		NMMA-11-3-4	8:39	41	517587				10.7	0.0		######		412
705		NMMA-11-3-5	8:46	38	471339				9.3	0.0		######		412
706		NMMA-11-3-6	8:57	18	277848				3.7	0.0		######		412
707		NMMA-11-3-7	9:05	12	178566				0.9	0.0		######		412
708	204	Styrene	9:17		8134685									412
709	204	Styrene			3596384									412
710	59.2	Styrene	9:54		1709808									412
711	59.2	Styrene			1514022									412
712	59.2	Styrene			883179									412
713	59.2	Styrene			5971597								Changed gas sampling valve	412
714	59.2	Styrene			6009331									412

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
715		NMMA-5-1-1	11:40	110					0.0	0.0		######	412
716		NMMA-5-1-2	11:49	90.7					0.0	0.0		######	412
717		NMMA-5-1-3	11:52	190	5387181				151.6	0.0		######	412
718		NMMA-5-1-4	11:59		18033760				517.7	0.0		######	412
719		NMMA-5-1-5	12:06	584	17177888				492.9	0.0		######	412
720		NMMA-5-1-6	12:12	400	12032696				344.0	0.0		######	412
721		NMMA-5-1-7	12:21	204	6380976				180.4	0.0		######	412
722		NMMA-5-1-8	12:30	182	5560259				156.6	0.0		######	412
723		NMMA-5-1-9	12:36	152	4986021				140.0	0.0		######	412
724		NMMA-5-1-10	12:47	80	2355536				63.9	0.0		######	412
725		NMMA-5-1-11	12:56	41	1339824				34.5	0.0		######	412
726		NMMA-5-1-12	13:04	23	651145				14.5	0.0		######	412
727		NMMA-5-1-13	13:11	17	535507				11.2	0.0		######	412
728		NMMA-5-1-14	13:21	12	345829				5.7	0.0		######	412
729	59.2	Styrene			5958909								412
730	59.2	Styrene			6291424								412
731	59.2	Styrene			6429882								412
732	122	Styrene			10977608								412
733	122	Styrene			11837000								412
734	204	Styrene			16097608								412
735	204	Styrene			19421208								412
736	204	Styrene			21264480								412
737	204	Styrene			19247328								412
738	204	Styrene			19026992								412
739		NMMA-2-1-1	15:15	170	5879133				165.9	0.0		######	412
740		NMMA-2-1-2	15:25	221	2987443				82.2	0.0		######	412
741		NMMA-2-1-3	15:31	888	27243904				784.3	0.0		######	412
742		NMMA-2-1-4	15:38	257	9444307				269.1	0.0		######	412
743		NMMA-2-1-5	15:46	170	5140301				144.5	0.0		######	412
744		NMMA-2-1-6	15:57	121	3865266				107.6	0.0		######	412
745		NMMA-2-1-7	16:05	460	14387944				412.2	0.0		######	412
746		NMMA-2-1-8	16:11	710	21751264				625.3	0.0		######	412
747		NMMA-2-1-9	16:18	295	11422000				326.3	0.0		######	412
748		NMMA-2-1-10	16:28	450	3746736				104.1	0.0		######	412
749		NMMA-2-1-11	16:36	160	5256288				147.8	0.0		######	412
750		NMMA-2-1-12	16:43	520	16205192				464.8	0.0		######	412
751		NMMA-2-1-13	16:49	430	11481928				328.1	0.0		######	412
752		NMMA-2-1-14	17:03	116	3457654				95.8	0.0		######	412
753		NMMA-2-1-15	17:15	88	2677034				73.2	0.0		######	412
754		NMMA-2-1-16	17:25	44	1404304				36.3	0.0		######	412
755		NMMA-2-1-17	17:34	27	852964				20.4	0.0		######	412

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
756		NMMA-2-1-18	17:46	19	568054				12.1	0.0		######		412
757		NMMA-2-1-19	17:52	15	405837				7.4	0.0		######		412
758		NMMA-2-1-20	18:01	12	381358				6.7	0.0		######		412
759	59.2	Styrene			5525818				155.6	0.0		######		412
760	59.2	Styrene			5744490				162.0	0.0		######		412
761	122	Styrene			11881808				339.6	0.0		######		412
762	122	Styrene			10853096				309.9	0.0		######		412
763		Audit (42)			12705496				363.5	0.0		######		412
764		Audit (42)			3053941				84.1	0.0		######		412
765		Audit (42)			5943861				167.7	0.0		######		412
766		Audit (42)			3917018				109.1	0.0		######		412
767		Audit (42)			3856778				107.3	0.0		######		412
768		Zero Air	6:50		352952	0							AM CAL	414
769		Zero Air	7:00		203009	0							AM CAL	414
770	59.2	Styrene	7:10		4755664		1.24E-05						AM CAL	414
771	59.2	Styrene	7:22		4167498		1.42E-05						AM CAL	414
772	59.2	Styrene	7:29		4384538		1.35E-05						AM CAL	414
773	122	Styrene	7:37		9403558		1.3E-05						AM CAL	414
774	122	Styrene	7:43		8547834		1.43E-05						AM CAL	414
775	122	Styrene	7:48		8905798		1.37E-05						AM CAL	414
776	204	Styrene	7:58		16823296		1.21E-05						AM CAL	414
777	204	Styrene	8:04		16883072		1.21E-05						AM CAL	414
778	204	Styrene	8:10		17030400		1.2E-05						AM CAL	414
779		NMMA-5-2-1	9:40	52	1785250				26.4	0.0		######		414
780		NMMA-5-2-2	9:46	260	6617882				84.7	0.0		######		414
781		NMMA-5-2-3	9:52	470	11096048				138.8	0.0		######		414
782		NMMA-5-2-4	10:01	334	5074253				66.1	0.0		######		414
783		NMMA-5-2-5	10:09	161	3876808				51.7	0.0		######		414
784		NMMA-5-2-6	10:16	127	3225021				43.8	0.0		######		414
785		NMMA-5-2-7	10:24	108	2559440				35.8	0.0		######		414
786		NMMA-5-2-8	10:31	90	2209029				31.5	0.0		######		414
787		NMMA-5-2-9	10:38	470	11530448				144.0	0.0		######		414
788		NMMA-5-2-10	10:48	825	18091048				223.2	0.0		######		414
789		NMMA-5-2-11	10:54	421	9953050				125.0	0.0		######		414
790		NMMA-5-2-12	11:05	221	6049504				77.9	0.0		######		414
791		NMMA-5-2-13	11:12	170	4419344				58.2	0.0		######		414
792		NMMA-5-2-14	11:19	134	3660850				49.0	0.0		######		414
793		NMMA-5-2-15	11:36	49	1876744				27.5	0.0		######		414
794		NMMA-5-2-16	11:48	20.6	516467				11.1	0.0		######		414
795		NMMA-5-2-17	12:03	10	243757				7.8	0.0		######		414
796	204	Styrene			17182512				212.3	0.0		######		414

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
797	204	Styrene			16327544				202.0	0.0		######		414
798	204	Styrene			16256032				201.1	0.0		######		414
799		NMMA-2-2-1	13:42	135	3605650				48.4	0.0		######		414
800		NMMA-2-2-2	13:48	333	8010685				101.6	0.0		######		414
801		NMMA-2-2-3	13:54	504	11811864				147.4	0.0		######		414
802		NMMA-2-2-4	14:00	340	8118000				102.9	0.0		######		414
803		NMMA-2-2-5	14:08	190	5035171				65.6	0.0		######		414
804		NMMA-2-2-6	14:15	156	3933746				52.3	0.0		######		414
805		NMMA-2-2-7	14:22	137	3575354				48.0	0.0		######		414
806		NMMA-2-2-8	14:28	300	6971277				89.0	0.0		######		414
807		NMMA-2-2-9	14:39	134	8199200				103.8	0.0		######		414
808		NMMA-2-2-10	14:47	187	4430733				58.3	0.0		######	Attenuation=8	414
809		NMMA-2-2-11	14:53	130	3347350				45.3	0.0		######	Attenuation=5	414
810		NMMA-2-2-12	15:03	81	1928095				28.1	0.0		######	Attenuation=7	414
811		NMMA-2-2-13	15:09	65	1539519				23.4	0.0		######		414
812		NMMA-2-2-14	15:16	410	10703672				134.1	0.0		######		414
813		NMMA-2-2-15	15:25	338	9611174				120.9	0.0		######		414
814		NMMA-2-2-16	15:43	88	2370269				33.5	0.0		######		414
815		NMMA-2-2-17	15:49	61	1575250				23.9	0.0		######		414
816		NMMA-2-2-18	15:58	31	826720				14.8	0.0		######		414
817		NMMA-2-2-19	16:11	12	354579				9.1	0.0		######		414
818	204	Styrene	16:19		17429680									414
819	204	Styrene			16991360									414
820	59.2	Styrene			5021901									414
821	59.2	Styrene			5041053									414
822		Zero Air			1187860									414
823		Zero Air												414
824		Zero Air												414
825		Zero Air			1239071								AM CAL	415
826		Zero Air			176395								AM CAL	415
827		Zero Air			213703								AM CAL	415
828	59.2	Styrene			4360042		1.36E-05						AM CAL	415
829	59.2	Styrene			3346936		1.77E-05						AM CAL	415
830	59.2	Styrene			4179248		1.42E-05						AM CAL	415
831	59.2	Styrene			5030979		1.18E-05						AM CAL	415
832	122	Styrene			9615066		1.27E-05						AM CAL	415
833	122	Styrene			9712975		1.26E-05						AM CAL	415
834	204	Styrene			17192032		1.19E-05						AM CAL	415
835	204	Styrene			16329160		1.25E-05						AM CAL	415
836		NMMA-16-1-1	9:51	40	1283739				19.4	0.0		######		415
837		NMMA-16-1-2	9:57	130	2849688				38.3	0.0		######		415

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA	
838		NMMA-16-1-3	10:08	182	5175330				66.3	0.0		######	415
839		NMMA-16-1-4	10:18	121	3053062				40.7	0.0		######	415
840		NMMA-16-1-5	10:26	107	2581154				35.0	0.0		######	415
841		NMMA-16-1-6	10:36	96	2614952				35.4	0.0		######	415
842		NMMA-16-1-7	10:44	94	3672360				48.2	0.0		######	415
843		NMMA-16-1-X	10:51	245					0.0	0.0		######	415
844		NMMA-16-1-8	11:00	340	9195730				114.8	0.0		######	415
845		NMMA-16-1-9	11:06	253	5991587				76.1	0.0		######	415
846		NMMA-16-1-10	11:15	170	4736778				61.0	0.0		######	415
847		NMMA-16-1-11	11:22	150	4231245				54.9	0.0		######	415
848		NMMA-16-1-12	11:29	136	3369664				44.5	0.0		######	415
849		NMMA-16-1-13	11:38	99	2470118				33.7	0.0		######	415
850		NMMA-16-1-14	11:49	48	1381485				20.5	0.0		######	415
851		NMMA-16-1-15	11:55	27	869409				14.4	0.0		######	415
852		NMMA-16-1-16	12:06	12	338874				8.0	0.0		######	415
853		NMMA-16-1-17	12:13	8	211325				6.4	0.0		######	415
854	204	Styrene			17244432				211.8	0.0		######	415
855	59.2	Styrene			4923560				63.3	0.0		######	415
856		NMMA-15-1-1	14:07	140	3033627				40.5	0.0		######	415
857		NMMA-15-1-2	14:14	186	5384074				68.8	0.0		######	415
858		NMMA-15-1-3	14:21	250	7477741				94.1	0.0		######	415
859		NMMA-15-1-4	14:32	145	3587285				47.1	0.0		######	415
860		NMMA-15-1-5	14:42	115	3067045				40.9	0.0		######	415
861		NMMA-15-1-6	14:54	160	3819214				49.9	0.0		######	415
862		NMMA-15-1-7	15:00	230	5637917				71.9	0.0		######	415
863		NMMA-15-1-8	15:07	242	5660490				72.1	0.0		######	415
864		NMMA-15-1-9	15:15	176	4797546				61.7	0.0		######	415
865		NMMA-15-1-10	15:22	124	3159824				42.0	0.0		######	415
866		NMMA-15-1-11	15:30	87	2212590				30.6	0.0		######	415
867		NMMA-15-1-12	15:42	147	3121314				41.5	0.0		######	415
868		NMMA-15-1-13	15:49	232	5720275				72.9	0.0		######	415
869		NMMA-15-1-14	16:00	130	3509638				46.2	0.0		######	415
870		NMMA-15-1-15	16:13	63	1858754				26.3	0.0		######	415
871		NMMA-15-1-16	16:28	27	826362				13.9	0.0		######	415
872		NMMA-15-1-17	16:35	17	499927				9.9	0.0		######	415
873		NMMA-15-1-18	16:42	12	311104				7.6	0.0		######	415
874		NMMA-15-1-19	16:49	9	234774				6.7	0.0		######	415
875	59.2	Styrene			4928013				63.3	0.0		######	415
876	59.2	Styrene			4053978								415
877	59.2	Styrene			4739386								415
878	204	Styrene			17330048								415

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
879		Zero Air	6:50										AM CAL	416
880		Zero Air	7:00										AM CAL	416
881	59.2	Styrene	7:20		4915139		1.2E-05						AM CAL	416
882	59.2	Styrene	7:30		4863680		1.22E-05						AM CAL	416
883	122	Styrene	7:42		10776440		1.13E-05						AM CAL	416
884	122	Styrene	7:48		9171008		1.33E-05						AM CAL	416
885	122	Styrene	7:58		10341320		1.18E-05						AM CAL	416
886	122	Styrene	8:12		10572206		1.15E-05						AM CAL	416
887		NMMA-16-2-1	9:35	82	2250389				27.1	0.0		######		416
888		NMMA-16-2-2	9:43	233	7025261				84.1	0.0		######		416
889		NMMA-16-2-3	9:54	194	4967896				59.6	0.0		######		416
890		NMMA-16-2-4	10:14	125	4328362				51.9	0.0		######		416
891		NMMA-16-2-5	10:23	93	3327666				40.0	0.0		######		416
892		NMMA-16-2-6	10:35	223	2804912				33.8	0.0		######		416
893		NMMA-16-2-7	10:41	368	6735869				80.6	0.0		######		416
894		NMMA-16-2-8	10:47	267	9537888				114.1	0.0		######		416
895		NMMA-16-2-9	10:54	205	6764320				81.0	0.0		######		416
896		NMMA-16-2-10	11:03	162	5089930				61.0	0.0		######		416
897		NMMA-16-2-11	11:11	123					0.0	0.0		######		416
898		NMMA-16-2-12	11:18	76	4044436				48.5	0.0		######		416
899		NMMA-16-2-13	11:25	43	2881882				34.7	0.0		######		416
900		NMMA-16-2-14	11:31	29	1333417				16.2	0.0		######		416
901		NMMA-16-2-15	11:38	26	777327				9.6	0.0		######		416
902		NMMA-16-2-16	11:46	17	482342				6.1	0.0		######		416
903		NMMA-16-2-17	11:53	11	289824				3.8	0.0		######		416
904		NMMA-16-2-18	12:00	8	204834				2.7	0.0		######		416
905	59.2	Styrene			4956816									416
906	59.2	Styrene			4888835									416
907	122	Styrene			9990438									416
908	122	Styrene			14172152								Poor injection?	416
909	122	Styrene			11932992									416
910		Zero Air			660				0.3	0.0		######		416
911	122	Styrene			11027728									416
912	122	Styrene	13:24		10367112									416
913		NMMA-15-2-1	13:36	2.7	65781				1.1	0.0		######		416
914		NMMA-15-2-2	13:42	104	2897704				34.9	0.0		######		416
915		NMMA-15-2-3	13:50		4461978				53.5	0.0		######		416
916		NMMA-15-2-4	13:56	234	6706013				80.3	0.0		######		416
917		NMMA-15-2-5	14:03	143	3824701				45.9	0.0		######		416
918		NMMA-15-2-6	14:15	120	2074794				25.0	0.0		######		416
919		NMMA-15-2-7	14:21	101	3010485				36.2	0.0		######		416

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
920		NMMA-15-2-8	14:28	184	5310560				63.6	0.0		######		416
921		NMMA-15-2-9	14:34	290	7218458				86.4	0.0		######		416
922		NMMA-15-2-10	14:40	170	3705642				44.5	0.0		######		416
923		NMMA-15-2-11	14:55	143	4085200				49.0	0.0		######		416
924		NMMA-15-2-12	15:01	256	6429536				77.0	0.0		######		416
925		NMMA-15-2-13	15:09	209	4903136				58.8	0.0		######		416
926		NMMA-15-2-14	15:19	149	4334771				52.0	0.0		######		416
927		NMMA-15-2-15	15:26	104	2799413				33.7	0.0		######		416
928		NMMA-15-2-16	15:35	69	1686089				20.4	0.0		######		416
929		NMMA-15-2-17	15:41	36	1059186				12.9	0.0		######		416
930		NMMA-15-2-18	15:48	22	627335				7.8	0.0		######		416
931		NMMA-15-2-19	15:58	15	423460				5.4	0.0		######		416
932		NMMA-15-2-20	16:06	10	234399				3.1	0.0		######		416
933		Zero Air			3379				0.3	0.0		######		416
934		Zero Air												416
935	122	Styrene			10505456									416
936	122	Styrene			10076096									416
937	59.2	Styrene			4985315									416
938	59.2	Styrene			5178906									416
939		Zero Air											AM CAL	417
940		Zero Air			2044								AM CAL	417
941	59.2	Styrene			4324157		1.37E-05						AM CAL	417
942	59.2	Styrene			4536176		1.31E-05						AM CAL	417
943	59.2	Styrene			4768189		1.24E-05						AM CAL	417
944	122	Styrene			10597432		1.15E-05						AM CAL	417
945	122	Styrene			9772608		1.25E-05						AM CAL	417
946	122	Styrene			11477432		1.06E-05						AM CAL	417
947	122	Styrene			9540512		1.28E-05						AM CAL	417
948		NMMA-12-1-1	8:32	2	44133				3.4	0.0		######	AM CAL	417
949		NMMA-12-1-2	8:40	115	2778440				35.6	0.0		######	AM CAL	417
950		NMMA-12-1-3	8:52	57	1517226				20.7	0.0		######		417
951		NMMA-12-1-4	8:59	39	992900				14.6	0.0		######		417
952		NMMA-12-1-5	9:06	26	710933				11.2	0.0		######		417
953		NMMA-12-1-6	9:14	23	689455				11.0	0.0		######		417
954		NMMA-12-1-7	9:19	23	577031				9.7	0.0		######		417
955		NMMA-12-1-8	9:25	21	708349				11.2	0.0		######		417
956		NMMA-12-1-9	9:34	16	504677				8.8	0.0		######		417
957		NMMA-12-1-10	9:41	13	387596				7.4	0.0		######		417
958		NMMA-12-1-11	9:51	9	305040				6.5	0.0		######		417
959	204	Styrene			15753016									417
960	204	Styrene			17712032									417

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
961	204	Styrene			18269232									417
962	122	Styrene			10231520									417
963	59.2	Styrene			5499240									417
964	59.2	Styrene			5894784									417
978		Zero Air			1915								AM CAL	418
979		Zero Air			3089								AM CAL	418
980	59.2	Styrene			5035434		1.18E-05						AM CAL	418
981	59.2	Styrene			4730973		1.25E-05						AM CAL	418
982	59.2	Styrene			5181651		1.14E-05						AM CAL	418
983	204	Styrene			19345334		1.05E-05						AM CAL	418
984	204	Styrene			18797024		1.09E-05						AM CAL	418
985		NMMA-9-1-1	7:58	311	10084736				109.9	0.0		######		418
986		NMMA-9-1-2	8:10	174	6702595				74.0	0.0		######		418
987		NMMA-9-1-3	8:18	290	10389824				113.1	0.0		######		418
988		NMMA-9-1-4	8:27	330	10715224				116.6	0.0		######		418
989		NMMA-9-1-5	8:36	127	4638685				52.2	0.0		######		418
990		NMMA-9-1-6	8:48	107	4050910				45.9	0.0		######		418
991		NMMA-9-1-7	8:58	100	4094269				46.4	0.0		######		418
992		NMMA-9-1-8	9:21	616	19671680				211.5	0.0		######		418
993		NMMA-9-1-9	9:34	520	10794992				117.4	0.0		######		418
994		NMMA-9-1-10	9:47	139	5416029				60.4	0.0		######		418
995		NMMA-9-1-11	10:00	105	3707136				42.3	0.0		######		418
996		NMMA-9-1-12	10:13	99	3523238				40.3	0.0		######		418
997		NMMA-9-1-13	10:31	430	15497008				167.2	0.0		######		418
998		NMMA-9-1-14	10:39	600	20079317				215.8	0.0		######		418
999		NMMA-9-1-15	10:52	565	17458832				188.0	0.0		######		418
1000		NMMA-9-1-16	11:06	163	6133602				68.0	0.0		######		418
1001		NMMA-9-1-17	11:19	129	4844813				54.3	0.0		######		418
1002		NMMA-9-1-18	11:35	103	3703840				42.3	0.0		######		418
1003		NMMA-9-1-19	11:48	65	2315698				27.5	0.0		######		418
1004		NMMA-9-1-20	12:08	29	4385025				49.5	0.0		######		418
1005		NMMA-9-1-21	12:14	540	17945536				193.2	0.0		######		418
1006		NMMA-9-1-22	12:28	630	22707728				243.6	0.0		######		418
1007		NMMA-9-1-23	12:36	267	9086290				99.3	0.0		######		418
1008		NMMA-9-1-24	12:45	131	4644509				52.2	0.0		######		418
1009		NMMA-9-1-25	12:55	101	3398800				39.0	0.0		######		418
1010		NMMA-9-1-26	13:07	99	3656178				41.8	0.0		######		418
1011		NMMA-9-1-27	13:24	81	3019537				35.0	0.0		######		418
1012		NMMA-9-1-28	13:44	42	1536858				19.3	0.0		######		418
1013		NMMA-9-1-29	14:02	30	997987				13.6	0.0		######		418

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
1014		NMMA-9-1-30	14:14	27	845051				12.0	0.0		######		418
1015		NMMA-9-1-31	14:22	25	782915				11.3	0.0		######		418
1016		NMMA-9-1-32	14:31	20	638408				9.8	0.0		######		418
1017		NMMA-9-1-33	14:44	16	565348				9.0	0.0		######		418
1018	204	Styrene			18110944									418
1019	204	Styrene			16396168									418
1020	204	Styrene			19007808									418
1021	59.2	Styrene			5687642								High	418
1022		NMMA-12-2-1	15:53	106	3376958				38.8	0.0		######		418
1023		NMMA-12-2-2	16:01	73	2429792				28.8	0.0		######		418
1024		NMMA-12-2-3	16:07	50	1608175				20.1	0.0		######		418
1025		NMMA-12-2-4	16:13	34	1212638				15.9	0.0		######		418
1026		NMMA-12-2-5	16:20	26	909559				12.6	0.0		######		418
1027		NMMA-12-2-6	16:29	22	718457				10.6	0.0		######		418
1028		NMMA-12-2-7	16:43	13	381869				7.1	0.0		######		418
1029	59.2	Styrene			4999213									418
1030	59.2	Styrene			4573312									418
1031	122	Styrene			11345776									418
1032	122	Styrene			10561088									418
1033	204	Styrene			18060768									418
1034	204	Styrene			18431840									418
1035	59.2	Styrene			4908355		1.21E-05						AM CAL	419
1036	59.2	Styrene			4736861		1.25E-05						AM CAL	419
1037	204	Styrene			18883424		1.08E-05						AM CAL	419
1038	204	Styrene			19033904		1.07E-05						AM CAL	419
1039		NMMA-9-2-1	7:40		79164				4.3	0.0	0.0	######	TTE Background	419
1040		NMMA-9-2-2	7:50	244	8462029				93.2	0.0	582.4	######		419
1041		NMMA-9-2-3	7:59	811	27239728				292.4	0.0	1935.9	######		419
1042		NMMA-9-2-4	8:11	202	7715888				85.3	0.0	482.2	######		419
1043		NMMA-9-2-5	8:23	129	4569920				51.9	0.0	307.9	######		419
1044		NMMA-9-2-6	8:34	95	3308221				38.5	0.0	226.8	######		419
1045		NMMA-9-2-7	8:45	745	24461856				263.0	0.0	1778.3	######		419
1046		NMMA-9-2-8	8:57	790	25658512				275.7	0.0	1885.7	######		419
1047		NMMA-9-2-9	9:09	259	9079418				99.8	0.0	618.2	######		419
1048		NMMA-9-2-10	9:20	157	5377642				60.5	0.0	374.8	######		419
1049		NMMA-9-2-11	9:32	105	3892938				44.7	0.0	250.6	######		419
1050		NMMA-9-2-12	9:44	116	3902208				44.8	0.0	276.9	######		419
1051		NMMA-9-2-13	9:59	540	17776080				192.0	0.0	1289.0	######		419
1052		NMMA-9-2-14	10:07	750	27690432				297.2	0.0	1790.3	######	Not vented, late	419
1053		NMMA-9-2-15	10:21	240	8271664				91.2	0.0	572.9	######		419
1054		NMMA-9-2-16	10:33	161	5583706				62.7	0.0	384.3	######		419

Gas Chromatography Runs for NMMA

Run No.	Concentration (ppmv)	Compound	Time	THC	Area Counts Styrene	Area Counts MMA	Response Factors Styrene	Response Factors MMA	Calculated Conc Styrene	Calculated Conc MMA	Equiv THC	Ratio Sty:MMA		
1055		NMMA-9-2-17	10:44	105	3983896				45.7	0.0	250.6	######		419
1056		NMMA-9-2-18	10:55	500	16651976				180.1	0.0	1193.5	######		419
1057		NMMA-9-2-19	11:07	678	23305888				250.7	0.0	1618.4	######		419
1058		NMMA-9-2-20	11:18	300	10110896				110.7	0.0	716.1	######		419
1059		NMMA-9-2-21	11:30	166	5610685				63.0	0.0	396.2	######		419
1060		NMMA-9-2-22	11:41	141	5072877				57.3	0.0	336.6	######		419
1061		NMMA-9-2-23	11:53	88	3295432				38.4	0.0	210.1	######		419
1062		NMMA-9-2-24	12:07	52	1826305				22.8	0.0	124.1	######		419
1063		NMMA-9-2-25	12:18	33	1147214				15.6	0.0	78.8	######		419
1064		NMMA-9-2-26	12:32	26	865464				12.6	0.0	62.1	######		419
1065		NMMA-9-2-27	12:45	20	697320				10.8	0.0	47.7	######		419
1066		NMMA-9-2-28	12:57	17	602814				9.8	0.0	40.6	######		419
1067		NMMA-9-2-29	13:09	14	514712				8.9	0.0	33.4	######		419
1068		NMMA-9-2-30	13:24	12	430509				8.0	0.0	28.6	######		419
1069		NMMA-9-2-31	13:40	10	354940				7.2	0.0	23.9	######		419
1070	204	Styrene			18327536		1.11E-05						Post Test QC	419
1071	204	Styrene			18467392		1.1E-05						Post Test QC	419
1072	122	Styrene			11046080		1.1E-05						Post Test QC	419
1073	122	Styrene			10864040		1.12E-05						Post Test QC	419
1074	122	Styrene			11025512		1.11E-05						Post Test QC	419
1075	59.2	Styrene			5985747		9.89E-06						Post Test QC	419
1076	59.2	Styrene			5700285		1.04E-05						Post Test QC	419
1077	59.2	Styrene			5780963		1.02E-05						Post Test QC	419
1078	139.6	MMA				6148867		2.27E-05						419
1079	139.6	MMA				6176253		2.26E-05						419

Appendix C.5

Emission Calculations

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-6-P		18 Deck Gel	
File:	040297.PRN			
Calibration:	0402A.CAL			
Date:	4/2/97			
Persons:	Stelling, Doerle			
			668.2	lb start
Amount of Resin Used:	21.2 lb		647.0	lb finish
Content of Styrene:	0.30786			
Content of MMA:	0.04987			
Temperature (F)	71.2			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3017		3017	
Average THC concentration (ppmv)	77.9			
Molar volume (scf/lb mol)	387.6		11:11	Time start
Duration of test (min)	136	2:16	13:27	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	3.66			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	6.53	1.06	7.58		6.53	1.06	7.58
Emissions	2.79	0.78	3.56	3.66	3.11	0.92	4.10
Fraction	42.7%	73.3%	47.0%	48.3%	47.7%	87.2%	54.1%
Difference between approaches—>				2.67%			13.11%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
11:20	9	31.2	67.1	384.6	0.002205	2.97	0.071	0.023	0.095	2.7%
11:35	15	176.4	69.5	386.4	0.020663	2.97	0.670	0.217	0.887	24.9%
11:43	8	228.5	70.4	387.0	0.01425	2.96	0.462	0.150	0.611	17.2%
11:53	10	173.8	70.6	387.2	0.013543	3.39	0.453	0.129	0.582	16.3%
11:59	6	111.3	70.6	387.2	0.005201	4.06	0.181	0.043	0.224	6.3%
12:05	6	92.0	70.5	387.1	0.004301	4.52	0.153	0.032	0.185	5.2%
12:15	10	76.6	70.6	387.2	0.00597	4.20	0.209	0.048	0.257	7.2%
12:30	15	57.8	71.5	387.8	0.00675	6.34	0.253	0.038	0.291	8.2%
12:46	16	37.9	71.7	388.0	0.00471	1.85	0.133	0.069	0.201	5.7%
12:55	9	25.3	72.4	388.5	0.001771	7.51	0.068	0.009	0.076	2.1%
13:05	10	21.1	73.3	389.2	0.001636	7.51	0.063	0.008	0.071	2.0%
13:27	22	11.4	73.4	389.3	0.001951	7.51	0.075	0.010	0.084	2.4%
	136									
				Emissions			2.787	0.775	3.563	
				Available			6.53	1.06	7.58	
				Percent of Available			42.7%	73.3%	47.0%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
166	83	0	0.0117	0.380	0.128	0.516
205	104	35	0.0240	0.778	0.262	1.056
228.5	115	39	0.0143	0.462	0.156	0.627
173.8	47	14	0.0135	0.453	0.134	0.596
111.3	46	11	0.0052	0.181	0.045	0.229
85	33	7	0.0040	0.141	0.031	0.175
69	30	7	0.0054	0.188	0.045	0.237
53	22	4	0.0062	0.231	0.036	0.272
32	18	10	0.0040	0.112	0.060	0.175
23	12	2	0.0016	0.061	0.008	0.071
18	9	0	0.0014	0.053	0.007	0.061
11.4			0.0020	0.075	0.010	0.086
Emissions				3.115	0.922	4.100
Available				6.53	1.06	7.58
Percent of Available				47.7%	87.2%	54.1%

National Marine Manufacturers Association
Baseline Emission Testing

US Marine
Arlington, WA

	<u>NMMA-8-1</u>	28 Hull Gel
File:	040397.PRN	
Calibration:	0403A.CAL	
Date:	4/3/97	
Persons:	Stelling, Doerle	
Amount of Gelcoat Used:	69.6 lb	
Content of Styrene:	0.32	
Content of MMA:	0.05	
Temperature (F)	73.4	
MW Styrene	104	
MW MMA	100.1	
Flow rate (acfm)	2884.54	
Average THC concentration (ppmv)	262.3	
Molar volume (scf/lb mol)	389.3	
Duration of test (min)	165	
Response factor (C3 to Styrene)	0.416	
Emissions (lb as styrene)	13.89	
Emissions (g as styrene)	6300	

	Styrene	MMA	Total	Propane
Input	22.27	3.48	25.75	
Emissions	11.18	2.63	13.81	14.1
Fraction	50.2%	75.5%	53.6%	54.8%
Difference between approaches--->				2.2%

National Marine Manufacturers Association
Baseline Emission Testing

US Marine
Arlington, WA

NMMA-8-1 28 Hull Gel

Time	Duration (min)	Av THC o (ppm)	Styrene (ppm)	MMA (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Elapsed Time (min)
10:32	1	13.1	98.3	37.6	64.6	382.8	9.89E-05	2.62	0.003	0.001	0.004	1
10:40	8	411.1	239.5	77.7	71.0	387.5	0.024478	3.08	0.800	0.250	1.051	9
10:46	6	710.3	218.1	67.1	73.3	389.2	0.031587	3.25	1.046	0.310	1.356	15
10:52	6	610.1	144.1	42.9	73.6	389.4	0.027114	3.36	0.905	0.259	1.164	21
10:57	5	690.6	277.5	73.8	73.6	389.4	0.025579	3.76	0.875	0.224	1.099	26
11:04	7	871.8	370.2	94.6	73.5	389.3	0.04521	3.91	1.560	0.384	1.943	33
11:13	9	664.6	194.2	44.4	73.8	389.5	0.044294	4.38	1.562	0.343	1.905	42
11:19	6	483.2	170.9	33.9	74.9	390.4	0.021422	5.04	0.774	0.148	0.922	48
11:25	6	448.0	182.8	30.7	76.3	391.4	0.019813	5.95	0.735	0.119	0.854	54
11:32	7	369.0	164.3	26.2	77.1	392.0	0.019006	6.28	0.710	0.109	0.819	61
11:38	6	316.8	132.5	18.7	77.7	392.4	0.013973	7.07	0.530	0.072	0.602	67
11:44	6	259.7	114.1	16.2	78.2	392.8	0.011442	7.06	0.434	0.059	0.493	73
11:51	7	210.0	72.4	11.9	78.6	393.1	0.010786	6.08	0.401	0.064	0.465	80
12:00	9	130.7	47.9	8.1	77.6	392.3	0.008647	5.94	0.321	0.052	0.373	89
12:06	6	85.9	34.5	6.8	75.5	390.8	0.003803	5.08	0.138	0.026	0.164	95
12:14	8	67.6	24.6	8.2	74.1	389.7	0.004001	2.99	0.130	0.042	0.172	103
12:21	7	49.7	19.9	11.3	73.0	388.9	0.002582	1.76	0.071	0.039	0.110	110
12:28	7	38.2	14.4	9.0	72.5	388.6	0.001985	1.61	0.053	0.032	0.085	117
12:35	7	28.2	10.5	6.4	72.1	388.3	0.001467	1.63	0.039	0.023	0.063	124
12:41	6	28.0	10.6	5.0	71.7	388.0	0.001251	2.11	0.037	0.017	0.054	130
12:50	9	16.5	6.6	4.8	70.7	387.3	0.001105	1.38	0.028	0.019	0.047	139
12:58	8	10.9	2.7	4.6	69.9	386.7	0.000649	0.59	0.010	0.017	0.027	147
13:04	6	7.3	2.5	7.5	69.1	386.1	0.000329	1.35	0.008	0.006	0.014	153
13:10	6	5.7	1.7	4.6	68.8	385.9	0.000257	0.37	0.003	0.008	0.011	159
13:16	6	4.7			67.8	385.2	0.000211	0.48	0.003	0.006	0.009	165
					Total mass emitted				11.177	2.628	13.806	
					Total mass input				22.27	3.48	25.75	
					Percentage emissions of input				50.2%	75.5%	53.6%	

STELLING ENGINEERING, P.A.
Air-Tech Environmental LLC

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-4-1	
File:	040397.PRN	
Calibration:	0403A.CAL	
Date:	4/3/97	
Persons:	Stelling, Doerle	
Amount of Resin Used:	136 lb	
Content of Styrene:	0.351	
Content of MMA:	0	
Temperature (F)	76.3	
MW Styrene	104	
MW MMA	100.1	
Flow rate (acfm)	2884	
Average THC concentration (ppmv)	145.3	
Molar volume (scf/lb mol)	391.4	
Duration of test (min)	123	2:03:00
Response factor (C3 to Styrene)	0.416	
Emissions (lb as styrene)	5.70	
Emissions (g as styrene)	2587	

	Styrene	MMA	Total	Propane
Input	47.74	0.00	47.74	
Emissions	5.70		5.70	5.79
Fraction	11.9%	#DIV/0!	11.9%	12.1%
Difference between approaches--->				1.56%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
14:58	3	45.6	73.8	389.6	0.0010	#######	0.044	0.000	0.044	
15:03	5	157.8	74.8	390.3	0.0058	#######	0.253	0.000	0.253	
15:10	7	218.4	76.5	391.5	0.0113	#######	0.488	0.000	0.488	
15:16	6	177.7	76.6	391.6	0.0079	#######	0.340	0.000	0.340	
15:23	7	127.0	76.7	391.7	0.0065	#######	0.284	0.000	0.284	
15:29	6	224.5	77.5	392.2	0.0099	#######	0.429	0.000	0.429	
15:34	5	288.2	78.0	392.7	0.0106	#######	0.458	0.000	0.458	
15:41	7	255.8	78.6	393.1	0.0131	#######	0.569	0.000	0.569	
15:47	6	301.1	78.4	392.9	0.0133	#######	0.574	0.000	0.574	
15:53	6	302.8	77.9	392.6	0.0133	#######	0.578	0.000	0.578	
16:01	8	194.7	77.2	392.1	0.0115	#######	0.496	0.000	0.496	
16:07	6	136.1	76.7	391.7	0.0060	#######	0.260	0.000	0.260	
16:13	6	109.0	76.5	391.5	0.0048	#######	0.209	0.000	0.209	
16:18	5	110.8	76.5	391.5	0.0041	#######	0.177	0.000	0.177	
16:24	6	79.6	76.4	391.4	0.0035	#######	0.152	0.000	0.152	
16:29	5	59.5	76.4	391.5	0.0022	#######	0.095	0.000	0.095	
16:37	8	34.4	76.1	391.2	0.0020	#######	0.088	0.000	0.088	
16:43	6	15.2	75.2	390.6	0.0007	#######	0.029	0.000	0.029	
16:48	5	8.5	74.5	390.1	0.0003	#######	0.014	0.000	0.014	
16:56	8	4.2	73.3	389.2	0.0002	#######	0.011	0.000	0.011	
17:02	2	2.5	72.4	388.5	0.0000	#######	0.002	0.000	0.002	
0:00	0	0.0	0.0	335.6	0.0000	#######	0.000	0.000	0.000	
				Emissions			5.549	0.000	5.549	
				Available			47.74	0.00	47.74	
				Percent of Available			11.6%	#DIV/0!	11.6%	

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-7-1	28 Hull 35R	
File:	040497.PRN		
Calibration:	0404A.CAL		
Date:	4/4/97		
Persons:	Stelling, Doerle		
		______	lb start
Amount of Resin Used:	359.0 lb	______	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	66.7		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	2588	2708	cfm
Average THC concentration (ppmv)	180.9		
Molar volume (scf/lb mol)	384.3	9:20	Time start
Duration of test (min)	375	6:15 15:35	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	19.80		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	126.02	0.00	126.02		126.02	0.00	126.02
Emissions	19.74	0.00	19.74	19.80	22.63	0.00	22.98
Fraction	15.7%	#DIV/0!	15.7%	15.7%	18.0%	#DIV/0!	18.2%
Difference between approaches--->				0.26%			14.10%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions	Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
9:20	1	30.8	61.6	380.6	0.00021	#######	0.009	0.000	0.009	0.0%	104	48	0	0.0007	0.032	0.000	0.033
9:26	6	258.8	62.0	380.9	0.010551	#######	0.457	0.000	0.457	2.3%	312	179	0	0.0133	0.576	0.000	0.585
9:33	7	261.6	62.5	381.3	0.012432	#######	0.539	0.000	0.539	2.7%	300	171	0	0.0149	0.646	0.000	0.656
9:43	10	371.2	63.2	381.8	0.025165	#######	1.090	0.000	1.090	5.5%	392	233	0	0.0278	1.204	0.000	1.223
9:49	6	281.9	62.7	381.4	0.011477	#######	0.497	0.000	0.497	2.5%	200	97	0	0.0085	0.369	0.000	0.375
9:55	6	171.2	61.6	380.6	0.006986	#######	0.303	0.000	0.303	1.5%	101	51	0	0.0043	0.187	0.000	0.190
10:01	6	126.6	62.0	381.0	0.005162	#######	0.224	0.000	0.224	1.1%	230	147	0	0.0098	0.425	0.000	0.432
10:07	6	385.8	63.2	381.8	0.015693	#######	0.680	0.000	0.680	3.4%	310	164	0	0.0132	0.571	0.000	0.580
10:13	6	427.6	63.5	382.0	0.017384	#######	0.753	0.000	0.753	3.8%	335	182	0	0.0142	0.617	0.000	0.627
10:20	7	287.0	63.3	381.9	0.013614	#######	0.590	0.000	0.590	3.0%	320	180	0	0.0159	0.688	0.000	0.699
10:26	6	397.5	63.7	382.2	0.016151	#######	0.700	0.000	0.700	3.5%	421	239	0	0.0179	0.775	0.000	0.787
10:32	6	359.2	64.1	382.4	0.014589	#######	0.632	0.000	0.632	3.2%	310	176	0	0.0132	0.570	0.000	0.579
10:38	6	245.6	63.4	381.9	0.009985	#######	0.432	0.000	0.432	2.2%	230	173	0	0.0098	0.424	0.000	0.430
10:45	7	184.4	64.4	382.7	0.008732	#######	0.378	0.000	0.378	1.9%	160	79	0	0.0079	0.343	0.000	0.349
10:56	11	128.1	65.4	383.4	0.009517	#######	0.412	0.000	0.412	2.1%	107	65	0	0.0083	0.360	0.000	0.366
11:07	11	95.9	65.8	383.7	0.007114	#######	0.308	0.000	0.308	1.6%	83	36	0	0.0064	0.279	0.000	0.283
11:22	15	77.6	67.0	384.5	0.00783	#######	0.339	0.000	0.339	1.7%	60	18	0	0.0063	0.274	0.000	0.279
12:32	70	23.5	68.6	385.8	0.011056	#######	0.479	0.000	0.479	2.4%	177	83	0	0.0870	3.766	0.000	3.826
12:38	6	218.2	69.4	386.3	0.008773	#######	0.380	0.000	0.380	1.9%	220	110	0	0.0093	0.401	0.000	0.407
12:44	6	421.1	68.9	386.0	0.016945	#######	0.734	0.000	0.734	3.7%	470	242	0	0.0198	0.857	0.000	0.870
12:51	7	423.4	68.5	385.7	0.019889	#######	0.862	0.000	0.862	4.4%	360	187	0	0.0177	0.766	0.000	0.778
12:58	7	349.5	68.6	385.8	0.016413	#######	0.711	0.000	0.711	3.6%	460	232	0	0.0226	0.979	0.000	0.994
13:05	7	443.7	68.8	385.9	0.020832	#######	0.902	0.000	0.902	4.6%	380	179	0	0.0187	0.808	0.000	0.821
13:11	6	272.8	68.7	385.9	0.010978	#######	0.476	0.000	0.476	2.4%	235	131	0	0.0099	0.429	0.000	0.435
13:16	5	190.4	68.5	385.7	0.006387	#######	0.277	0.000	0.277	1.4%	166	85	0	0.0058	0.252	0.000	0.256
13:24	8	148.4	68.5	385.7	0.00797	#######	0.345	0.000	0.345	1.7%	138	44	0	0.0078	0.336	0.000	0.341
13:32	6	118.8	68.1	385.4	0.004786	#######	0.207	0.000	0.207	1.1%	102	49	0	0.0043	0.186	0.000	0.189
13:42	10	88.0	67.6	385.0	0.005915	#######	0.256	0.000	0.256	1.3%	68	23	0	0.0048	0.207	0.000	0.210
13:53	11	321.8	68.1	385.4	0.023774	#######	1.030	0.000	1.030	5.2%	315	273	0	0.0243	1.054	0.000	1.071
14:00	7	558.8	68.1	385.4	0.026269	#######	1.138	0.000	1.138	5.8%	422	244	0	0.0208	0.899	0.000	0.913
14:06	6	408.3	68.3	385.6	0.016444	#######	0.712	0.000	0.712	3.6%	349	180	0	0.0147	0.637	0.000	0.647
14:12	6	477.8	68.1	385.4	0.019257	#######	0.834	0.000	0.834	4.2%	520	240	0	0.0219	0.949	0.000	0.964
14:18	6	346.0	68.0	385.3	0.013946	#######	0.604	0.000	0.604	3.1%	277	141	0	0.0117	0.506	0.000	0.514
14:26	8	191.3	67.9	385.2	0.010286	#######	0.446	0.000	0.446	2.3%	148	61	0	0.0083	0.360	0.000	0.366
14:35	9	123.9	67.3	384.8	0.007499	#######	0.325	0.000	0.325	1.6%	110	44	0	0.0070	0.302	0.000	0.306
14:46	11	95.3	66.8	384.5	0.007055	#######	0.306	0.000	0.306	1.5%	76	36	0	0.0059	0.255	0.000	0.259
14:55	9	63.3	66.6	384.3	0.003837	#######	0.166	0.000	0.166	0.8%	57	18	0	0.0036	0.157	0.000	0.159
15:05	10	35.6	66.8	384.5	0.002397	#######	0.104	0.000	0.104	0.5%	26	0	0	0.0018	0.079	0.000	0.081
15:11	6	21.4	66.8	384.4	0.000866	#######	0.037	0.000	0.037	0.2%	18	-6	0	0.0008	0.033	0.000	0.033
15:22	11	12.6	66.5	384.2	0.00093	#######	0.040	0.000	0.040	0.2%	11	-9	0	0.0009	0.037	0.000	0.038
15:34	12	7.8	66.3	384.1	0.000634	#######	0.027	0.000	0.027	0.1%	7.8	-12	0	0.0007	0.029	0.000	0.029
15:35	2	5.9	66.2	384.0	7.9E-05	#######	0.003	0.000	0.003	0.0%							

375

Emissions	19.744	0.000	19.744	
Available	126.02	0.00	126.02	
Percent of Available	15.7%	#DIV/0!	15.7%	

Emissions		22.625	0.000	22.983
Available		126.02	0.00	126.02
Percent of Available		18.0%	#DIV/0!	18.2%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-3-1	
File:	040497.PRN	
Calibration:	0404A.CAL	
Date:	4/4/97	
Persons:	Stelling, Doerle	
Amount of Resin Used:	27.5 lb	
Content of Styrene:	0.32	
Content of MMA:	0.05	
Temperature (F)	66.7	
MW Styrene	104	
MW MMA	100.1	
Flow rate (acfm)	2664	
Average THC concentration (ppmv)	125.7	
Molar volume (scf/lb mol)	384.4	
Duration of test (min)	115	1:55:00
Response factor (C3 to Styrene)	0.416	

	Styrene	MMA	Total	Propane
Input	8.80	1.38	10.18	
Emissions	3.51	0.82	4.34	4.45
Fraction	39.9%	59.7%	42.6%	43.8%
Difference between approaches--->				2.64%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
16:11	2	59.8	61.6	380.6	0.000836	2.27	0.025	0.011	0.036	0.8%
16:17	6	304.1	62.9	381.6	0.012741	2.53	0.395	0.151	0.546	12.6%
16:23	6	390.7	64.2	382.6	0.016322	2.75	0.518	0.181	0.700	16.1%
16:30	7	320.3	65.3	383.3	0.015581	2.83	0.499	0.169	0.668	15.4%
16:40	10	197.4	66.3	384.1	0.013691	3.84	0.470	0.118	0.588	13.6%
16:47	7	162.4	66.8	384.4	0.007878	4.84	0.283	0.056	0.339	7.8%
16:53	6	155.9	67.0	384.6	0.006479	6.00	0.241	0.039	0.279	6.4%
17:01	8	127.7	67.5	384.9	0.007071	8.16	0.273	0.032	0.305	7.0%
17:07	6	111.9	67.5	384.9	0.004645	8.29	0.180	0.021	0.200	4.6%
17:13	6	94.6	67.7	385.1	0.003928	7.03	0.149	0.020	0.169	3.9%
17:19	6	76.6	67.8	385.2	0.00318	20.09	0.131	0.006	0.138	3.2%
17:28	9	57.4	67.9	385.2	0.003572	20.09	0.147	0.007	0.154	3.6%
17:38	10	36.8	67.7	385.1	0.002546	20.09	0.105	0.005	0.110	2.5%
17:43	5	22.9	67.7	385.1	0.000792	20.09	0.033	0.002	0.034	0.8%
17:49	6	16.4	67.7	385.1	0.000681	20.09	0.028	0.001	0.029	0.7%
17:56	7	10.5	67.8	385.2	0.00051	20.09	0.021	0.001	0.022	0.5%
18:04	8	7.2	67.0	384.6	0.0004	20.09	0.017	0.001	0.017	0.4%
				Emissions			3.515	0.822	4.336	
				Available			8.80	1.38	10.18	
				Percent of Available			39.9%	59.7%	42.6%	

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-8-2		
File:	040497.PRN		
Calibration:	0404A.CAL		
Date:	4/4/97		
Persons:	Stelling, Doerle		
Amount of Resin Used:	61.8 lb		61.5
Content of Styrene:	0.32		
Content of MMA:	0.05		
Temperature (F)	66.3		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	2923		2916 cfm
Average THC concentration (ppmv)	228.6		
Molar volume (scf/lb mol)	384.0		
Duration of test (min)	161	2:41:02	
Response factor (C3 to Styrene)	0.416		

	Styrene	MMA	Total	Propane
Input	19.78	3.09	22.87	
Emissions	9.65	2.43	12.09	12.27
Fraction	48.8%	78.8%	52.9%	53.7%
Difference between approaches--->				1.51%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
8:47	9	28.7	63.3	381.9	0.001975	2.09	0.058	0.027	0.085	0.7%
8:53	6	303.8	63.6	382.1	0.013945	2.21	0.416	0.181	0.597	4.9%
8:58	5	458.4	63.6	382.1	0.017534	2.34	0.532	0.219	0.751	6.2%
9:04	6	450.1	63.3	381.9	0.020671	2.49	0.639	0.247	0.886	7.3%
9:09	5	491.5	64.1	382.5	0.01878	2.73	0.595	0.210	0.805	6.7%
9:14	5	624.0	64.2	382.5	0.023841	2.92	0.769	0.254	1.023	8.5%
9:21	7	775.7	64.3	382.6	0.041476	3.09	1.357	0.423	1.780	14.7%
9:27	6	519.9	64.6	382.8	0.023818	3.60	0.807	0.216	1.023	8.5%
9:34	7	422.8	65.1	383.2	0.022578	4.41	0.797	0.174	0.971	8.0%
9:42	8	357.8	65.8	383.7	0.021809	5.37	0.796	0.143	0.939	7.8%
9:51	9	286.9	66.1	383.9	0.019658	7.11	0.747	0.101	0.848	7.0%
10:00	9	224.8	66.5	384.2	0.015387	7.49	0.588	0.076	0.664	5.5%
10:08	8	174.9	66.9	384.5	0.010633	9.90	0.418	0.041	0.459	3.8%
10:15	7	129.9	66.9	384.5	0.006912	8.02	0.266	0.032	0.298	2.5%
10:22	8	103.1	67.2	384.7	0.006265	12.13	0.251	0.020	0.271	2.2%
10:27	5	81.5	67.6	385.0	0.003093	5.28	0.113	0.021	0.133	1.1%
10:33	6	66.8	67.7	385.1	0.003044	4.78	0.109	0.022	0.131	1.1%
10:42	9	52.5	67.9	385.2	0.003585	5.62	0.132	0.023	0.154	1.3%
10:52	10	37.6	68.3	385.5	0.002852	30.20	0.120	0.004	0.123	1.0%
11:01	9	24.1	68.7	385.8	0.001641	28.21	0.069	0.002	0.071	0.6%
11:08	7	16.4	68.9	386.0	0.000868	74.73	0.037	0.000	0.038	0.3%
11:18	10	11.5	69.3	386.3	0.000868	74.73	0.037	0.000	0.038	0.3%
				Emissions			9.652	2.435	12.087	
				Available			19.78	3.09	22.87	
				Percent of Available			48.8%	78.8%	52.9%	

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-1-1		
File:	040597.PRN		
Calibration:	0405A.CAL		
Date:	4/5/97		
Persons:	Stelling, Doerle		
Amount of Resin Used:	152.7 lb		152.8
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	67.7		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	2950		2948 cfm
Average THC concentration (ppmv)	143.4		
Molar volume (scf/lb mol)	385.1		
Duration of test (min)	172	2:52:00	
Response factor (C3 to Styrene)	0.416		

	Styrene	MMA	Total	Propane
Input	53.60	0.00	53.60	
Emissions	8.20	0.00	8.20	8.32
Fraction	15.3%	#DIV/0!	15.3%	15.5%
Difference between approaches--->				1.36%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
12:10	3	98.5	67.2	384.7	0.002266	#######	0.098	0.000	0.098	1.2%
12:20	10	218.8	67.1	384.7	0.01678	#######	0.727	0.000	0.727	8.9%
12:27	7	144.1	67.5	385.0	0.007727	#######	0.335	0.000	0.335	4.1%
12:32	5	384.3	67.4	384.9	0.014725	#######	0.638	0.000	0.638	7.8%
12:41	9	236.0	67.4	384.9	0.016281	#######	0.705	0.000	0.705	8.6%
12:47	6	141.0	67.5	384.9	0.006481	#######	0.281	0.000	0.281	3.4%
12:54	7	107.7	67.6	385.0	0.005776	#######	0.250	0.000	0.250	3.1%
13:01	7	94.8	67.6	385.0	0.005086	#######	0.220	0.000	0.220	2.7%
13:09	8	236.3	67.6	385.0	0.014485	#######	0.627	0.000	0.627	7.6%
13:17	8	256.7	67.7	385.1	0.015731	#######	0.681	0.000	0.681	8.3%
13:23	6	220.3	67.8	385.2	0.01012	#######	0.438	0.000	0.438	5.3%
13:32	9	128.6	67.5	385.0	0.008869	#######	0.384	0.000	0.384	4.7%
13:39	7	83.1	67.8	385.1	0.004453	#######	0.193	0.000	0.193	2.4%
13:48	9	75.0	67.7	385.1	0.005171	#######	0.224	0.000	0.224	2.7%
13:56	8	235.6	67.8	385.2	0.014436	#######	0.625	0.000	0.625	7.6%
14:01	5	255.1	67.9	385.2	0.009769	#######	0.423	0.000	0.423	5.2%
14:17	16	167.6	67.8	385.1	0.020538	#######	0.890	0.000	0.890	10.8%
14:23	6	78.4	68.0	385.3	0.003603	#######	0.156	0.000	0.156	1.9%
14:32	9	49.9	68.0	385.3	0.003441	#######	0.149	0.000	0.149	1.8%
14:39	7	29.9	68.0	385.3	0.001601	#######	0.069	0.000	0.069	0.8%
14:46	7	18.4	68.0	385.3	0.000988	#######	0.043	0.000	0.043	0.5%
14:53	7	12.0	68.0	385.3	0.000642	#######	0.028	0.000	0.028	0.3%
14:59	6	8.6	68.1	385.4	0.000396	#######	0.017	0.000	0.017	0.2%
	172									
				Emissions			8.202	0.000	8.202	
				Available			53.60	0.00	53.60	
				Percent of Available			15.3%	#DIV/0!	15.3%	

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-7-2	28 Hull 35R	
File:	040797.PRN		
Calibration:	0407A.CAL		
Date:	4/7/97		
Persons:	Doerle		
		550.1	lb start
Amount of Resin Used:	349.6 lb	200.5	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	67.4		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3187	3118 acfm	
Average THC concentration (ppmv)	208.2		
Molar volume (scf/lb mol)	384.9	9:34	Time start
Duration of test (min)	305	5:05 14:39	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	23.08		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	122.71	0.00	122.71		122.71	0.00	122.71
Emissions	23.11	0.00	23.11	23.08	22.56	0.00	22.56
Fraction	18.8%	#DIV/0!	18.8%	18.8%	18.4%	0.0%	18.4%
Difference between approaches--->				-0.12%			-2.42%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions	Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
9:40	6	58.0	63.3	381.9	0.002906	#######	0.126	0.000	0.126	0.5%	320	149	0	0.0160	0.694	0.000	0.705
9:45	5	318.3	63.8	382.2	0.013273	#######	0.575	0.000	0.575	2.5%	300	146	0	0.0125	0.542	0.000	0.550
9:51	6	379.1	64.0	382.4	0.018958	#######	0.821	0.000	0.821	3.6%	490	185	0	0.0245	1.061	0.000	1.078
9:57	6	393.8	64.1	382.4	0.019694	#######	0.853	0.000	0.853	3.7%	491	254	0	0.0246	1.064	0.000	1.080
10:05	8	306.9	64.2	382.5	0.020454	#######	0.886	0.000	0.886	3.8%	165	96	0	0.0110	0.476	0.000	0.484
10:12	7	272.7	64.4	382.6	0.015903	#######	0.689	0.000	0.689	3.0%	160	91	0	0.0093	0.404	0.000	0.411
10:19	7	142.3	65.2	383.3	0.008286	#######	0.359	0.000	0.359	1.6%	140	59	0	0.0082	0.353	0.000	0.359
10:24	5	379.6	64.9	383.0	0.015796	#######	0.684	0.000	0.684	3.0%	510	113	0	0.0212	0.919	0.000	0.934
10:30	6	499.0	64.9	383.1	0.024913	#######	1.079	0.000	1.079	4.7%	464	183	0	0.0232	1.003	0.000	1.019
10:36	6	428.1	65.1	383.2	0.021365	#######	0.925	0.000	0.925	4.0%	530	230	0	0.0265	1.146	0.000	1.164
10:42	6	467.7	65.1	383.2	0.023341	#######	1.011	0.000	1.011	4.4%	308	124	0	0.0154	0.666	0.000	0.676
10:48	6	228.9	65.6	383.6	0.011413	#######	0.494	0.000	0.494	2.1%	183	80	0	0.0091	0.395	0.000	0.401
10:54	6	161.6	65.9	383.7	0.008054	#######	0.349	0.000	0.349	1.5%	150	71	0	0.0075	0.324	0.000	0.329
11:02	8	131.7	66.1	383.9	0.008748	#######	0.379	0.000	0.379	1.6%	115	52	0	0.0076	0.331	0.000	0.336
11:11	9	96.7	66.3	384.1	0.007223	#######	0.313	0.000	0.313	1.4%	93	41	0	0.0069	0.301	0.000	0.306
11:17	6	88.1	66.7	384.4	0.004384	#######	0.190	0.000	0.190	0.8%	80	45	0	0.0040	0.172	0.000	0.175
11:24	7	80.3	66.9	384.5	0.004659	#######	0.202	0.000	0.202	0.9%	75	38	0	0.0044	0.189	0.000	0.191
11:30	6	63.3	67.0	384.6	0.003147	#######	0.136	0.000	0.136	0.6%	71	31	0	0.0035	0.153	0.000	0.155
11:47	17	38.7	67.5	384.9	0.005454	#######	0.236	0.000	0.236	1.0%	30	13	0	0.0042	0.183	0.000	0.186
11:54	7	95.2	67.8	385.1	0.005517	#######	0.239	0.000	0.239	1.0%	240	102	0	0.0139	0.602	0.000	0.612
11:59	5	402.5	68.0	385.3	0.016649	#######	0.721	0.000	0.721	3.1%	464	202	0	0.0192	0.831	0.000	0.844
12:05	6	523.9	68.0	385.3	0.026002	#######	1.126	0.000	1.126	4.9%	548	267	0	0.0272	1.178	0.000	1.197
12:12	7	494.3	68.1	385.4	0.028615	#######	1.239	0.000	1.239	5.4%	600	330	0	0.0347	1.505	0.000	1.528
12:17	5	507.3	68.1	385.4	0.020978	#######	0.909	0.000	0.909	3.9%	390	175	0	0.0161	0.699	0.000	0.710
12:23	6	312.2	68.2	385.5	0.015488	#######	0.671	0.000	0.671	2.9%	233	79	0	0.0116	0.501	0.000	0.509
12:29	6	189.2	68.3	385.6	0.009385	#######	0.407	0.000	0.407	1.8%	181	69	0	0.0090	0.389	0.000	0.395
12:35	6	129.5	68.5	385.6	0.006422	#######	0.278	0.000	0.278	1.2%	128	56	0	0.0063	0.275	0.000	0.279
12:40	5	106.2	68.6	385.8	0.004386	#######	0.190	0.000	0.190	0.8%	104	46	0	0.0043	0.186	0.000	0.189
12:46	6	89.3	68.7	385.9	0.004425	#######	0.192	0.000	0.192	0.8%	89	40	0	0.0044	0.191	0.000	0.194
12:51	5	75.8	69.0	386.1	0.003128	#######	0.135	0.000	0.135	0.6%	63	32	0	0.0026	0.113	0.000	0.114
12:57	6	160.4	69.1	386.2	0.007945	#######	0.344	0.000	0.344	1.5%	330	152	0	0.0163	0.708	0.000	0.719
13:02	5	361.7	69.2	386.2	0.014928	#######	0.647	0.000	0.647	2.8%	255	113	0	0.0105	0.456	0.000	0.463
13:07	5	401.5	69.2	386.2	0.016569	#######	0.718	0.000	0.718	3.1%	380	223	0	0.0157	0.679	0.000	0.690
13:14	7	434.0	69.3	386.3	0.025069	#######	1.086	0.000	1.086	4.7%	466	204	0	0.0269	1.166	0.000	1.184
13:20	6	433.9	69.4	386.4	0.02148	#######	0.930	0.000	0.930	4.0%	470	225	0	0.0233	1.008	0.000	1.024
13:27	7	460.3	69.5	386.4	0.02658	#######	1.151	0.000	1.151	5.0%	310	138	0	0.0179	0.775	0.000	0.788
13:34	7	221.7	69.5	386.4	0.012797	#######	0.554	0.000	0.554	2.4%	160	74	0	0.0092	0.400	0.000	0.406
13:40	6	119.3	69.6	386.5	0.005904	#######	0.256	0.000	0.256	1.1%	107	45	0	0.0053	0.229	0.000	0.233
13:46	6	96.0	69.8	386.6	0.004751	#######	0.206	0.000	0.206	0.9%	101	50	0	0.0050	0.216	0.000	0.220
13:54	8	93.1	69.8	386.6	0.006141	#######	0.266	0.000	0.266	1.2%	96	57	0	0.0063	0.274	0.000	0.279
14:01	7	79.4	69.8	386.7	0.004581	#######	0.198	0.000	0.198	0.9%	76	32	0	0.0044	0.190	0.000	0.193
14:06	5	57.6	69.3	386.3	0.002378	#######	0.103	0.000	0.103	0.4%	57	25	0	0.0024	0.102	0.000	0.103

14:12	6	41.2	69.0	386.1	0.002039	#######	0.088	0.000	0.088	0.4%
14:21	9	23.7	68.9	386.0	0.00176	#######	0.076	0.000	0.076	0.3%
14:28	7	13.7	68.9	386.0	0.000795	#######	0.034	0.000	0.034	0.1%
14:35	7	9.8	68.9	386.0	0.000569	#######	0.025	0.000	0.025	0.1%
14:39	4	7.5	68.7	385.9	0.000249	#######	0.011	0.000	0.011	0.0%
	305	222.9								
				Emissions			23.109	0.000	23.109	
				Available			122.71	0.00	122.71	
				Percent of Available			18.8%	#DIV/0!	18.8%	

38	17	0	0.0019	0.082	0.000	0.083
20	7	0	0.0015	0.064	0.000	0.065
14	5	0	0.0008	0.035	0.000	0.036
11	4	0	0.0006	0.028	0.000	0.028
Emissions				22.564	0.000	22.920
Available				122.71	0.00	122.71
Percent of Available				18.4%	#DIV/0!	18.7%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-6-1	18 Deck Gel	
File:	040897.PRN		
Calibration:	0408A.CAL		
Date:	4/8/97		
Persons:	Doerle		
		244.1	lb start
Amount of Resin Used:	22.4 lb	221.7	lb finish
Content of Styrene:	0.32		
Content of MMA:	0.05		
Temperature (F)	68.1		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3350	3377	cfm
Average THC concentration (ppmv)	88.2		
Molar volume (scf/lb mol)	385.4	9:39	Time start
Duration of test (min)	105	1:45 11:24	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	3.56		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	7.18	1.12	8.30		7.18	1.12	8.30
Emissions	3.24	0.28	3.51	3.56	3.23	0.29	3.58
Fraction	45.1%	24.5%	42.3%	42.9%	44.9%	26.1%	43.1%
Difference between approaches--->				1.37%			1.74%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:40	1	7.0	65.9	383.7	6.09E-05	8.96	0.002	0.000	0.003	0.1%
9:45	5	62.1	66.5	384.2	0.002705	7.71	0.104	0.013	0.117	3.3%
9:50	5	167.4	66.7	384.4	0.007295	6.89	0.276	0.039	0.314	9.0%
9:57	7	221.6	66.8	384.4	0.01352	13.36	0.545	0.039	0.584	16.6%
10:02	5	261.2	66.9	384.5	0.011379	11.35	0.453	0.038	0.491	14.0%
10:08	6	261.6	67.0	384.6	0.013672	7.35	0.521	0.068	0.590	16.8%
10:13	5	164.5	67.2	384.7	0.007163	17.25	0.293	0.016	0.310	8.8%
10:19	6	113.5	67.5	384.9	0.005927	21.04	0.245	0.011	0.256	7.3%
10:24	5	92.2	67.8	385.1	0.00401	18.61	0.165	0.009	0.173	4.9%
10:30	6	79.5	68.4	385.6	0.004144	21.09	0.171	0.008	0.179	5.1%
10:37	7	54.2	68.8	385.9	0.003292	11.98	0.132	0.011	0.142	4.0%
10:44	7	39.2	69.2	386.2	0.002378	17.10	0.097	0.005	0.103	2.9%
10:50	6	30.8	69.5	386.4	0.001605	19.57	0.066	0.003	0.069	2.0%
10:56	6	23.4	69.4	386.3	0.001219	13.61	0.049	0.003	0.053	1.5%
11:03	7	19.4	68.7	385.9	0.001176	17.97	0.048	0.003	0.051	1.4%
11:09	6	15.1	68.8	385.9	0.000785	8.66	0.030	0.003	0.034	1.0%
11:15	6	10.8	68.8	385.9	0.000565	8.05	0.022	0.003	0.024	0.7%
11:23	8	6.2	68.6	385.7	0.000432	7.21	0.016	0.002	0.019	0.5%
11:24	1	2.8	68.6	385.7	2.43E-05	7.21	0.001	0.000	0.001	0.0%
	105									
				Emissions			3.238	0.275	3.513	
				Available			7.18	1.12	8.30	
				Percent of Available			45.1%	24.5%	42.3%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
51	109	12	0.0004	0.017	0.002	0.020
94	185	24	0.0041	0.158	0.021	0.182
239	317	46	0.0105	0.397	0.058	0.462
190	363	27	0.0117	0.471	0.035	0.514
265	382	34	0.0116	0.463	0.041	0.512
176	323	44	0.0093	0.354	0.048	0.408
130	361	21	0.0057	0.234	0.014	0.251
89	296	14	0.0047	0.194	0.009	0.206
89	245	13	0.0039	0.160	0.009	0.172
79	235	11	0.0042	0.172	0.008	0.183
54	137	11	0.0033	0.132	0.011	0.146
45	124	7	0.0028	0.113	0.007	0.121
36	120	6	0.0019	0.078	0.004	0.083
31	80	6	0.0016	0.066	0.005	0.072
28	64	4	0.0017	0.070	0.004	0.075
24	44	5	0.0013	0.049	0.006	0.055
21	44	5	0.0011	0.042	0.005	0.049
20	38	5	0.0014	0.053	0.007	0.062
10			0.0001	0.003	0.000	0.004
Emissions				3.227	0.293	3.575
Available				7.18	1.12	8.30
Percent of Available				44.9%	26.1%	43.1%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-3-2		18 Hull Gel	
File:	040897.PRN			
Calibration:	0408A.CAL			
Date:	4/8/97			
Persons:	Doerle			
			311.3	lb start
Amount of Resin Used:	23.9 lb		287.4	lb finish
Content of Styrene:	0.32			
Content of MMA:	0.05			
Temperature (F)	64.9			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3180		3189	cfm
Average THC concentration (ppmv)	118.2			
Molar volume (scf/lb mol)	383.1		12:01	Time start
Duration of test (min)	113	1:53	13:54	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	4.98			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	7.66	1.20	8.85		7.66	1.20	8.85
Emissions	3.82	0.98	4.80	4.98	3.67	0.99	4.74
Fraction	49.9%	82.0%	54.2%	56.2%	47.9%	83.1%	53.5%
Difference between approaches—>				3.64%			-1.30%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
12:02	1	22.7	67.7	385.1	0.000187	2.33	0.006	0.002	0.008	0.2%
12:07	5	235.0	66.8	384.4	0.00972	3.10	0.318	0.099	0.417	8.7%
12:13	6	417.2	65.7	383.6	0.02075	3.42	0.696	0.196	0.891	18.6%
12:19	6	417.1	65.2	383.3	0.020764	3.25	0.688	0.204	0.891	18.6%
12:30	11	194.9	64.9	383.1	0.017794	3.71	0.607	0.157	0.765	15.9%
12:35	5	142.5	64.7	382.9	0.005917	3.88	0.204	0.051	0.254	5.3%
12:41	6	128.5	64.6	382.9	0.006401	3.91	0.221	0.054	0.275	5.7%
12:49	8	111.4	64.6	382.8	0.007401	5.49	0.271	0.048	0.319	6.6%
12:56	7	94.6	64.5	382.7	0.005501	6.06	0.205	0.032	0.237	4.9%
13:01	5	84.5	64.4	382.7	0.003512	4.13	0.122	0.029	0.151	3.1%
13:06	5	73.5	64.7	382.9	0.003051	4.15	0.106	0.025	0.131	2.7%
13:11	5	59.0	64.7	382.9	0.002452	2.56	0.076	0.029	0.105	2.2%
13:19	8	50.2	64.8	383.0	0.003334	6.03	0.124	0.020	0.144	3.0%
13:27	8	31.7	64.9	383.0	0.002104	6.03	0.078	0.012	0.091	1.9%
13:36	9	20.6	64.8	383.0	0.00154	6.03	0.057	0.009	0.066	1.4%
13:41	5	12.7	64.8	383.0	0.000529	2.61	0.017	0.006	0.023	0.5%
13:47	6	8.3	64.6	382.9	0.000413	2.61	0.013	0.005	0.018	0.4%
13:54	7	4.9	64.5	382.8	0.000283	2.61	0.009	0.003	0.012	0.3%
	113									
				Emissions			3.818	0.981	4.798	
				Available			7.66	1.20	8.85	
				Percent of Available			49.9%	82.0%	54.2%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
129	64	27	0.0011	0.032	0.014	0.047
380	192	62	0.0158	0.516	0.166	0.694
488	258	75	0.0243	0.816	0.238	1.071
255	156	48	0.0127	0.422	0.130	0.560
167	79	21	0.0153	0.522	0.141	0.673
130	90	23	0.0054	0.186	0.048	0.238
113	49	12	0.0056	0.195	0.050	0.249
103	67	12	0.0069	0.252	0.046	0.302
76	80	13	0.0044	0.165	0.027	0.195
81	33	8	0.0034	0.118	0.029	0.149
65	44	11	0.0027	0.094	0.023	0.119
57	31	12	0.0024	0.074	0.029	0.104
43	24	4	0.0029	0.106	0.018	0.126
34	20	6	0.0023	0.084	0.014	0.100
19	17	4	0.0014	0.053	0.009	0.063
14	4	1	0.0006	0.018	0.007	0.026
10	12	5	0.0005	0.016	0.006	0.022
0	0	0	0.0000	0.000	0.000	0.000
Emissions				3.669	0.994	4.737
Available				7.66	1.20	8.85
Percent of Available				47.9%	83.1%	53.5%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-4-2	18 Deck 35R	
File:	040897.PRN		
Calibration:	0408A.CAL		
Date:	4/8/97		
Persons:	Doerle		
		258.3	lb start
Amount of Resin Used:	113.2 lb	145.0	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	65.9		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3170	3189 cfm	
Average THC concentration (ppmv)	106.0		
Molar volume (scf/lb mol)	383.8	14:43	Time start
Duration of test (min)	140	2:20 17:03	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	5.45		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	39.74	0.00	39.74		39.74	0.00	39.74
Emissions	6.40	0.00	6.40	5.45	6.29	0.00	6.38
Fraction	16.1%	#DIV/0!	16.1%	13.7%	15.8%	#DIV/0!	16.1%
Difference between approaches--->				-17.52%			-0.29%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
14:46	3	86.1	64.6	382.8	0.002138	#######	0.093	0.000	0.093	1.4%
14:51	6	176.9	64.9	383.0	0.008784	#######	0.380	0.000	0.380	5.9%
14:55	5	272.0	65.0	383.1	0.011252	#######	0.487	0.000	0.487	7.6%
15:01	6	187.8	65.1	383.2	0.00932	#######	0.404	0.000	0.404	6.3%
15:06	5	130.1	65.2	383.3	0.005382	#######	0.233	0.000	0.233	3.6%
15:12	5	96.0	65.2	383.3	0.003969	#######	0.172	0.000	0.172	2.7%
15:16	7	75.4	65.3	383.3	0.004362	#######	0.189	0.000	0.189	3.0%
15:21	6	61.4	65.3	383.4	0.003047	#######	0.132	0.000	0.132	2.1%
15:27	7	54.3	65.3	383.4	0.003141	#######	0.136	0.000	0.136	2.1%
15:33	8	47.4	65.3	383.4	0.003133	#######	0.136	0.000	0.136	2.1%
15:42	9	51.8	65.5	383.5	0.003855	#######	0.167	0.000	0.167	2.6%
15:47	9	193.3	66.0	383.8	0.014371	#######	0.622	0.000	0.622	9.7%
15:52	8	277.6	66.0	383.8	0.018342	#######	0.795	0.000	0.795	12.4%
15:58	7	235.8	65.1	383.2	0.013652	#######	0.591	0.000	0.591	9.2%
16:04	8	247.0	65.8	383.7	0.016321	#######	0.707	0.000	0.707	11.0%
16:13	5	144.8	65.9	383.8	0.00598	#######	0.259	0.000	0.259	4.0%
16:19	6	104.1	66.3	384.1	0.005156	#######	0.223	0.000	0.223	3.5%
16:24	9	82.8	66.3	384.1	0.006152	#######	0.266	0.000	0.266	4.2%
16:33	10	59.9	66.5	384.2	0.004941	#######	0.214	0.000	0.214	3.3%
16:40	9	33.8	66.6	384.3	0.002512	#######	0.109	0.000	0.109	1.7%
16:48	7	17.1	66.8	384.5	0.000988	#######	0.043	0.000	0.043	0.7%
16:53	10	8.7	67.6	385.0	0.000714	#######	0.031	0.000	0.031	0.5%
17:03	10	3.8	67.9	385.2	0.000311	#######	0.013	0.000	0.013	0.2%
				Emissions			6.403	0.000	6.403	
				Available			39.74	0.00	39.74	
				Percent of Available			16.1%	#DIV/0!	16.1%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
160	78	0	0.0040	0.173	0.000	0.176
181	109	0	0.0090	0.392	0.000	0.398
260	144	0	0.0108	0.469	0.000	0.476
157	112	0	0.0078	0.340	0.000	0.345
113	94	0	0.0047	0.204	0.000	0.207
94	52	0	0.0039	0.169	0.000	0.172
71	38	0	0.0041	0.179	0.000	0.182
54	28	0	0.0027	0.117	0.000	0.119
55	32	0	0.0032	0.139	0.000	0.141
45	21	0	0.0030	0.130	0.000	0.132
100	53	0	0.0075	0.324	0.000	0.329
206	111	0	0.0154	0.667	0.000	0.678
310	234	0	0.0206	0.893	0.000	0.907
185	102	0	0.0108	0.467	0.000	0.474
208	107	0	0.0138	0.599	0.000	0.609
120	53	0	0.0050	0.216	0.000	0.219
97	52	0	0.0048	0.209	0.000	0.213
78	47	0	0.0058	0.253	0.000	0.256
49	19	0	0.0041	0.176	0.000	0.179
30	4	0	0.0022	0.097	0.000	0.099
15	6	0	0.0009	0.038	0.000	0.038
10	0	0	0.0008	0.036	0.000	0.036
Emissions				6.285	0.000	6.385
Available				39.74	0.00	39.74
Percent of Available				15.8%	#DIV/0!	16.1%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-1-2	18 Hull 35R	
File:	040997.PRN		
Calibration:	0409A.CAL		
Date:	4/9/97		
Persons:	Doerle		
		300.6	lb start
Amount of Resin Used:	136.2 lb	164.4	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	66.3		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3111	3206	cfm
Average THC concentration (ppmv)	127.2		
Molar volume (scf/lb mol)	384.1	9:51	Time start
Duration of test (min)	148	2:28 12:19	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	6.76		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	47.80	0.00	47.80		47.80	0.00	47.80
Emissions	6.63	0.00	6.63	6.76	6.32	0.00	6.42
Fraction	13.9%	#DIV/0!	13.9%	14.1%	13.2%	#DIV/0!	13.4%
Difference between approaches—>				1.85%			-3.27%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:55	4	77.0	65.7	383.7	0.002498	#######	0.108	0.000	0.108	1.6%
10:02	7	196.9	65.6	383.6	0.011179	#######	0.484	0.000	0.484	7.3%
10:06	4	170.1	65.8	383.7	0.005515	#######	0.239	0.000	0.239	3.6%
10:12	6	322.8	66.3	384.1	0.015688	#######	0.680	0.000	0.680	10.2%
10:17	5	196.5	66.4	384.1	0.007955	#######	0.345	0.000	0.345	5.2%
10:21	4	140.5	66.8	384.4	0.004549	#######	0.197	0.000	0.197	3.0%
10:27	6	98.4	66.7	384.4	0.00478	#######	0.207	0.000	0.207	3.1%
10:32	5	77.3	66.1	383.9	0.003131	#######	0.136	0.000	0.136	2.0%
10:37	5	68.9	66.0	383.9	0.002794	#######	0.121	0.000	0.121	1.8%
10:43	6	56.2	65.5	383.5	0.002738	#######	0.119	0.000	0.119	1.8%
10:49	6	141.8	65.4	383.4	0.006902	#######	0.299	0.000	0.299	4.5%
10:58	9	259.4	65.7	383.6	0.018931	#######	0.820	0.000	0.820	12.4%
11:04	6	157.6	65.6	383.5	0.007672	#######	0.332	0.000	0.332	5.0%
11:10	6	103.0	66.0	383.8	0.005011	#######	0.217	0.000	0.217	3.3%
11:16	6	70.1	65.8	383.7	0.003412	#######	0.148	0.000	0.148	2.2%
11:23	7	191.5	66.3	384.1	0.010859	#######	0.470	0.000	0.470	7.1%
11:29	6	288.6	66.9	384.5	0.01401	#######	0.607	0.000	0.607	9.2%
11:36	7	188.6	66.7	384.3	0.010686	#######	0.463	0.000	0.463	7.0%
11:42	6	106.5	66.7	384.4	0.005173	#######	0.224	0.000	0.224	3.4%
11:50	8	67.8	66.9	384.5	0.004386	#######	0.190	0.000	0.190	2.9%
12:03	13	34.7	67.0	384.6	0.003646	#######	0.158	0.000	0.158	2.4%
12:08	5	17.5	66.8	384.4	0.000707	#######	0.031	0.000	0.031	0.5%
12:14	6	11.6	67.0	384.6	0.000562	#######	0.024	0.000	0.024	0.4%
12:19	5	7.2	67.7	385.1	0.000292	#######	0.013	0.000	0.013	0.2%
	148									
				Emissions			6.630	0.000	6.630	
				Available			47.80	0.00	47.80	
				Percent of Available			13.9%	#DIV/0!	13.9%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
238	114	0	0.0080	0.345	0.000	0.350
156	63	0	0.0091	0.395	0.000	0.402
219	132	0	0.0073	0.317	0.000	0.322
286	189	0	0.0143	0.620	0.000	0.630
178	137	0	0.0074	0.322	0.000	0.327
132	82	0	0.0044	0.191	0.000	0.194
88	67	0	0.0044	0.191	0.000	0.194
79	45	0	0.0033	0.143	0.000	0.145
65	26	0	0.0027	0.118	0.000	0.119
53	20	0	0.0027	0.115	0.000	0.117
0	157	0	0.0000	0.000	0.000	0.000
233	122	0	0.0175	0.759	0.000	0.771
125	58	0	0.0063	0.272	0.000	0.276
88	62	0	0.0044	0.191	0.000	0.194
70	42	0	0.0035	0.152	0.000	0.154
297	137	0	0.0174	0.752	0.000	0.764
253	123	0	0.0127	0.548	0.000	0.557
152	87	0	0.0089	0.384	0.000	0.391
86	44	0	0.0043	0.186	0.000	0.189
52	26	0	0.0035	0.150	0.000	0.153
24	7	0	0.0026	0.113	0.000	0.114
17	4	0	0.0007	0.031	0.000	0.031
12	0	0	0.0006	0.026	0.000	0.026
Emissions				6.321	0.000	6.421
Available				47.80	0.00	47.80
Percent of Available				13.2%	#DIV/0!	13.4%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-11-1G		CFA Gel	
File:	040997.PRN			
Calibration:	0409A.CAL			
Date:	4/9/97			
Persons:	Doerle			
			281.5	lb start
Amount of Resin Used:	3.2 lb		278.3	lb finish
Content of Styrene:	0.32			
Content of MMA:	0.05			
Temperature (F)	72.0			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3170		3171	cfm
Average THC concentration (ppmv)	37.9			
Molar volume (scf/lb mol)	388.3		13:17	Time start
Duration of test (min)	40	0:40	13:57	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	0.56			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	1.03	0.16	1.19		1.03	0.16	1.19
Emissions	0.39	0.13	0.52	0.56	0.34	0.12	0.46
Fraction	38.0%	77.7%	43.4%	46.9%	32.9%	73.4%	39.0%
Difference between approaches—>				7.44%			-11.23%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
13:21	4	79.9	71.3	387.7	0.002613	2.49	0.081	0.031	0.112	21.7%
13:27	6	82.8	71.9	388.2	0.004057	2.52	0.126	0.048	0.174	33.7%
13:34	7	47.7	72.4	388.5	0.002723	3.89	0.094	0.023	0.117	22.7%
13:43	9	23.3	72.7	388.7	0.001713	3.89	0.059	0.015	0.074	14.3%
13:49	6	11.8	72.9	388.9	0.000578	3.89	0.020	0.005	0.025	4.8%
13:57	8	5.4	70.9	387.4	0.000353	3.89	0.012	0.003	0.015	2.9%
	40									
				Emissions			0.391	0.125	0.517	
				Available			1.03	0.16	1.19	
				Percent of Available			38.0%	77.7%	43.4%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
110	40	16	0.0036	0.111	0.045	0.158
70	24	9	0.0034	0.106	0.042	0.151
36	11	3	0.0021	0.071	0.018	0.090
20	2	8	0.0015	0.051	0.013	0.065
0	-3	7	0.0000	0.000	0.000	0.000
Emissions				0.339	0.118	0.464
Available				1.03	0.16	1.19
Percent of Available				32.9%	73.4%	39.0%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-11-1R		CFA 35R	
File:	040997.PRN			
Calibration:	0409A.CAL			
Date:	4/9/97			
Persons:	Doerle			
			174.0	lb start
Amount of Resin Used:	3.5 lb		170.4	lb finish
Content of Styrene:	0.351			
Content of MMA:	0			
Temperature (F)	70.7			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3165		3171 cfm	
Average THC concentration (ppmv)	24.1			
Molar volume (scf/lb mol)	387.3		14:17	Time start
Duration of test (min)	161	0:43	15:00	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	0.38			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	1.24	0.00	1.24		1.24	0.00	1.24
Emissions	0.37	0.00	0.37	0.38	0.46	0.00	0.47
Fraction	29.8%	#DIV/0!	29.8%	30.6%	37.1%	#DIV/0!	37.7%
Difference between approaches—>				2.64%			20.98%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
14:22	5	13.3	71.4	387.8	0.000541	#######	0.023	0.000	0.023	6.3%
14:28	6	60.7	71.1	387.6	0.002975	#######	0.129	0.000	0.129	34.8%
14:36	8	37.5	70.9	387.4	0.002452	#######	0.106	0.000	0.106	28.7%
14:43	7	20.9	70.8	387.4	0.001198	#######	0.052	0.000	0.052	14.0%
14:51	8	12.8	70.3	387.0	0.000839	#######	0.036	0.000	0.036	9.8%
14:59	8	7.8	70.1.	386.8	0.000508	#######	0.022	0.000	0.022	5.9%
15:00	1	4.8	70.2	386.9	0.000039	#######	0.002	0.000	0.002	0.5%
				Emissions			0.370	0.000	0.370	
				Available			Styrene	MMA	Total	
				Percent of Available			######	######	######	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
86	30	0	0.0035	0.152	0.000	0.155
54	24	0	0.0027	0.115	0.000	0.117
29	3	0	0.0019	0.082	0.000	0.084
20	5	0	0.0011	0.050	0.000	0.050
14	0	0	0.0009	0.040	0.000	0.040
8	-3	0	0.0005	0.023	0.000	0.023
Emissions				0.461	0.000	0.469
Available				Styrene	MMA	Total
Percent of Available				######	######	######

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-14-1		18 Deck 35R - FC	
File:	041097.PRN			
Calibration:	0410A.CAL			
Date:	4/10/97			
Persons:	Doerle			
			349.5	lb start
Amount of Resin Used:	115.1 lb		234.4	lb finish
Content of Styrene:	0.351			
Content of MMA:	0			
Temperature (F)	68.1			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3289		3281	cfm
Average THC concentration (ppmv)	95.2			
Molar volume (scf/lb mol)	385.4		9:18	Time start
Duration of test (min)	126	2:06	11:24	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	4.53			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	40.40	0.00	40.40		40.40	0.00	40.40
Emissions	4.47	0.00	4.47	4.53	4.18	0.00	4.25
Fraction	11.1%	#DIV/0!	11.1%	11.2%	10.4%	#DIV/0!	10.5%
Difference between approaches—>				1.44%			-5.10%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:19	1	12.5	66.3	384.1	0.000107	#######	0.005	0.000	0.005	0.1%
9:26	7	65.3	66.5	384.2	0.00391	#######	0.169	0.000	0.169	3.8%
9:32	6	148.8	66.8	384.5	0.007637	#######	0.331	0.000	0.331	7.4%
9:38	6	152.3	66.9	384.5	0.007815	#######	0.339	0.000	0.339	7.6%
9:50	12	104.6	67.1	384.6	0.01073	#######	0.465	0.000	0.465	10.4%
9:58	8	72.6	67.1	384.6	0.004962	#######	0.215	0.000	0.215	4.8%
10:08	10	61.9	68.2	385.4	0.005281	#######	0.229	0.000	0.229	5.1%
10:16	8	84.6	68.3	385.5	0.005773	#######	0.250	0.000	0.250	5.6%
10:28	12	205.4	68.5	385.7	0.021015	#######	0.910	0.000	0.910	20.4%
10:37	9	192.8	68.6	385.7	0.014792	#######	0.641	0.000	0.641	14.3%
10:51	14	116.7	68.5	385.7	0.013935	#######	0.604	0.000	0.604	13.5%
11:00	9	57.4	69.0	386.0	0.004401	#######	0.191	0.000	0.191	4.3%
11:11	11	21.4	69.2	386.2	0.002004	#######	0.087	0.000	0.087	1.9%
11:24	13	6.6	69.5	386.4	0.000728	#######	0.032	0.000	0.032	0.7%
	126									
				Emissions			4.465	0.000	4.465	
				Available			40.40	0.00	40.40	
				Percent of Available			11.1%	#DIV/0!	11.1%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
18	11	0	0.0002	0.007	0.000	0.007
76	36	0	0.0045	0.197	0.000	0.200
160	62	0	0.0082	0.355	0.000	0.360
137	51	0	0.0070	0.304	0.000	0.309
86	26	0	0.0088	0.381	0.000	0.387
71	30	0	0.0048	0.210	0.000	0.213
55	26	0	0.0047	0.203	0.000	0.206
121	57	0	0.0082	0.357	0.000	0.362
229	77	0	0.0234	1.012	0.000	1.028
161	56	0	0.0123	0.534	0.000	0.542
85	37	0	0.0101	0.438	0.000	0.445
40	19	0	0.0031	0.133	0.000	0.135
13	11	0	0.0012	0.053	0.000	0.053
Emissions				4.183	0.000	4.249
Available				40.40	0.00	40.40
Percent of Available				10.4%	#DIV/0!	10.5%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-13-1		18 Hull 35R - FC	
File:	041097.PRN			
Calibration:	0410B.CAL			
Date:	4/10/97			
Persons:	Doerle			
			363.3	lb start
Amount of Resin Used:	143.5 lb		219.8	lb finish
Content of Styrene:	0.351			
Content of MMA:	0			
Temperature (F)	66.4			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3227		3273 cfm	
Average THC concentration (ppmv)	98.1			
Molar volume (scf/lb mol)	384.1		12:42	Time start
Duration of test (min)	147	2:27	15:09	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	5.37			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	50.35	0.00	50.35		50.35	0.00	50.35
Emissions	5.27	0.00	5.27	5.37	5.54	0.00	5.62
Fraction	10.5%	#DIV/0!	10.5%	10.7%	11.0%	#DIV/0!	11.2%
Difference between approaches--->				1.75%			6.21%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
12:44	2	43.8	65.5	383.5	0.000736	#######	0.032	0.000	0.032	0.6%
12:51	7	85.8	65.9	383.8	0.005048	#######	0.219	0.000	0.219	4.1%
13:00	9	132.3	65.9	383.8	0.010014	#######	0.434	0.000	0.434	8.2%
13:10	10	183.0	65.7	383.6	0.015392	#######	0.667	0.000	0.667	12.6%
13:18	8	119.9	65.8	383.7	0.008064	#######	0.349	0.000	0.349	6.6%
13:28	10	90.1	65.9	383.8	0.007575	#######	0.328	0.000	0.328	6.2%
13:36	8	113.8	66.0	383.9	0.007653	#######	0.332	0.000	0.332	6.3%
13:45	9	155.3	66.1	383.9	0.011751	#######	0.509	0.000	0.509	9.7%
13:54	9	131.1	66.1	383.9	0.009913	#######	0.429	0.000	0.429	8.1%
14:02	8	87.3	66.2	384.0	0.005869	#######	0.254	0.000	0.254	4.8%
14:12	10	62.7	66.6	384.3	0.005264	#######	0.228	0.000	0.228	4.3%
14:20	8	146.5	67.0	384.6	0.009833	#######	0.426	0.000	0.426	8.1%
14:32	12	134.8	67.1	384.6	0.013575	#######	0.588	0.000	0.588	11.2%
14:42	10	70.4	66.9	384.5	0.005908	#######	0.256	0.000	0.256	4.9%
14:50	8	42.0	66.8	384.5	0.002819	#######	0.122	0.000	0.122	2.3%
14:58	8	22.4	66.8	384.4	0.001505	#######	0.065	0.000	0.065	1.2%
15:05	7	10.5	66.9	384.5	0.000616	#######	0.027	0.000	0.027	0.5%
15:09	4	6.2	66.8	384.4	0.000209	#######	0.009	0.000	0.009	0.2%
	147									
				Emissions			5.273	0.000	5.273	
				Available			50.35	0.00	50.35	
				Percent of Available			10.5%	#DIV/0!	10.5%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
58	15	0	0.0010	0.043	0.000	0.044
127	29	0	0.0076	0.328	0.000	0.334
195	33	0	0.0150	0.648	0.000	0.659
158	40	0	0.0135	0.584	0.000	0.593
103	17	0	0.0070	0.304	0.000	0.309
58	20	0	0.0049	0.214	0.000	0.218
135	37	0	0.0092	0.399	0.000	0.405
160	31	0	0.0123	0.532	0.000	0.540
187	29	0	0.0143	0.621	0.000	0.631
75	28	0	0.0051	0.221	0.000	0.225
94	23	0	0.0080	0.347	0.000	0.352
179	33	0	0.0122	0.528	0.000	0.536
97	24	0	0.0099	0.429	0.000	0.436
57	15	0	0.0049	0.210	0.000	0.213
34	87	0	0.0023	0.100	0.000	0.102
0	12	0	0.0000	0.000	0.000	0.000
10	9	0	0.0006	0.026	0.000	0.026
Emissions				5.535	0.000	5.623
Available				50.35	0.00	50.35
Percent of Available				11.0%	#DIV/0!	11.2%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-11-2R	CFA Gel	
File:	041097.PRN		
Calibration:	0410B.CAL		
Date:	4/10/97		
Persons:	Doerle		
		211.9	lb start
Amount of Resin Used:	10.1 lb	201.8	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	65.1		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3233	3273 cfm	
Average THC concentration (ppmv)	35.8		
Molar volume (scf/lb mol)	383.2	15:45	Time start
Duration of test (min)	78	1:18 17:03	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	1.06		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	3.54	0.00	3.54		3.54	0.00	3.54
Emissions	1.02	0.00	1.02	1.06	0.95	0.00	0.97
Fraction	28.8%	#DIV/0!	28.8%	29.9%	26.8%	#DIV/0!	27.3%
Difference between approaches—>				3.87%			-5.54%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
15:48	3	72.0	65.7	383.6	0.001821	#######	0.079	0.000	0.079	7.7%
15:54	6	135.7	66.0	383.9	0.006859	#######	0.297	0.000	0.297	29.1%
16:03	9	73.6	65.4	383.4	0.005588	#######	0.242	0.000	0.242	23.7%
16:13	10	42.6	65.0	383.1	0.003596	#######	0.156	0.000	0.156	15.3%
16:23	10	25.8	64.5	382.8	0.002179	#######	0.094	0.000	0.094	9.3%
16:32	9	17.9	64.3	382.6	0.001363	#######	0.059	0.000	0.059	5.8%
16:49	17	10.9	64.9	383.0	0.001571	#######	0.068	0.000	0.068	6.7%
17:03	14	4.7	65.4	383.4	0.000561	#######	0.024	0.000	0.024	2.4%
	78									
				Emissions			1.019	0.000	1.019	
				Available			Styrene	MMA	Total	
				Percent of Available			######	######	######	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
157	59	0	0.0040	0.174	0.000	0.177
106	44	0	0.0054	0.235	0.000	0.239
63	30	0	0.0048	0.210	0.000	0.213
34.5	19	0	0.0029	0.128	0.000	0.130
24	14	0	0.0021	0.089	0.000	0.090
17	12	0	0.0013	0.057	0.000	0.058
9.4	10	0	0.0014	0.059	0.000	0.060
Emissions				0.951	0.000	0.966
Available				Styrene	MMA	Total
Percent of Available				######	######	######

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-6-2		18 Deck Gel	
File:	041197.PRN			
Calibration:	0411A.CAL			
Date:	4/11/97			
Persons:	Doerle			
			270.2	lb start
Amount of Resin Used:	18.7 lb		251.5	lb finish
Content of Styrene:	0.32			
Content of MMA:	0.05			
Temperature (F)	70.1			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3309		3319	cfm
Average THC concentration (ppmv)	68.8			
Molar volume (scf/lb mol)	386.8		9:06	Time start
Duration of test (min)	123	2:03	11:09	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	3.16			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	6.00	0.94	6.94		6.00	0.94	6.94
Emissions	2.43	0.71	3.13	3.16	2.42	0.75	3.22
Fraction	40.5%	75.2%	45.2%	45.5%	40.3%	80.1%	46.4%
Difference between approaches—>				0.76%			2.67%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:07	1	10.4	67.4	384.9	8.94E-05	2.60	0.003	0.001	0.004	0.1%
9:13	6	64.1	67.8	385.2	0.003303	2.65	0.104	0.038	0.142	4.5%
9:19	6	145.6	68.3	385.5	0.007496	2.60	0.234	0.087	0.321	10.3%
9:24	5	211.8	68.7	385.8	0.009083	2.54	0.282	0.107	0.389	12.4%
9:30	6	193.3	69.1	386.1	0.00994	2.75	0.316	0.111	0.426	13.6%
9:37	7	219.7	69.6	386.5	0.013166	3.20	0.434	0.131	0.565	18.0%
9:46	9	129.1	70.1	386.9	0.009937	3.57	0.336	0.091	0.427	13.6%
9:53	7	88.5	70.6	387.2	0.005291	4.11	0.184	0.043	0.228	7.3%
10:00	7	67.8	71.2	387.7	0.00405	5.44	0.148	0.026	0.174	5.6%
10:06	6	51.9	71.6	388.0	0.002658	5.32	0.097	0.018	0.114	3.7%
10:12	6	36.5	71.2	387.7	0.001869	6.27	0.070	0.011	0.081	2.6%
10:18	6	29.0	71.8	388.1	0.001482	5.92	0.055	0.009	0.064	2.0%
10:24	6	20.6	72.4	388.5	0.001051	5.78	0.039	0.006	0.045	1.4%
10:31	7	15.0	72.9	388.9	0.000894	3.73	0.031	0.008	0.038	1.2%
10:38	7	12.0	72.6	388.7	0.000715	6.03	0.027	0.004	0.031	1.0%
10:45	7	9.5	72.0	388.3	0.000568	3.93	0.020	0.005	0.024	0.8%
10:52	7	7.3	69.7	386.6	0.000436	3.27	0.014	0.004	0.019	0.6%
10:58	6	7.7	67.2	384.7	0.0004	4.72	0.014	0.003	0.017	0.5%
11:09	11	5.3	66.6	384.3	0.0005	4.72	0.018	0.004	0.022	0.7%
	123									
				Emissions			2.426	0.705	3.132	
				Available			6.00	0.94	6.94	
				Percent of Available			40.5%	75.2%	45.2%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
61	25	9	0.0005	0.016	0.006	0.023
122	47	18	0.0063	0.198	0.075	0.278
177	0	23	0.0091	0.286	0.110	0.402
194	72	28	0.0083	0.259	0.102	0.367
256	69	25	0.0132	0.419	0.153	0.581
150	52	16	0.0090	0.298	0.093	0.397
94	36	10	0.0073	0.246	0.069	0.319
85	34	8	0.0051	0.178	0.043	0.224
59	22	4	0.0035	0.129	0.024	0.156
48	29	5	0.0025	0.090	0.017	0.108
38	17	3	0.0020	0.073	0.012	0.086
27	15	3	0.0014	0.051	0.009	0.061
22	14	3	0.0011	0.042	0.007	0.050
18	12	3	0.0011	0.037	0.010	0.047
14	9	2	0.0008	0.031	0.005	0.037
12	10	3	0.0007	0.025	0.006	0.032
10.2	9	3	0.0006	0.020	0.006	0.027
10	9	2	0.0005	0.018	0.004	0.023
Emissions				2.417	0.750	3.217
Available				6.00	0.94	6.94
Percent of Available				40.3%	80.1%	46.4%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-14-2		18 Deck 35R - FC	
File:	041197.PRN			
Calibration:	0410B.CAL			
Date:	4/11/97			
Persons:	Doerle			
			375.6	lb start
Amount of Resin Used:	114.2 lb		261.4	lb finish
Content of Styrene:	0.351			
Content of MMA:	0			
Temperature (F)	65.8			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3360		3329	cfm
Average THC concentration (ppmv)	87.9			
Molar volume (scf/lb mol)	383.7		11:58	Time start
Duration of test (min)	145	2:25	14:23	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	5.02			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	40.08	0.00	40.08		40.08	0.00	40.08
Emissions	4.85	0.00	4.85	5.02	4.44	0.00	4.51
Fraction	12.1%	#DIV/0!	12.1%	12.5%	11.1%	#DIV/0!	11.3%
Difference between approaches--->				3.47%			-7.41%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
12:02	4	50.9	66.0	383.9	0.001783	#######	0.077	0.000	0.077	1.6%
12:10	8	151.6	65.8	383.7	0.010619	#######	0.460	0.000	0.460	9.5%
12:17	7	153.5	65.3	383.3	0.00942	#######	0.408	0.000	0.408	8.4%
12:24	7	113.3	65.5	383.5	0.006949	#######	0.301	0.000	0.301	6.2%
12:30	6	85.4	65.6	383.6	0.004486	#######	0.194	0.000	0.194	4.0%
12:46	16	62.0	65.7	383.6	0.008684	#######	0.376	0.000	0.376	7.8%
12:52	6	45.6	65.4	383.4	0.002398	#######	0.104	0.000	0.104	2.1%
12:59	7	52.9	65.5	383.5	0.003242	#######	0.140	0.000	0.140	2.9%
13:07	8	147.9	65.9	383.8	0.010361	#######	0.449	0.000	0.449	9.3%
13:13	6	200.8	66.1	383.9	0.010543	#######	0.457	0.000	0.457	9.4%
13:19	6	214.6	65.9	383.8	0.011273	#######	0.488	0.000	0.488	10.1%
13:28	9	149.0	66.0	383.9	0.011739	#######	0.508	0.000	0.508	10.5%
13:35	7	100.9	65.9	383.8	0.006183	#######	0.268	0.000	0.268	5.5%
13:46	11	74.3	65.6	383.6	0.007159	#######	0.310	0.000	0.310	6.4%
13:56	10	43.8	65.9	383.8	0.003832	#######	0.166	0.000	0.166	3.4%
14:06	10	22.2	66.0	383.9	0.001942	#######	0.084	0.000	0.084	1.7%
14:13	7	12.1	66.5	384.2	0.000742	#######	0.032	0.000	0.032	0.7%
14:23	10	6.7	66.3	384.1	0.000589	#######	0.025	0.000	0.025	0.5%
	145									
				Emissions			4.849	0.000	4.849	
				Available			40.08	0.00	40.08	
				Percent of Available			12.1%	#DIV/0!	12.1%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
94	38	0	0.0033	0.141	0.000	0.143
182	74	0	0.0126	0.547	0.000	0.556
121	43	0	0.0074	0.319	0.000	0.324
94	38	0	0.0057	0.247	0.000	0.251
0	34	0	0.0000	0.000	0.000	0.000
51	22	0	0.0071	0.307	0.000	0.312
43	17	0	0.0022	0.097	0.000	0.099
111	28	0	0.0067	0.292	0.000	0.297
145	56	0	0.0101	0.436	0.000	0.443
252	78	0	0.0131	0.568	0.000	0.577
185	80	0	0.0096	0.417	0.000	0.424
112	48	0	0.0087	0.379	0.000	0.385
93	43	0	0.0056	0.245	0.000	0.248
59	24	0	0.0056	0.244	0.000	0.248
31	14	0	0.0027	0.116	0.000	0.118
16	13	0	0.0014	0.060	0.000	0.061
11	8	0	0.0007	0.029	0.000	0.029
Emissions				4.444	0.000	4.514
Available				40.08	0.00	40.08
Percent of Available				11.1%	#DIV/0!	11.3%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-13-2	18 Hull 35R - FC	
File:	041197.PRN		
Calibration:	0410B.CAL		
Date:	4/11/97		
Persons:	Doerle		
		352.0	lb start
Amount of Resin Used:	139.9 lb	212.1	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	66.3		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3050	3217 cfm	
Average THC concentration (ppmv)	109.6		
Molar volume (scf/lb mol)	384.1	15:43	Time start
Duration of test (min)	136	2:16 17:59	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	5.30		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	49.11	0.00	49.11		49.11	0.00	49.11
Emissions	5.16	0.00	5.16	5.30	5.36	0.00	5.45
Fraction	10.5%	#DIV/0!	10.5%	10.8%	10.9%	#DIV/0!	11.1%
Difference between approaches—>				2.52%			5.25%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
15:44	1	12.6	65.7	383.6	0.0001	#######	0.004	0.000	0.004	0.1%
15:53	9	105.1	65.9	383.8	0.007519	#######	0.326	0.000	0.326	6.3%
15:59	6	206.1	65.9	383.8	0.009827	#######	0.426	0.000	0.426	8.2%
16:05	6	195.3	65.9	383.8	0.009312	#######	0.403	0.000	0.403	7.8%
16:11	6	142.9	65.7	383.6	0.006818	#######	0.295	0.000	0.295	5.7%
16:22	11	100.2	65.7	383.6	0.008766	#######	0.380	0.000	0.380	7.4%
16:28	6	97.7	65.8	383.7	0.004658	#######	0.202	0.000	0.202	3.9%
16:37	9	181.6	65.9	383.8	0.012988	#######	0.563	0.000	0.563	10.9%
16:45	8	179.3	65.8	383.7	0.011403	#######	0.494	0.000	0.494	9.6%
16:52	7	109.4	65.8	383.7	0.006085	#######	0.264	0.000	0.264	5.1%
17:01	9	139.8	66.0	383.8	0.009998	#######	0.433	0.000	0.433	8.4%
17:16	15	152.8	65.9	383.8	0.018216	#######	0.789	0.000	0.789	15.3%
17:24	8	82.7	66.0	383.9	0.005259	#######	0.228	0.000	0.228	4.4%
17:32	8	56.1	66.9	384.5	0.003557	#######	0.154	0.000	0.154	3.0%
17:40	8	36.4	67.5	384.9	0.002305	#######	0.100	0.000	0.100	1.9%
17:48	8	21.9	67.8	385.2	0.001384	#######	0.060	0.000	0.060	1.2%
17:56	8	12.5	68.0	385.3	0.000794	#######	0.034	0.000	0.034	0.7%
17:59	3	8.8	68.1	385.4	0.000209	#######	0.009	0.000	0.009	0.2%
	136									
				Emissions			5.163	0.000	5.163	
				Available			49.11	0.00	49.11	
				Percent of Available			10.5%	#DIV/0!	10.5%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
28	16	0	0.0002	0.010	0.000	0.010
157	73	0	0.0118	0.513	0.000	0.521
233	79	0	0.0117	0.508	0.000	0.516
158	66	0	0.0079	0.344	0.000	0.350
110	33	0	0.0055	0.240	0.000	0.244
83	40	0	0.0077	0.332	0.000	0.337
145	55	0	0.0073	0.316	0.000	0.321
225	73	0	0.0170	0.735	0.000	0.747
141	60	0	0.0095	0.410	0.000	0.416
90	40	0	0.0053	0.229	0.000	0.232
209	72	0	0.0158	0.683	0.000	0.694
96	40	0	0.0121	0.523	0.000	0.531
72	28	0	0.0048	0.209	0.000	0.212
48	20	0	0.0032	0.139	0.000	0.141
30	16	0	0.0020	0.087	0.000	0.088
18	12	0	0.0012	0.052	0.000	0.053
12	8	0	0.0008	0.035	0.000	0.035
Emissions				5.365	0.000	5.449
Available				49.11	0.00	49.11
Percent of Available				10.9%	#DIV/0!	11.1%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-11-3	CFA 35R	
File:	041297.PRN		
Calibration:	0412A.CAL		
Date:	4/11/97		
Persons:	Doerle		
		200.8	lb start
Amount of Resin Used:	6.1 lb	194.7	lb finish
Content of Styrene:	0.351		
Content of MMA:	0		
Temperature (F)	71.9		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3370	3332	cfm
Average THC concentration (ppmv)	45.6		
Molar volume (scf/lb mol)	388.2	8:15	Time start
Duration of test (min)	66	1:06 9:21	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	1.14		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	2.13	0.00	2.13		2.13	0.00	2.13
Emissions	1.11	0.00	1.11	1.14	0.95	0.00	0.97
Fraction	52.0%	#DIV/0!	52.0%	53.6%	44.8%	#DIV/0!	45.5%
Difference between approaches—>				2.95%			-14.40%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
8:17	2	110.9	70.3	387.0	0.001931	#######	0.084	0.000	0.084	7.5%
8:24	7	151.9	70.5	387.1	0.009255	#######	0.401	0.000	0.401	36.1%
8:30	6	87.3	70.8	387.4	0.004557	#######	0.197	0.000	0.197	17.8%
8:39	9	52.6	71.4	387.8	0.004114	#######	0.178	0.000	0.178	16.1%
8:46	7	32.6	71.6	388.0	0.001984	#######	0.086	0.000	0.086	7.7%
8:57	11	21.1	72.1	388.3	0.002013	#######	0.087	0.000	0.087	7.9%
9:05	8	12.9	72.5	388.6	0.000893	#######	0.039	0.000	0.039	3.5%
9:21	16	6.2	73.2	389.1	0.000856	#######	0.037	0.000	0.037	3.3%
	66									
				Emissions			1.109	0.000	1.109	
				Available			2.13	0.00	2.13	
				Percent of Available			52.0%	#DIV/0!	52.0%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
200	123	0	0.0034	0.149	0.000	0.152
117	48	0	0.0070	0.305	0.000	0.310
69	23	0	0.0036	0.154	0.000	0.157
41	11	0	0.0032	0.137	0.000	0.140
38	9	0	0.0023	0.099	0.000	0.101
18	4	0	0.0017	0.074	0.000	0.075
12	1	0	0.0008	0.036	0.000	0.036
Emissions				0.954	0.000	0.969
Available				2.13	0.00	2.13
Percent of Available				44.8%	#DIV/0!	45.5%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-5-1	18 Deck 42R	
File:	041297.PRN		
Calibration:	0412B.CAL		
Date:	4/11/97		
Persons:	Doerle		
		236.0	lb start
Amount of Resin Used:	109.9 lb	126.1	lb finish
Content of Styrene:	0.422		
Content of MMA:	0		
Temperature (F)	70.7		
MW Styrene	104		
MW MMA	100.1		
Flow rate (acfm)	3227	3236 cfm	
Average THC concentration (ppmv)	181.0		
Molar volume (scf/lb mol)	387.3	11:03	Time start
Duration of test (min)	145	2:25 13:28	Time end
Response factor (C3 to Styrene)	0.416		
Propane emissions from continuous data (lb	9.73		

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	46.39	0.00	46.39		46.39	0.00	46.39
Emissions	9.47	0.00	9.47	9.73	6.52	0.00	6.62
Fraction	20.4%	#DIV/0!	20.4%	21.0%	14.1%	#DIV/0!	14.3%
Difference between approaches—>				2.75%			-42.92%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
11:40	37	225.4	69.3	386.3	0.069696	#######	3.019	0.000	3.019	31.9%
11:49	9	94.5	69.9	386.7	0.007095	#######	0.307	0.000	0.307	3.2%
11:52	3	102.4	70.1	386.9	0.002563	#######	0.111	0.000	0.111	1.2%
11:59	7	390.5	70.2	386.9	0.022801	#######	0.988	0.000	0.988	10.4%
12:06	7	568.4	70.3	387.0	0.03318	#######	1.437	0.000	1.437	15.2%
12:12	6	495.0	70.4	387.1	0.024761	#######	1.073	0.000	1.073	11.3%
12:21	9	250.2	70.6	387.2	0.018767	#######	0.813	0.000	0.813	8.6%
12:30	9	187.5	70.9	387.4	0.014056	#######	0.609	0.000	0.609	6.4%
12:36	6	162.2	71.0	387.5	0.008105	#######	0.351	0.000	0.351	3.7%
12:47	11	107.8	71.5	387.8	0.009865	#######	0.427	0.000	0.427	4.5%
12:56	9	51.2	71.8	388.1	0.00383	#######	0.166	0.000	0.166	1.8%
13:04	8	26.4	71.9	388.2	0.001757	#######	0.076	0.000	0.076	0.8%
13:11	7	15.6	72.0	388.3	0.000907	#######	0.039	0.000	0.039	0.4%
13:21	10	9.6	72.1	388.3	0.000795	#######	0.034	0.000	0.034	0.4%
13:28	7	6.2	72.2	388.4	0.00036	#######	0.016	0.000	0.016	0.2%
	145									
				Emissions			9.466	0.000	9.466	
				Available			46.39	0.00	46.39	
				Percent of Available			20.4%	#DIV/0!	20.4%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
110	0	0	0.0341	1.477	0.000	1.500
90.7	0	0	0.0068	0.296	0.000	0.301
190	152	0	0.0048	0.207	0.000	0.210
0	518	0	0.0000	0.000	0.000	0.000
584	493	0	0.0342	1.481	0.000	1.504
400	344	0	0.0201	0.869	0.000	0.883
204	180	0	0.0153	0.665	0.000	0.675
182	157	0	0.0137	0.593	0.000	0.602
152	140	0	0.0076	0.330	0.000	0.335
80	64	0	0.0073	0.318	0.000	0.323
41	34	0	0.0031	0.133	0.000	0.135
23	15	0	0.0015	0.066	0.000	0.067
17	11	0	0.0010	0.043	0.000	0.044
12	6	0	0.0010	0.043	0.000	0.044
Emissions				6.520	0.000	6.623
Available				46.39	0.00	46.39
Percent of Available				14.1%	#DIV/0!	14.3%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-2-1		18 Hull 42R	
File:	041297.PRN			
Calibration:	0412B.CAL			
Date:	4/11/97			
Persons:	Doerle		375.2	lb start
Amount of Resin Used:	136.2 lb		239.0	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	72.0			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3189		3236 cfm	
Average THC concentration (ppmv)	182.2			
Molar volume (scf/lb mol)	388.2		15:12	Time start
Duration of test (min)	197	3:17	18:29	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	13.18			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	57.47	0.00	57.47		57.47	0.00	57.47
Emissions	12.82	0.00	12.82	13.18	13.84	0.00	14.05
Fraction	22.3%	#DIV/0!	22.3%	22.9%	24.1%	#DIV/0!	24.5%
Difference between approaches--->				2.75%			8.81%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
15:15	3	53.8	71.9	388.2	0.001326	#######	0.057	0.000	0.057	0.4%
15:25	10	388.6	71.9	388.2	0.031922	#######	1.383	0.000	1.383	10.8%
15:31	6	520.2	71.9	388.2	0.02564	#######	1.111	0.000	1.111	8.7%
15:38	7	429.7	71.9	388.2	0.024709	#######	1.070	0.000	1.070	8.4%
15:46	8	192.8	72.0	388.2	0.01267	#######	0.549	0.000	0.549	4.3%
15:57	11	136.5	72.1	388.3	0.012331	#######	0.534	0.000	0.534	4.2%
16:05	8	200.6	72.2	388.4	0.013177	#######	0.571	0.000	0.571	4.5%
16:11	6	526.1	72.2	388.4	0.025915	#######	1.123	0.000	1.123	8.8%
16:18	7	439.4	72.2	388.4	0.025254	#######	1.094	0.000	1.094	8.5%
16:28	10	209.2	72.3	388.5	0.017174	#######	0.744	0.000	0.744	5.8%
16:36	8	111.1	72.3	388.5	0.007298	#######	0.316	0.000	0.316	2.5%
16:43	7	424.3	72.3	388.5	0.02438	#######	1.056	0.000	1.056	8.2%
16:49	6	538.6	72.2	388.4	0.026529	#######	1.149	0.000	1.149	9.0%
17:03	14	208.3	72.1	388.3	0.02394	#######	1.037	0.000	1.037	8.1%
17:15	12	115.9	72.2	388.4	0.011417	#######	0.495	0.000	0.495	3.9%
17:25	10	61.8	72.3	388.4	0.00507	#######	0.220	0.000	0.220	1.7%
17:34	9	31.7	72.2	388.4	0.002343	#######	0.101	0.000	0.101	0.8%
17:46	12	18.5	72.1	388.3	0.001825	#######	0.079	0.000	0.079	0.6%
17:52	6	13.0	71.8	388.1	0.000639	#######	0.028	0.000	0.028	0.2%
18:01	9	10.4	71.6	388.0	0.00077	#######	0.033	0.000	0.033	0.3%
18:29	28	6.7	71.2	387.7	0.001535	#######	0.066	0.000	0.066	0.5%
	197									
				Emissions			12.815	0.000	12.815	
				Available			57.47	0.00	57.47	
				Percent of Available			22.3%	#DIV/0!	22.3%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
170	166	0	0.0043	0.184	0.000	0.187
221	82	0	0.0184	0.798	0.000	0.811
888	784	0	0.0444	1.924	0.000	1.954
257	269	0	0.0150	0.650	0.000	0.660
170	144	0	0.0113	0.491	0.000	0.499
121	108	0	0.0111	0.480	0.000	0.488
460	412	0	0.0307	1.328	0.000	1.349
710	625	0	0.0355	1.537	0.000	1.562
295	326	0	0.0172	0.745	0.000	0.757
450	104	0	0.0375	1.624	0.000	1.649
160	148	0	0.0107	0.462	0.000	0.469
520	465	0	0.0303	1.313	0.000	1.334
430	328	0	0.0215	0.931	0.000	0.946
116	96	0	0.0135	0.586	0.000	0.595
88	73	0	0.0088	0.381	0.000	0.387
44	36	0	0.0037	0.159	0.000	0.161
27	20	0	0.0020	0.088	0.000	0.089
19	12	0	0.0019	0.082	0.000	0.084
15	7	0	0.0008	0.033	0.000	0.033
12	7	0	0.0009	0.039	0.000	0.040
Emissions				13.835	0.000	14.054
Available				57.47	0.00	57.47
Percent of Available				24.1%	#DIV/0!	24.5%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-5-2		18 Deck 42R	
File:	041497.PRN			
Calibration:	0414A.CAL			
Date:	4/14/97			
Persons:	Doerle			
			339.8	lb start
Amount of Resin Used:	113.7 lb		226.1	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	66.3			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3137		3071	cfm
Average THC concentration (ppmv)	187.4			
Molar volume (scf/lb mol)	384.0		9:39	Time start
Duration of test (min)	150	2:30	12:09	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	10.12			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	47.99	0.00	47.99		47.99	0.00	47.99
Emissions	10.00	0.00	10.00	10.12	10.73	0.00	10.90
Fraction	20.8%	#DIV/0!	20.8%	21.1%	22.4%	#DIV/0!	22.7%
Difference between approaches—>				1.23%			8.26%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:40	1	38.8	61.5	380.5	0.00032	#######	0.014	0.000	0.014	0.1%
9:46	6	225.7	63.1	381.7	0.011129	#######	0.482	0.000	0.482	4.8%
9:52	6	366.2	65.3	383.3	0.017976	#######	0.779	0.000	0.779	7.8%
10:01	9	289.1	65.7	383.7	0.021269	#######	0.921	0.000	0.921	9.2%
10:09	8	180.1	66.3	384.1	0.011767	#######	0.510	0.000	0.510	5.1%
10:16	7	139.2	66.8	384.4	0.007952	#######	0.344	0.000	0.344	3.4%
10:24	8	113.9	67.0	384.6	0.007429	#######	0.322	0.000	0.322	3.2%
10:31	7	93.8	66.4	384.1	0.005361	#######	0.232	0.000	0.232	2.3%
10:38	7	232.9	66.3	384.1	0.01331	#######	0.577	0.000	0.577	5.8%
10:48	10	595.0	66.6	384.3	0.048568	#######	2.104	0.000	2.104	21.0%
10:54	6	538.1	66.8	384.5	0.026339	#######	1.141	0.000	1.141	11.4%
11:05	11	272.8	66.8	384.4	0.024484	#######	1.061	0.000	1.061	10.6%
11:12	7	184.8	66.8	384.4	0.010553	#######	0.457	0.000	0.457	4.6%
11:19	7	147.8	66.4	384.2	0.008447	#######	0.366	0.000	0.366	3.7%
11:36	17	82.1	66.5	384.2	0.011388	#######	0.493	0.000	0.493	4.9%
11:48	12	27.3	66.7	384.3	0.002676	#######	0.116	0.000	0.116	1.2%
12:03	15	11.7	66.4	384.1	0.001439	#######	0.062	0.000	0.062	0.6%
12:09	6	7.6	66.4	384.1	0.00037	#######	0.016	0.000	0.016	0.2%
	150									
				Emissions			9.996	0.000	9.996	
				Available			47.99	0.00	47.99	
				Percent of Available			20.8%	#DIV/0!	20.8%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
52	26	0	0.0004	0.018	0.000	0.018
260	85	0	0.0126	0.544	0.000	0.552
470	139	0	0.0226	0.979	0.000	0.994
334	66	0	0.0241	1.042	0.000	1.059
161	52	0	0.0103	0.446	0.000	0.453
127	44	0	0.0071	0.308	0.000	0.313
108	36	0	0.0069	0.299	0.000	0.304
90	32	0	0.0050	0.218	0.000	0.222
470	144	0	0.0263	1.139	0.000	1.157
825	223	0	0.0659	2.856	0.000	2.901
421	125	0	0.0202	0.874	0.000	0.888
221	78	0	0.0194	0.841	0.000	0.854
170	58	0	0.0095	0.412	0.000	0.418
134	49	0	0.0075	0.325	0.000	0.330
49	28	0	0.0067	0.288	0.000	0.293
20.6	11	0	0.0020	0.086	0.000	0.087
10	8	0	0.0012	0.052	0.000	0.053
0	212	0	0.0000	0.000	0.000	0.000
Emissions				10.726	0.000	10.896
Available				47.99	0.00	47.99
Percent of Available				22.4%	#DIV/0!	22.7%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-2-2		18 Hull 42R	
File:	041497.PRN			
Calibration:	0414B.CAL			
Date:	4/14/97			
Persons:	Doerle			
			357.0	lb start
Amount of Resin Used:	149.5 lb		207.5	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	66.8			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3231		3053 cfm	
Average THC concentration (ppmv)	194.6			
Molar volume (scf/lb mol)	384.4		13:40	Time start
Duration of test (min)	161	2:40:59	16:21	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	11.70			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	63.10	0.00	63.10		63.10	0.00	63.10
Emissions	11.46	0.00	11.46	11.70	8.93	0.00	9.07
Fraction	18.2%	#DIV/0!	18.2%	18.5%	14.2%	#DIV/0!	14.4%
Difference between approaches—>				1.98%			-26.39%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
13:42	2	42.8	63.6	382.1	0.000724	#######	0.031	0.000	0.031	0.3%
13:48	6	356.3	65.5	383.5	0.018009	#######	0.780	0.000	0.780	6.8%
13:54	6	423.5	65.9	383.8	0.021389	#######	0.926	0.000	0.926	8.1%
14:00	6	480.7	65.9	383.8	0.024283	#######	1.052	0.000	1.052	9.2%
14:08	8	255.0	66.0	383.9	0.01717	#######	0.744	0.000	0.744	6.5%
14:15	7	178.5	66.1	383.9	0.010512	#######	0.455	0.000	0.455	4.0%
14:22	7	151.7	66.6	384.3	0.008925	#######	0.387	0.000	0.387	3.4%
14:28	6	147.5	67.6	385.0	0.007427	#######	0.322	0.000	0.322	2.8%
14:39	11	446.3	67.3	384.8	0.041214	#######	1.785	0.000	1.785	15.6%
14:47	8	243.2	66.6	384.3	0.016355	#######	0.708	0.000	0.708	6.2%
14:53	6	150.3	66.6	384.3	0.007579	#######	0.328	0.000	0.328	2.9%
15:03	10	102.2	66.4	384.1	0.008592	#######	0.372	0.000	0.372	3.2%
15:09	6	70.1	66.8	384.4	0.003535	#######	0.153	0.000	0.153	1.3%
15:16	7	216.6	66.9	384.5	0.01274	#######	0.552	0.000	0.552	4.8%
15:25	9	405.5	67.0	384.6	0.030657	#######	1.328	0.000	1.328	11.6%
15:43	18	173.5	67.3	384.8	0.026223	#######	1.136	0.000	1.136	9.9%
15:49	6	70.6	67.4	384.9	0.003554	#######	0.154	0.000	0.154	1.3%
15:58	9	42.0	67.5	384.9	0.003169	#######	0.137	0.000	0.137	1.2%
16:11	13	18.1	67.6	385.0	0.001971	#######	0.085	0.000	0.085	0.7%
16:21	10	7.8	67.4	384.9	0.000657	#######	0.028	0.000	0.028	0.2%
	161									
				Emissions			11.465	0.000	11.465	
				Available			63.10	0.00	63.10	
				Percent of Available			18.2%	#DIV/0!	18.2%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
135	48	0	0.0022	0.093	0.000	0.095
333	102	0	0.0159	0.689	0.000	0.700
504	147	0	0.0241	1.042	0.000	1.058
340	103	0	0.0162	0.703	0.000	0.714
190	66	0	0.0121	0.524	0.000	0.532
156	52	0	0.0087	0.376	0.000	0.382
137	48	0	0.0076	0.330	0.000	0.335
300	89	0	0.0143	0.618	0.000	0.628
134	104	0	0.0117	0.506	0.000	0.515
187	58	0	0.0119	0.515	0.000	0.523
130	45	0	0.0062	0.268	0.000	0.273
81	28	0	0.0064	0.279	0.000	0.283
65	23	0	0.0031	0.134	0.000	0.136
410	134	0	0.0228	0.987	0.000	1.003
338	121	0	0.0241	1.046	0.000	1.062
88	33	0	0.0126	0.544	0.000	0.553
61	24	0	0.0029	0.126	0.000	0.128
31	15	0	0.0022	0.096	0.000	0.097
12	9	0	0.0012	0.054	0.000	0.054
Emissions				8.930	0.000	9.071
Available				63.10	0.00	63.10
Percent of Available				14.2%	#DIV/0!	14.4%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-16-1		18 Deck 42R-FC	
File:	041597.PRN			
Calibration:	0415A.CAL			
Date:	4/15/97			
Persons:	Doerle			
			380.4	lb start
Amount of Resin Used:	128.5 lb		251.9	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	66.6			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3206		3297	cfm
Average THC concentration (ppmv)	121.0			
Molar volume (scf/lb mol)	384.3		9:49	Time start
Duration of test (min)	150	2:30:00	12:19	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	6.76			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	54.22	0.00	54.22		54.22	0.00	54.22
Emissions	6.60	0.00	6.60	6.76	6.49	0.00	6.59
Fraction	12.2%	#DIV/0!	12.2%	12.5%	12.0%	#DIV/0!	12.2%
Difference between approaches—>				2.40%			-0.12%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:51	2	18.1	66.4	384.1	0.000302	#######	0.013	0.000	0.013	0.2%
9:57	6	122.0	66.7	384.4	0.006105	#######	0.264	0.000	0.264	4.0%
10:08	11	182.2	66.3	384.1	0.016728	#######	0.725	0.000	0.725	11.0%
10:18	10	146.7	66.6	384.3	0.01224	#######	0.530	0.000	0.530	8.0%
10:26	8	112.1	66.6	384.3	0.00748	#######	0.324	0.000	0.324	4.9%
10:36	10	100.4	66.5	384.2	0.008375	#######	0.363	0.000	0.363	5.5%
10:44	8	89.4	66.5	384.2	0.005967	#######	0.258	0.000	0.258	3.9%
10:51	7	214.8	66.7	384.3	0.012542	#######	0.543	0.000	0.543	8.2%
11:06	15	263.0	66.9	384.5	0.032893	#######	1.425	0.000	1.425	21.6%
11:15	9	187.3	66.8	384.5	0.014057	#######	0.609	0.000	0.609	9.2%
11:22	7	153.2	66.4	384.2	0.008949	#######	0.388	0.000	0.388	5.9%
11:29	7	137.9	66.2	384.0	0.008062	#######	0.349	0.000	0.349	5.3%
11:38	9	113.5	66.3	384.1	0.008526	#######	0.369	0.000	0.369	5.6%
11:49	11	69.1	66.5	384.2	0.006343	#######	0.275	0.000	0.275	4.2%
11:55	6	33.9	66.7	384.3	0.001697	#######	0.074	0.000	0.074	1.1%
12:06	11	15.7	66.7	384.4	0.001439	#######	0.062	0.000	0.062	0.9%
12:13	7	6.6	66.9	384.5	0.000387	#######	0.017	0.000	0.017	0.3%
12:19	6	3.6	66.9	384.5	0.00018	#######	0.008	0.000	0.008	0.1%
	150									
				Emissions			6.596	0.000	6.596	
				Available			54.22	0.00	54.22	
				Percent of Available			12.2%	#DIV/0!	12.2%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
40	19	0	0.0007	0.030	0.000	0.030
130	38	0	0.0067	0.290	0.000	0.294
182	66	0	0.0172	0.744	0.000	0.756
121	41	0	0.0104	0.450	0.000	0.457
107	35	0	0.0073	0.318	0.000	0.323
96	35	0	0.0082	0.357	0.000	0.362
94	48	0	0.0065	0.280	0.000	0.284
245	0	0	0.0147	0.637	0.000	0.647
253	76	0	0.0325	1.410	0.000	1.432
170	61	0	0.0131	0.568	0.000	0.577
150	55	0	0.0090	0.390	0.000	0.397
136	45	0	0.0082	0.354	0.000	0.360
99	34	0	0.0076	0.331	0.000	0.337
48	21	0	0.0045	0.196	0.000	0.199
27	14	0	0.0014	0.060	0.000	0.061
12	8	0	0.0011	0.049	0.000	0.050
8	6	0	0.0005	0.021	0.000	0.021
0	212	0	0.0000	0.000	0.000	0.000
Emissions				6.485	0.000	6.588
Available				54.22	0.00	54.22
Percent of Available				12.0%	#DIV/0!	12.2%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-15-1		18 Hull 42R-FC	
File:	041597.PRN			
Calibration:	0414B.CAL			
Date:	4/15/97			
Persons:	Doerle			
			386.1	lb start
Amount of Resin Used:	152.5 lb		233.6	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	67.5			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3218		3168 cfm	
Average THC concentration (ppmv)	114.4			
Molar volume (scf/lb mol)	384.9		13:59	Time start
Duration of test (min)	180	3:00:00	16:59	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	7.69			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	64.35	0.00	64.35		64.35	0.00	64.35
Emissions	7.47	0.00	7.47	7.69	7.55	0.00	7.67
Fraction	11.6%	#DIV/0!	11.6%	11.9%	11.7%	#DIV/0!	11.9%
Difference between approaches—>				2.79%			2.53%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
14:07	8	51.2	68.0	385.3	0.00342	#######	0.148	0.000	0.148	2.0%
14:14	7	169.6	68.3	385.5	0.00991	#######	0.429	0.000	0.429	5.7%
14:21	7	261.2	68.4	385.6	0.015255	#######	0.661	0.000	0.661	8.8%
14:32	11	182.4	68.3	385.6	0.016742	#######	0.725	0.000	0.725	9.7%
14:42	10	111.9	68.1	385.4	0.009348	#######	0.405	0.000	0.405	5.4%
14:54	12	108.7	68.1	385.4	0.010893	#######	0.472	0.000	0.472	6.3%
15:00	6	215.0	68.3	385.6	0.010768	#######	0.466	0.000	0.466	6.2%
15:07	7	275.1	68.4	385.6	0.01607	#######	0.696	0.000	0.696	9.3%
15:15	8	200.3	68.3	385.5	0.013373	#######	0.579	0.000	0.579	7.8%
15:22	7	145.1	68.0	385.3	0.008484	#######	0.368	0.000	0.368	4.9%
15:30	8	99.8	67.8	385.2	0.006666	#######	0.289	0.000	0.289	3.9%
15:42	12	71.3	67.7	385.1	0.007145	#######	0.309	0.000	0.309	4.1%
15:49	7	190.9	67.6	385.0	0.011171	#######	0.484	0.000	0.484	6.5%
16:00	11	168.3	67.2	384.7	0.015489	#######	0.671	0.000	0.671	9.0%
16:13	13	91.5	66.8	384.5	0.009958	#######	0.431	0.000	0.431	5.8%
16:28	15	41.0	66.5	384.2	0.005148	#######	0.223	0.000	0.223	3.0%
16:35	7	18.8	66.3	384.1	0.001105	#######	0.048	0.000	0.048	0.6%
16:42	7	11.7	66.2	384.0	0.000689	#######	0.030	0.000	0.030	0.4%
16:49	7	8.1	66.1	384.0	0.000473	#######	0.020	0.000	0.020	0.3%
16:59	10	4.8	66.2	384.0	0.000406	#######	0.018	0.000	0.018	0.2%
	180									
				Emissions			7.473	0.000	7.473	
				Available			64.35	0.00	64.35	
				Percent of Available			11.6%	#DIV/0!	11.6%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
140	40	0	0.0092	0.399	0.000	0.405
186	69	0	0.0107	0.463	0.000	0.471
250	94	0	0.0144	0.623	0.000	0.633
145	47	0	0.0131	0.568	0.000	0.577
115	41	0	0.0095	0.409	0.000	0.416
160	50	0	0.0158	0.684	0.000	0.694
230	72	0	0.0113	0.491	0.000	0.499
242	72	0	0.0139	0.603	0.000	0.612
176	62	0	0.0116	0.501	0.000	0.509
124	42	0	0.0071	0.309	0.000	0.314
87	31	0	0.0057	0.248	0.000	0.252
147	42	0	0.0145	0.629	0.000	0.639
232	73	0	0.0134	0.579	0.000	0.588
130	46	0	0.0118	0.510	0.000	0.518
63	26	0	0.0067	0.292	0.000	0.297
27	14	0	0.0033	0.145	0.000	0.147
17	10	0	0.0010	0.043	0.000	0.043
12	8	0	0.0007	0.030	0.000	0.030
9	7	0	0.0005	0.023	0.000	0.023
Emissions				7.547	0.000	7.666
Available				64.35	0.00	64.35
Percent of Available				11.7%	#DIV/0!	11.9%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-16-2		18 Deck 42R-FC	
File:	041697.PRN			
Calibration:	0416A.CAL			
Date:	4/16/97			
Persons:	Doerle			
			426.0	lb start
Amount of Resin Used:	115.9 lb		310.1	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	69.1			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3243		3243	cfm
Average THC concentration (ppmv)	130.0			
Molar volume (scf/lb mol)	386.1		9:32	Time start
Duration of test (min)	144	2:24:00	11:56	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	6.99			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	48.90	0.00	48.90		48.90	0.00	48.90
Emissions	6.85	0.00	6.85	6.99	7.05	0.00	7.16
Fraction	14.0%	#DIV/0!	14.0%	14.3%	14.4%	#DIV/0!	14.6%
Difference between approaches--->				2.06%			4.38%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
9:35	3	33.2	68.8	385.9	0.000837	#######	0.036	0.000	0.036	0.5%
9:43	8	154.1	68.8	385.9	0.010358	#######	0.449	0.000	0.449	6.6%
9:54	11	220.2	68.7	385.8	0.020357	#######	0.882	0.000	0.882	12.9%
10:14	20	146.0	68.4	385.6	0.024554	#######	1.064	0.000	1.064	15.5%
10:23	9	102.9	68.2	385.5	0.007791	#######	0.337	0.000	0.337	4.9%
10:35	12	157.4	68.3	385.5	0.015887	#######	0.688	0.000	0.688	10.0%
10:41	6	322.0	68.6	385.8	0.016241	#######	0.703	0.000	0.703	10.3%
10:47	6	286.7	68.8	385.9	0.014456	#######	0.626	0.000	0.626	9.1%
10:54	7	220.3	68.9	386.0	0.012955	#######	0.561	0.000	0.561	8.2%
11:03	9	176.3	69.2	386.2	0.013322	#######	0.577	0.000	0.577	8.4%
11:11	8	138.1	69.5	386.4	0.009271	#######	0.402	0.000	0.402	5.9%
11:18	7	89.3	69.8	386.6	0.005244	#######	0.227	0.000	0.227	3.3%
11:25	7	51.8	69.9	386.7	0.003041	#######	0.132	0.000	0.132	1.9%
11:31	6	29.8	70.1	386.8	0.001497	#######	0.065	0.000	0.065	0.9%
11:38	7	18.3	70.3	387.0	0.001073	#######	0.046	0.000	0.046	0.7%
11:46	8	10.7	70.2	386.9	0.000719	#######	0.031	0.000	0.031	0.5%
11:53	7	6.7	70.3	387.0	0.000394	#######	0.017	0.000	0.017	0.2%
11:56	3	4.8	70.4	387.0	0.00012	#######	0.005	0.000	0.005	0.1%
	144									
				Emissions			6.849	0.000	6.849	
				Available			48.90	0.00	48.90	
				Percent of Available			14.0%	#DIV/0!	14.0%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
82	27	0	0.0021	0.090	0.000	0.091
233	84	0	0.0157	0.678	0.000	0.689
194	60	0	0.0179	0.777	0.000	0.789
125	52	0	0.0210	0.911	0.000	0.925
93	40	0	0.0070	0.305	0.000	0.310
223	34	0	0.0225	0.975	0.000	0.990
368	81	0	0.0186	0.804	0.000	0.817
267	114	0	0.0135	0.583	0.000	0.592
205	81	0	0.0121	0.522	0.000	0.530
162	61	0	0.0122	0.530	0.000	0.539
123	0	0	0.0083	0.358	0.000	0.363
76	49	0	0.0045	0.193	0.000	0.196
43	35	0	0.0025	0.109	0.000	0.111
29	16	0	0.0015	0.063	0.000	0.064
26	10	0	0.0015	0.066	0.000	0.067
17	6	0	0.0011	0.049	0.000	0.050
11	4	0	0.0006	0.028	0.000	0.028
8	3	0	0.0002	0.009	0.000	0.009
Emissions				7.051	0.000	7.162
Available				48.90	0.00	48.90
Percent of Available				14.4%	#DIV/0!	14.6%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-12-1		CFA 42R	
File:	041797.PRN			
Calibration:	0417A.CAL			
Date:	4/17/97			
Persons:	Doerle			
			236.3	lb start
Amount of Resin Used:	5.4 lb		230.9	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	65.6			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3249		3246	cfm
Average THC concentration (ppmv)	40.8			
Molar volume (scf/lb mol)	383.6		8:31	Time start
Duration of test (min)	83	1:23:00	9:54	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	1.27			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	2.28	0.00	2.28		2.28	0.00	2.28
Emissions	1.25	0.00	1.25	1.27	1.02	0.00	1.04
Fraction	54.6%	#DIV/0!	54.6%	55.7%	44.8%	#DIV/0!	45.5%
Difference between approaches--->				1.91%			-19.94%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
8:32	1	6.4	64.2	382.5	5.46E-05	#######	0.002	0.000	0.002	0.2%
8:40	8	149.3	65.5	383.5	0.010118	#######	0.438	0.000	0.438	35.2%
8:52	12	72.2	65.5	383.5	0.00734	#######	0.318	0.000	0.318	25.5%
8:59	7	45.0	64.8	383.0	0.002672	#######	0.116	0.000	0.116	9.3%
9:06	7	34.3	65.5	383.5	0.002034	#######	0.088	0.000	0.088	7.1%
9:14	7	28.9	65.3	383.4	0.001717	#######	0.074	0.000	0.074	6.0%
9:19	5	21.8	65.2	383.3	0.000923	#######	0.040	0.000	0.040	3.2%
9:25	6	18.6	65.5	383.5	0.000945	#######	0.041	0.000	0.041	3.3%
9:34	9	16.6	65.9	383.8	0.001268	#######	0.055	0.000	0.055	4.4%
9:41	7	12.8	66.1	383.9	0.000761	#######	0.033	0.000	0.033	2.6%
9:51	10	8.9	66.3	384.1	0.000754	#######	0.033	0.000	0.033	2.6%
9:54	3	6.6	66.5	384.2	0.000166	#######	0.007	0.000	0.007	0.6%
	82									
				Emissions			1.245	0.000	1.245	
				Available			2.28	0.00	2.28	
				Percent of Available			54.6%	#DIV/0!	54.6%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
2	3	0	0.0000	0.001	0.000	0.001
115	36	0	0.0078	0.337	0.000	0.343
57	21	0	0.0058	0.251	0.000	0.255
39	15	0	0.0023	0.100	0.000	0.102
26	11	0	0.0015	0.067	0.000	0.068
23	11	0	0.0014	0.059	0.000	0.060
23	10	0	0.0010	0.042	0.000	0.043
21	11	0	0.0011	0.046	0.000	0.047
16	9	0	0.0012	0.053	0.000	0.054
13	7	0	0.0008	0.033	0.000	0.034
9	6	0	0.0008	0.033	0.000	0.033
Emissions				1.022	0.000	1.038
Available				2.28	0.00	2.28
Percent of Available				44.8%	#DIV/0!	45.5%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-9-1		28 Hull 42R	
File:	041897.PRN			
Calibration:	0418A.CAL			
Date:	4/18/97			
Persons:	Doerle			
			462.5	lb start
Amount of Resin Used:	292.7 lb		169.7	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	66.0			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3201		3271	cfm
Average THC concentration (ppmv)	180.6			
Molar volume (scf/lb mol)	383.9		7:55	Time start
Duration of test (min)	431	7:11:00	15:06	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	28.40			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	THC
Input	123.53	0.00	123.53		123.53	0.00	123.53
Emissions	28.19	0.00	28.19	28.40	31.53	0.00	32.03
Fraction	22.8%	#DIV/0!	22.8%	23.0%	25.5%	#DIV/0!	25.9%
Difference between approaches--->				0.74%			11.98%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
7:58	3	74.5	62.9	381.6	0.001874	#######	0.081	0.000	0.081	0.3%
8:10	12	297.0	63.2	381.8	0.029883	#######	1.294	0.000	1.294	4.6%
8:18	8	339.8	63.3	381.8	0.022793	#######	0.987	0.000	0.987	3.5%
8:27	9	388.8	63.2	381.8	0.029339	#######	1.271	0.000	1.271	4.5%
8:36	9	182.6	63.0	381.6	0.013784	#######	0.597	0.000	0.597	2.1%
8:48	12	110.1	63.0	381.6	0.011085	#######	0.480	0.000	0.480	1.7%
8:58	10	108.8	63.0	381.6	0.009127	#######	0.395	0.000	0.395	1.4%
9:21	23	194.8	63.2	381.8	0.037577	#######	1.628	0.000	1.628	5.8%
9:34	13	586.7	63.5	382.0	0.063913	#######	2.768	0.000	2.768	9.8%
9:47	13	229.0	63.6	382.1	0.024941	#######	1.080	0.000	1.080	3.8%
10:00	13	114.3	63.8	382.2	0.01244	#######	0.539	0.000	0.539	1.9%
10:13	13	92.1	64.0	382.4	0.010026	#######	0.434	0.000	0.434	1.5%
10:31	18	191.0	64.5	382.8	0.02876	#######	1.246	0.000	1.246	4.4%
10:39	8	528.9	65.0	383.1	0.035357	#######	1.531	0.000	1.531	5.4%
10:52	13	584.8	65.1	383.2	0.063503	#######	2.751	0.000	2.751	9.8%
11:06	14	290.9	65.3	383.3	0.034005	#######	1.473	0.000	1.473	5.2%
11:19	13	135.9	65.6	383.6	0.01474	#######	0.638	0.000	0.638	2.3%
11:35	16	115.6	66.1	383.9	0.015423	#######	0.668	0.000	0.668	2.4%
11:48	13	77.6	66.7	384.4	0.008397	#######	0.364	0.000	0.364	1.3%
12:08	20	39.3	67.2	384.8	0.00654	#######	0.283	0.000	0.283	1.0%
12:14	6	226.6	67.6	385.0	0.011306	#######	0.490	0.000	0.490	1.7%
12:28	14	663.9	67.9	385.2	0.077238	#######	3.346	0.000	3.346	11.9%
12:36	8	370.4	68.1	385.4	0.02461	#######	1.066	0.000	1.066	3.8%
12:45	9	160.2	68.2	385.5	0.011974	#######	0.519	0.000	0.519	1.8%
12:55	10	104.7	68.4	385.6	0.008693	#######	0.377	0.000	0.377	1.3%
13:07	12	96.2	68.5	385.7	0.009581	#######	0.415	0.000	0.415	1.5%
13:24	17	87.2	68.7	385.8	0.012301	#######	0.533	0.000	0.533	1.9%
13:44	20	52.4	68.9	386.0	0.008694	#######	0.377	0.000	0.377	1.3%
14:02	18	30.4	69.3	386.3	0.004534	#######	0.196	0.000	0.196	0.7%
14:14	12	23.0	69.4	386.4	0.002287	#######	0.099	0.000	0.099	0.4%
14:22	8	19.8	69.5	386.4	0.001312	#######	0.057	0.000	0.057	0.2%
14:31	9	16.9	68.0	385.3	0.001261	#######	0.055	0.000	0.055	0.2%
14:44	13	14.4	66.0	383.8	0.001563	#######	0.068	0.000	0.068	0.2%
15:06	22	11.0	67.6	385.0	0.002008	#######	0.087	0.000	0.087	0.3%
	431									
				Emissions			28.193	0.000	28.193	
				Available			123.53	0.00	123.53	
				Percent of Available			22.8%	#DIV/0!	22.8%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
311	110	0	0.0080	0.346	0.000	0.352
174	74	0	0.0179	0.775	0.000	0.787
290	113	0	0.0199	0.861	0.000	0.874
330	117	0	0.0254	1.102	0.000	1.119
127	52	0	0.0098	0.424	0.000	0.431
107	46	0	0.0110	0.477	0.000	0.484
100	46	0	0.0086	0.371	0.000	0.377
616	211	0	0.1214	5.257	0.000	5.340
520	117	0	0.0579	2.507	0.000	2.546
139	60	0	0.0155	0.670	0.000	0.681
105	42	0	0.0117	0.506	0.000	0.514
99	40	0	0.0110	0.477	0.000	0.484
430	167	0	0.0661	2.865	0.000	2.910
600	216	0	0.0410	1.775	0.000	1.803
565	188	0	0.0627	2.715	0.000	2.758
163	68	0	0.0195	0.843	0.000	0.857
129	54	0	0.0143	0.619	0.000	0.629
103	42	0	0.0140	0.608	0.000	0.618
65	28	0	0.0072	0.311	0.000	0.316
29	49	0	0.0049	0.214	0.000	0.217
540	193	0	0.0275	1.192	0.000	1.211
630	244	0	0.0749	3.243	0.000	3.295
267	99	0	0.0181	0.785	0.000	0.798
131	52	0	0.0100	0.433	0.000	0.440
101	39	0	0.0086	0.371	0.000	0.377
99	42	0	0.0101	0.436	0.000	0.443
81	35	0	0.0117	0.506	0.000	0.514
42	19	0	0.0071	0.308	0.000	0.313
30	14	0	0.0046	0.198	0.000	0.201
27	12	0	0.0027	0.119	0.000	0.121
25	11	0	0.0017	0.073	0.000	0.074
20	10	0	0.0015	0.066	0.000	0.067
16	9	0	0.0018	0.077	0.000	0.078
Emissions				31.531	0.000	32.029
Available				123.53	0.00	123.53
Percent of Available				25.5%	#DIV/0!	25.9%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-12-2		CFA 42R	
File:	041897.PRN			
Calibration:	0418A.CAL			
Date:	4/18/97			
Persons:	Doerle			
			170.7	lb start
Amount of Resin Used:	4.73 lb		165.9	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	67.6			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3218		3271	cfm
Average THC concentration (ppmv)	33.4			
Molar volume (scf/lb mol)	385.0		15:49	Time start
Duration of test (min)	67	1:07:00	16:56	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	0.83			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	THC
Input	2.00	0.00	2.00		2.00	0.00	2.00
Emissions	0.78	0.00	0.78	0.83	0.76	0.00	0.77
Fraction	39.2%	#DIV/0!	39.2%	41.7%	38.2%	#DIV/0!	38.8%
Difference between approaches--->				5.86%			-1.19%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
15:53	4	102.1	67.7	385.1	0.003413	#######	0.148	0.000	0.148	18.9%
16:01	8	84.0	68.0	385.3	0.005614	#######	0.243	0.000	0.243	31.0%
16:07	6	49.8	67.9	385.2	0.002494	#######	0.108	0.000	0.108	13.8%
16:13	6	34.4	67.7	385.1	0.001726	#######	0.075	0.000	0.075	9.5%
16:20	7	24.0	67.7	385.1	0.001403	#######	0.061	0.000	0.061	7.8%
16:29	9	18.9	67.6	385.0	0.001418	#######	0.061	0.000	0.061	7.8%
16:43	14	11.6	67.5	384.9	0.001354	#######	0.059	0.000	0.059	7.5%
16:56	13	6.2	67.3	384.8	0.000679	#######	0.029	0.000	0.029	3.7%
	67									
				Emissions			0.784	0.000	0.784	
				Available			2.00	0.00	2.00	
				Percent of Available			39.2%	#DIV/0!	39.2%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
106	39	0	0.0036	0.156	0.000	0.158
73	29	0	0.0050	0.215	0.000	0.218
50	20	0	0.0025	0.110	0.000	0.112
34	16	0	0.0017	0.075	0.000	0.076
26	13	0	0.0015	0.067	0.000	0.068
22	11	0	0.0017	0.073	0.000	0.074
13	7	0	0.0015	0.067	0.000	0.068
Emissions				0.763	0.000	0.775
Available				2.00	0.00	2.00
Percent of Available				38.2%	#DIV/0!	38.8%

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test No.	NMMA-9-2		28 Hull 42R	
File:	041997.PRN			
Calibration:	0419A.CAL			
Date:	4/19/97			
Persons:	Doerle			
			496.5	lb start
Amount of Resin Used:	315.7 lb		180.9	lb finish
Content of Styrene:	0.422			
Content of MMA:	0			
Temperature (F)	67.6			
MW Styrene	104			
MW MMA	100.1			
Flow rate (acfm)	3328		3306	cfm
Average THC concentration (ppmv)	217.4			
Molar volume (scf/lb mol)	385.0		7:39	Time start
Duration of test (min)	376	6:16:00	13:55	Time end
Response factor (C3 to Styrene)	0.416			
Propane emissions from continuous data (lb	31.29			

	Average Data				Point Data		
	Styrene	MMA	Total	Propane	Styrene	MMA	Total
Input	133.22	0.00	133.22		133.22	0.00	133.22
Emissions	30.64	0.00	30.64	31.29	31.35	0.00	31.84
Fraction	23.0%	#DIV/0!	23.0%	23.5%	23.5%	#DIV/0!	23.9%
Difference between approaches—>				2.07%			3.77%

Time	Duration (min)	Av THC o (ppm)	Av Temp (F)	Molar Volume (cf/lbmol)	Total mols THC	Relative Styrene to MMA	Styrene	MMA	Total	Fraction of Emissions
7:40	1	0.7	64.8	383.0	6.12E-06	#######	0.000	0.000	0.000	0.0%
7:50	10	339.6	66.7	384.4	0.029402	#######	1.274	0.000	1.274	4.2%
7:59	9	602.1	67.3	384.8	0.046866	#######	2.030	0.000	2.030	6.6%
8:11	12	387.7	67.3	384.8	0.040244	#######	1.743	0.000	1.743	5.7%
8:23	12	155.9	67.7	385.1	0.01617	#######	0.700	0.000	0.700	2.3%
8:34	11	109.5	67.7	385.1	0.010408	#######	0.451	0.000	0.451	1.5%
8:45	11	209.2	69.1	386.1	0.019833	#######	0.859	0.000	0.859	2.8%
8:57	12	725.3	70.4	387.1	0.07483	#######	3.241	0.000	3.241	10.6%
9:09	12	460.0	70.0	386.8	0.047495	#######	2.057	0.000	2.057	6.7%
9:20	11	175.4	70.2	386.9	0.016593	#######	0.719	0.000	0.719	2.3%
9:32	12	114.9	70.5	387.2	0.011847	#######	0.513	0.000	0.513	1.7%
9:44	12	94.8	70.1	386.8	0.009789	#######	0.424	0.000	0.424	1.4%
9:59	15	355.8	69.0	386.0	0.04601	#######	1.993	0.000	1.993	6.5%
10:07	8	728.4	68.9	386.0	0.050246	#######	2.176	0.000	2.176	7.1%
10:21	14	480.2	68.8	385.9	0.057968	#######	2.511	0.000	2.511	8.2%
10:33	12	183.7	68.3	385.5	0.019032	#######	0.824	0.000	0.824	2.7%
10:44	11	131.0	68.0	385.3	0.012449	#######	0.539	0.000	0.539	1.8%
10:55	11	186.4	67.7	385.1	0.017723	#######	0.768	0.000	0.768	2.5%
11:07	12	682.7	67.6	385.0	0.070813	#######	3.067	0.000	3.067	10.0%
11:18	11	423.6	67.2	384.7	0.04031	#######	1.746	0.000	1.746	5.7%
11:30	12	196.4	66.9	384.5	0.020399	#######	0.884	0.000	0.884	2.9%
11:41	11	148.8	66.9	384.5	0.014167	#######	0.614	0.000	0.614	2.0%
11:53	12	107.3	66.8	384.5	0.011147	#######	0.483	0.000	0.483	1.6%
12:07	14	61.9	66.5	384.2	0.007502	#######	0.325	0.000	0.325	1.1%
12:18	11	38.3	66.4	384.1	0.003651	#######	0.158	0.000	0.158	0.5%
12:32	14	27.2	66.3	384.1	0.003297	#######	0.143	0.000	0.143	0.5%
12:45	13	20.6	66.2	384.0	0.002316	#######	0.100	0.000	0.100	0.3%
12:57	12	16.6	65.9	383.8	0.001724	#######	0.075	0.000	0.075	0.2%
13:09	12	13.8	65.8	383.7	0.001432	#######	0.062	0.000	0.062	0.2%
13:24	15	11.4	65.7	383.6	0.001479	#######	0.064	0.000	0.064	0.2%
13:40	16	9.2	65.6	383.6	0.001271	#######	0.055	0.000	0.055	0.2%
13:55	15	7.6	65.6	383.5	0.000984	#######	0.043	0.000	0.043	0.1%
				Emissions			30.641	0.000	30.641	
	376			Available			133.22	0.00	133.22	
				Percent of Available			23.0%	#DIV/0!	23.0%	

Point THC o (ppm)	Point Styrene (ppm)	Point MMA (ppm)	Point THC Mols	Point Styrene (lb)	Point MMA (lb)	Point THC o (lb)
0	4	0	0.0000	0.000	0.000	0.000
244	93	0	0.0210	0.909	0.000	0.923
811	292	0	0.0627	2.716	0.000	2.759
202	85	0	0.0208	0.902	0.000	0.916
129	52	0	0.0133	0.576	0.000	0.585
95	39	0	0.0090	0.389	0.000	0.395
745	263	0	0.0702	3.039	0.000	3.087
790	276	0	0.0810	3.507	0.000	3.562
259	100	0	0.0266	1.150	0.000	1.169
157	60	0	0.0148	0.639	0.000	0.649
105	45	0	0.0108	0.466	0.000	0.473
116	45	0	0.0119	0.515	0.000	0.523
540	192	0	0.0694	3.004	0.000	3.052
750	297	0	0.0514	2.226	0.000	2.261
240	91	0	0.0288	1.247	0.000	1.266
161	63	0	0.0166	0.718	0.000	0.729
105	46	0	0.0099	0.429	0.000	0.436
500	180	0	0.0472	2.045	0.000	2.077
678	251	0	0.0699	3.026	0.000	3.074
300	111	0	0.0284	1.228	0.000	1.247
166	63	0	0.0171	0.742	0.000	0.753
141	57	0	0.0133	0.578	0.000	0.587
88	38	0	0.0091	0.393	0.000	0.399
52	23	0	0.0063	0.271	0.000	0.276
33	16	0	0.0031	0.135	0.000	0.137
26	13	0	0.0031	0.136	0.000	0.138
20	11	0	0.0022	0.097	0.000	0.098
17	10	0	0.0018	0.076	0.000	0.077
14	9	0	0.0014	0.063	0.000	0.064
12	8	0	0.0016	0.067	0.000	0.068
10	7	0	0.0014	0.060	0.000	0.061
Emissions				31.347	0.000	31.842
Available				133.22	0.00	133.22
Percent of Available				23.5%	#DIV/0!	23.9%

Appendix C.6

Analysis of Concentration Tail

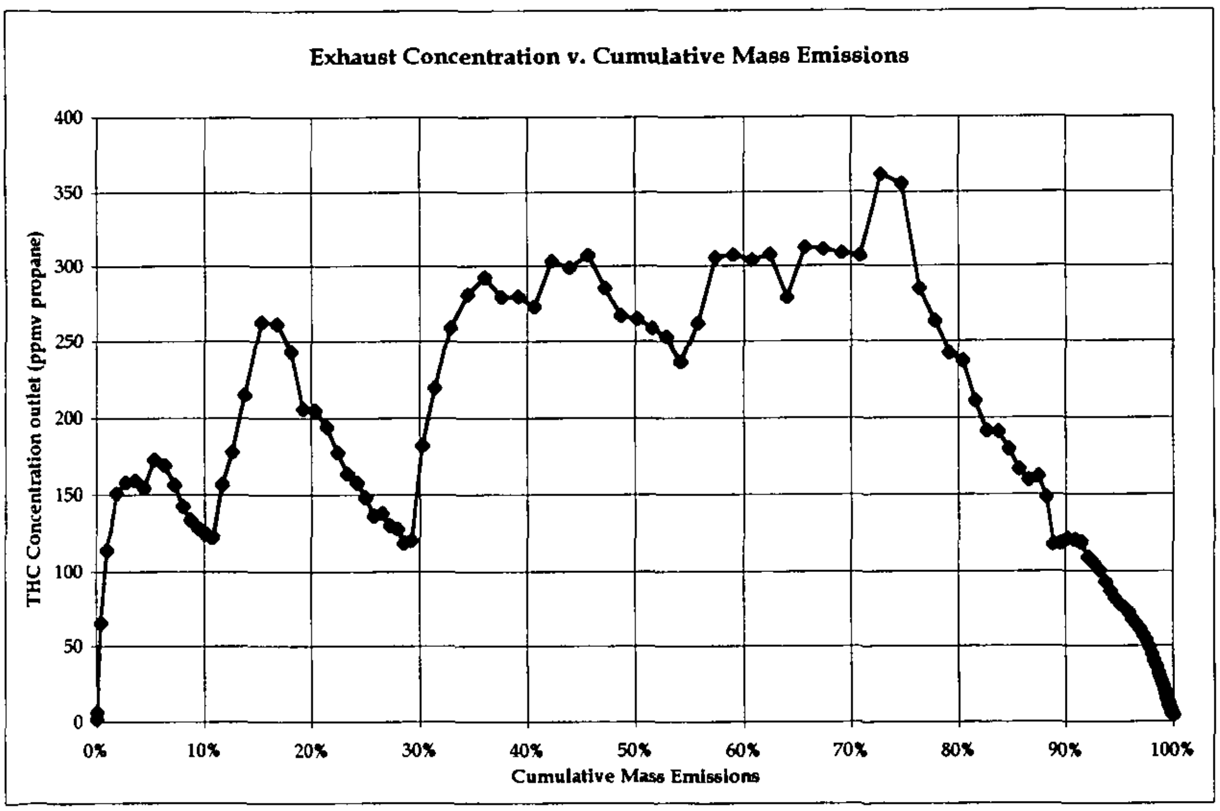
Calculation of Emissions from Concentration Tail

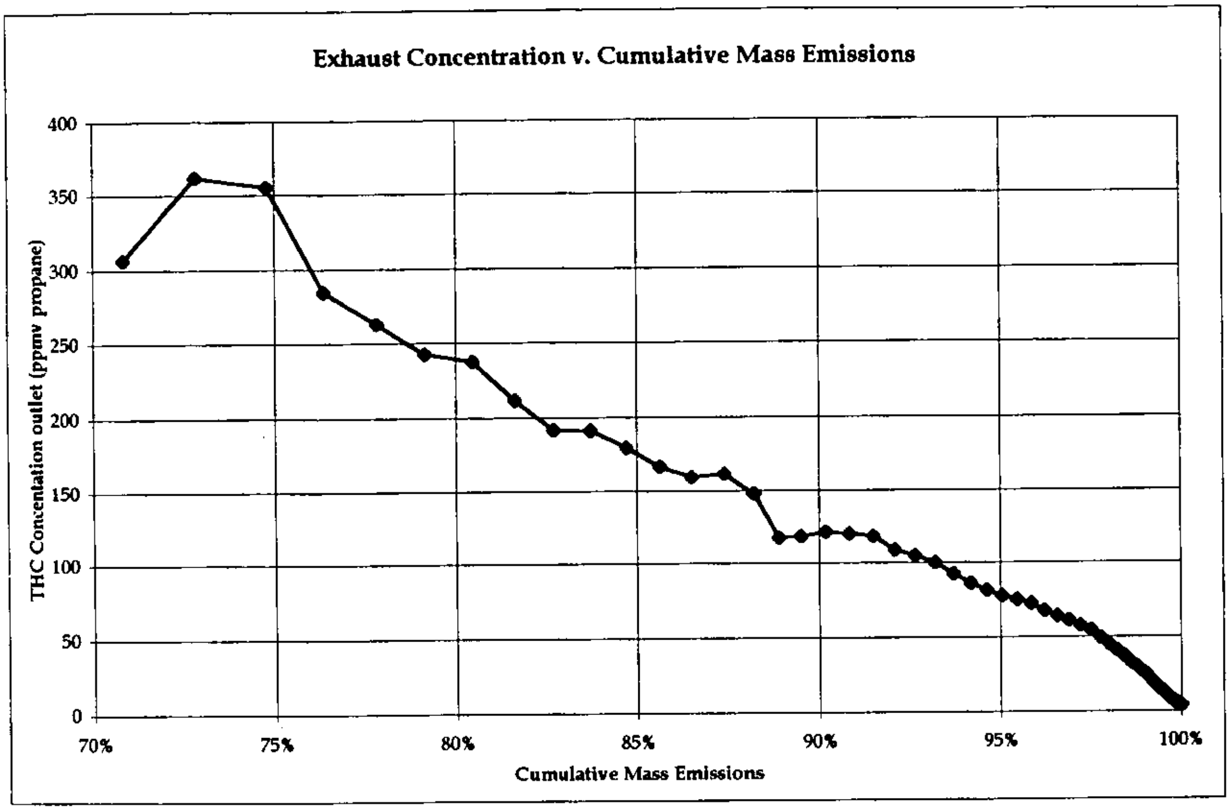
The QAPP for the NMMA testing noted the duration of testing to achieve background concentrations of styrene during lamination and gelcoat operations. The initial testing was conducted to ascertain the need for continuing sampling until reaching background concentrations. The criteria for ceasing sampling was to quantify at least 95 percent of emissions. This calculation presents the results from this sampling to determine the quantity of emissions in the tail not captured by the sampling using various cutoff concentrations as criteria for ceasing sampling.

Run NMMA-4-1 was conducted on April 3, 1997; this was a 35 percent styrene lamination run on the 18-ft deck mold. Sampling continued until the exhaust concentration was about 4 ppmv as propane, or less than 10 ppmv as styrene. The actual duration of sampling to achieve background would be no more than 10-20 minutes longer.

Measured emissions	lb	5.83	5.83
Concentration at cessation of sampling	ppmv propane	4	4
Duration of tail	min	20	10
Average concentration for tail	ppmv propane	2	2
Flow rate	cfm	3200	3200
Average molar volume	cfm/lbmol	391.4	391.4
Emissions in tail	lb	0.0144	0.0072
Percentage of measured emissions		0.2%	0.1%

Another evaluation was to consider alternate cutoff concentrations that would effectively capture 95 percent of total emissions. This was evaluated by looking at concentration and percentage of total emissions.





Using these curves, 95 percent of total emissions would be characterized with a cutoff concentration in the outlet (not accounting for the inlet background concentration) of approximately 75 ppmv propane. This was confirmed with data from other test runs.

Appendix C.7

Styrene Recovery Test Results

National Marine Manufacturers Association
Styrene Evaporation Test (Material Balance)

US Marine
Arlington, WA

File:	040197.PRN	
Calibration:	0331A.CAL	
Date:	4/1/97	
Persons:	Stelling, Doerle	
Quantity of Styrene Emitted:	1199 g	**[Styrene losses by mass balance]**
Temperature	65.6 F	
MW Styrene	104 lb/lb mol	
Flow rate	3017 acfm	
Average THC concentration	117.8 ppmv	**[Average value from DAS for entire run]**
Molar volume	383.6 scf/lb mol	
Duration of test	66 min	
Response factor (C3 to Styrene)	0.416	**[Model 51 response to styrene]**
Emissions	2.65 lb	
Emissions	1202 g	
Percent difference	0.21%	

STELLING ENGINEERING, P.A.
Air-Tech Environmental LLC

National Marine Manufacturers Association
Baseline Styrene Emission Testing

US Marine
Arlington, WA

Test Designation:	Towel Test 2			
File:	041997.PRN			
Calibration:	0419A.CAL			
Date:	4/19/97			
Persons:	Doerle			
		21.71	lb start	9.848
Quantity of Styrene Emitted:	1095 g	19.30	lb finish	8.753
Temperature (F)	66			
MW Styrene	104			
Flow rate (acfm)	3306			
Average THC concentration out (ppmv)	121.7			
Background concentration start (ppmv)	5.2			
Background concentration end (ppmv)	4.8			
Average THC concentration (ppmv)	116.7			
Molar volume (scf/lb mol)	383.9		14:50:24	
Duration of test (min)	59		15:49:24	
Response factor (C3 to Styrene)	0.416			
Emissions (lb)	2.57			
Emissions (g)	1165			
Percent difference	6.4%			

Appendix C. 8

Calculation of Error and Drift for Method 25A

18' Hull Spray Lamination, 35% Resin

Date	05-Apr-97							
Run Number	0405-02	Test Number		NMMA-1-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.1	14.3	30.0	45.7	0.0	304.5	628.6	939.5
Post-test Response (ppm)	-0.5	14.8	30.7		0.0	307.5	632.9	
Calibration Error (%AGV)	N.A.	-4.67	-1.32	0.44	N.A.	2.53	4.77	2.79
Calibration Drift (%Span)	-1.20	1.00	1.40	N.A.	0.00	0.30	0.43	N.A.

Date	09-Apr-97							
Run Number	0409-01	Test Number		NMMA-1-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	15.1	30.5	45.6	-0.1	294.6	601.1	914.4
Post-test Response (ppm)	0.0	14.8	30.2		-0.3	292.6	601.4	
Calibration Error (%AGV)	N.A.	0.67	0.33	0.22	N.A.	-0.81	0.18	0.04
Calibration Drift (%Span)	-0.04	-0.60	-0.60	N.A.	-0.02	-0.20	0.03	N.A.

18' Hull Spray Lamination, 42% Resin

Date	12-Apr-97							
Run Number	0412-03	Test Number		NMMA-2-1				
		Inlet			Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.2	15.3	30.8	45.6	0.0	295.2	601.5	913.1
Post-test Response (ppm)	0.1	15.0	30.5		0.0	286.1	586.5	
Calibration Error (%AGV)	N.A.	2.00	1.32	0.22	N.A.	-0.61	0.25	-0.10
Calibration Drift (%Span)	-0.20	-0.60	-0.60	N.A.	0.00	-0.91	-1.50	N.A.

Date	14-Apr-97							
Run Number	0414-02	Test Number		NMMA-2-2				
		Inlet			Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	15.3	30.8	45.6	0.0	299.2	611.1	903.4
Post-test Response (ppm)	-0.2	14.3	29.5		0.0	297.9	612.5	
Calibration Error (%AGV)	N.A.	2.00	1.32	0.22	N.A.	0.74	1.85	-1.16
Calibration Drift (%Span)	-0.20	-2.00	-2.60	N.A.	0.00	-0.13	0.14	N.A.

18' Hull Gel Coat

Date	04-Apr-97							
Run Number	0404-02	Test Number		NMMA-3-1				
		Inlet			Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	14.8	30.2	45.5	0	296.1	595.9	911.2
Post-test Response (ppm)	-0.9	14.2	29.7		0	296.6		917.2
Calibration Error (% AGV)	N.A.	-1.33	-0.66	0.00	N.A.	-0.30	-0.68	-0.31
Calibration Drift (% Span)	-1.6	-1.20	-1.00	N.A.	0.00	0.05	N.A.	0.60

Date	08-Apr-97							
Run Number	0408-02	Test Number		NMMA-3-2				
		Inlet			Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	14.8	30.4	45.3	0.0	299.2	613.9	914.2
Post-test Response (ppm)	0.0	14.7	29.7		0.0	295.3	610.6	
Calibration Error (% AGV)	N.A.	-1.33	0.00	-0.44	N.A.	0.74	2.32	0.02
Calibration Drift (% Span)	0.00	-0.20	-1.40	N.A.	0.00	-0.39	-0.33	N.A.

18' Deck Spray Lamination, 35% Resin

Date	03-Apr-97							
Run Number	0403-02	Test Number		NMMA-4-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	14.9	30.3	45.5	0	302.3	618	915.7
Post-test Response (ppm)	-0.6	14.3	29.5	43.6	0	300.7	615	930.8
Calibration Error (%AGV)	N.A.	-0.67	-0.33	0.00	N.A.	1.78	3.00	0.19
Calibration Drift (%Span)	-1.00	-1.20	-1.60	-3.80	0.00	-0.16	-0.30	1.51

Date	08-Apr-97							
Run Number	0408-03	Test Number		NMMA-4-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	14.8	30.4	45.3	0.0	299.2	613.9	914.2
Post-test Response (ppm)	0.0	14.6	29.5	44.0	0.8	297.2	613.7	935.0
Calibration Error (%AGV)	N.A.	-1.33	0.00	-0.44	N.A.	0.74	2.32	0.02
Calibration Drift (%Span)	0.00	-0.40	-1.80	-2.60	0.08	-0.20	-0.02	2.08

18' Deck Spray Lamination, 42% Resin

Date	12-Apr-97							
Run Number	0412-02	Test Number		NMMA-5-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.2	15.3	30.8	45.6	0.0	295.2	601.5	913.1
Post-test Response (ppm)	0.2	15.7	31.6		0.0	284.4	585.4	
Calibration Error (%AGV)	N.A.	2.00	1.32	0.22	N.A.	-0.61	0.25	-0.10
Calibration Drift (%Span)	0.00	0.80	1.60	N.A.	0.00	-1.08	-1.61	N.A.

Date	14-Apr-97							
Run Number	0414-01	Test Number		NMMA-5-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	15.3	30.8	45.6	0.0	299.2	611.1	903.4
Post-test Response (ppm)	-0.5	14.6	29.2		0.0	297.8	611.8	
Calibration Error (%AGV)	N.A.	2.00	1.32	0.22	N.A.	0.74	1.85	-1.16
Calibration Drift (%Span)	-0.80	-1.40	-3.20	N.A.	0.00	-0.14	0.07	N.A.

18' Deck Gel Coat

Date	02-Apr-97							
Run Number	0402-01	Test Number		Low styrene test				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.01	15.1	30.8	44.8	0	296.1	595.9	911.2
Post-test Response (ppm)	-0.3	14.7		46	0	296.6		917.2
Calibration Error (%AGV)	N.A.	0.67	1.32	-1.54	N.A.	-0.30	-0.68	-0.31
Calibration Drift (%Span)	-0.62	-0.80	N.A.	2.40	0.00	0.05	N.A.	0.60

Date	08-Apr-97							
Run Number	0408-01	Test Number		NMMA-6-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	14.8	30.4	45.3	0.0	299.2	613.9	914.2
Post-test Response (ppm)	0.1	15.0	29.3		0.0	301.1	621.9	
Calibration Error (%AGV)	N.A.	-1.33	0.00	-0.44	N.A.	0.74	2.32	0.02
Calibration Drift (%Span)	0.2	0.40	-2.20	N.A.	0.00	0.19	0.80	N.A.

Date	11-Apr-97							
Run Number	0411-01	Test Number		NMMA-6-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	15.5	31.7	45.7	0.0	295.5	601.8	913.2
Post-test Response (ppm)	0.1	15.1	30.4	45.3	0.0	295.8	608.1	894.6
Calibration Error (%AGV)	N.A.	3.33	4.28	0.44	N.A.	-0.51	0.30	-0.09
Calibration Drift (%Span)	0.2	-0.80	-2.60	-0.80	0.00	0.03	0.63	-1.86

28' Hull Spray Lamination, 35% Resin

Date	04-Apr-97							
Run Number	0404-01	Test Number		NMMA-7-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	14.8	30.2	45.5	0.0	298.6	615.6	910.4
Post-test Response (ppm)	-0.2	14.5		44.6	0.0	297		933.4
Calibration Error (%AGV)	N.A.	-1.33	-0.66	0.00	N.A.	0.54	2.60	-0.39
Calibration Drift (%Span)	-0.20	-0.60	N.A.	-1.80	0.00	-0.16	N.A.	2.30

Date	07-Apr-97							
Run Number	0707-01	Test Number		NMMA-7-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.1	14.3	29.2	45.8	-0.1	306	630.9	913.7
Post-test Response (ppm)	-1.2	14.7	27.8		0.0	309.9	640	
Calibration Error (%AGV)	N.A.	-4.67	-3.95	0.66	N.A.	3.03	5.15	-0.03
Calibration Drift (%Span)	-2.60	0.80	-2.80	N.A.	0.01	0.39	0.91	N.A.

28' Hull Gel Coat

Date	03-Apr-97							
Run Number	0403-01	Test Number		NMMA-8-1				
		Inlet				Outlet		
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	14.9	30.3	45.5	0	302.3	618	915.7
Post-test Response (ppm)	-0.7	15.3			0		622.5	
Calibration Error (%AGV)	N.A.	-0.67	-0.33	0.00	N.A.	1.78	3.00	0.19
Calibration Drift (%Span)	-1.20	0.80	N.A.	N.A.	0.00	N.A.	0.45	N.A.

Date	05-Apr-97							
Run Number	0405-01	Test Number		NMMA-8-2				
		Inlet				Outlet		
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	14.8	31.8	43.3	0.0	310.9	629.0	924.0
Post-test Response (ppm)	-2	14.4	32.2		0.0	304.5	628.6	939.5
Calibration Error (%AGV)	N.A.	-1.33	4.61	-4.84	N.A.	4.68	4.83	1.09
Calibration Drift (%Span)	-3.80	-0.80	0.80	N.A.	0.00	-0.64	-0.04	1.55

28' Hull Spray Lamination, 42% Resin

Date	18-Apr-97								
Run Number	0418-01	Test Number		NMMA-9-1					
	Inlet				Outlet				
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914	1604
Pre-test Response (ppm)	-0.1	15.1	30.7	45.5	0.0		600.3	912.9	1576.6
Post-test Response (ppm)	-0.2	15.0	30.1		0.0	294.3	600.1	922.0	
Calibration Error (%AGV)	N.A.	0.67	0.99	0.00	N.A.	0.02	0.05	-0.12	-1.71
Calibration Drift (%Span)	-0.20	-0.20	-1.20	N.A.	0.00	N.A.	-0.01	0.51	N.A.

Date	19-Apr-97							
Run Number	0419-01	Test Number		NMMA-9-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	14.8	30.6	45.3	0.0	294.9	604.7	914.5
Post-test Response (ppm)	-0.5	14.6	29.6		0.0	295.9	605.9	
Calibration Error (%AGV)	N.A.	-1.33	0.66	-0.44	N.A.	-0.71	0.78	0.05
Calibration Drift (%Span)	-1.00	-0.40	-2.00	N.A.	0.00	0.06	0.07	N.A.

CFA Mold Spray Lamination, 35% Resin

Date	09-Apr-97							
Run Number	0409-03	Test Number		NMMA-11-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	15.1	30.5	45.6	-0.1	294.6	601.1	914.4
Post-test Response (ppm)	-0.1	14.5	30.1	44.1	0.0	294.9	605.5	912.9
Calibration Error (%AGV)	N.A.	0.67	0.33	0.22	N.A.	-0.81	0.18	0.04
Calibration Drift (%Span)	-0.20	-1.20	-0.80	-3.00	0.01	0.03	0.44	-0.15

Date	10-Apr-97							
Run Number	0410-03	Test Number		NMMA-11-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.2	15.0	30.2	45.6	0.0	303	617	913.5
Post-test Response (ppm)	0.0	14.7	29.8		0.0	298.6	609.2	
Calibration Error (%AGV)	N.A.	0.00	-0.66	0.22	N.A.	2.02	2.83	-0.05
Calibration Drift (%Span)	-0.40	-0.60	-0.80	N.A.	0.00	-0.44	-0.78	N.A.

Date	12-Apr-97							
Run Number	0412-01	Test Number		NMMA-11-3				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.2	14.8	30.0	45.1	0.0	305.3	622.9	919.9
Post-test Response (ppm)	-0.4	13.7	29.7		0.0	304.4	627.5	
Calibration Error (%AGV)	N.A.	-1.33	-1.32	-0.88	N.A.	2.79	3.82	0.65
Calibration Drift (%Span)	-0.40	-2.20	-0.60	N.A.	0.00	-0.09	0.46	N.A.

CFA Mold Spray Lamination, 42% Resin

Date	17-Apr-97								
Run Number	0417-01	Test Number		NMMA-12-1					
	Inlet				Outlet				
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914	1604
Pre-test Response (ppm)	-0.2	15.5	31.2	45.6	0.1	296.6	604.3	913.1	1602.0
Post-test Response (ppm)	-0.3	15.7	32.8		0.0	299.1	613.9	935.7	
Calibration Error (%AGV)	N.A.	3.33	2.63	0.22	N.A.	-0.13	0.72	-0.10	-0.12
Calibration Drift (%Span)	-0.20	0.40	3.20	N.A.	-0.01	0.14	0.53	1.26	N.A.

Date	18-Apr-97								
Run Number	0418-02	Test Number		NMMA-12-2					
	Inlet				Outlet				
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914	1604
Pre-test Response (ppm)	-0.1	15.1	30.7	45.5	0.0	294.3	600.3	912.9	1576.6
Post-test Response (ppm)	-0.1	14.9	30.2		0.0	298.4	608.0	927.2	
Calibration Error (%AGV)	N.A.	0.67	0.99	0.00	N.A.	-0.91	0.05	-0.12	-1.71
Calibration Drift (%Span)	0.00	-0.40	-1.00	N.A.	0.00	0.23	0.43	0.79	N.A.

18' Hull Flow Choper Lamination, 35% Resin

Date	10-Apr-97							
Run Number	0410-02	Test Number		NMMA-13-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.2	15.0	30.2	45.6	0.0	303.0	617.0	913.5
Post-test Response (ppm)	0.0	14.5	29.6		0.0	294.8	606.2	
Calibration Error (%AGV)	N.A.	0.00	-0.66	0.22	N.A.	2.02	2.83	-0.05
Calibration Drift (%Span)	-0.40	-1.00	-1.20	N.A.	0.00	-0.82	-1.08	N.A.

Date	11-Apr-97							
Run Number	0411-03	Test Number		NMMA-13-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.1	15.1	30.4	45.3	-0.1	295.8	608.1	894.6
Post-test Response (ppm)	0.0	14.9	30.1		0.0	293.8	605.1	
Calibration Error (%AGV)	N.A.	0.67	0.00	-0.44	N.A.	-0.40	1.35	-2.12
Calibration Drift (%Span)	-0.20	-0.40	-0.60	N.A.	0.01	-0.20	-0.30	N.A.

18' Deck Flow/Chopper Lamination, 35% Resin

Date 10-Apr-97
Run Number 0410-01 Test Number NMMA-14-1

	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	15.0	30.4	45.2	0.0	300.9	614.0	913.6
Post-test Response (ppm)	0.0	14.8	29.9	43.1	0.0	299.2	619.1	932.1
Calibration Error (%AGV)	N.A.	0.00	0.00	-0.66	N.A.	1.31	2.33	-0.04
Calibration Drift (%Span)	0.00	-0.40	-1.00	-4.20	0.00	-0.17	0.51	1.85

Date 11-Apr-97
Run Number 0411-02 Test Number NMMA-14-2

	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.1	15.1	30.4	45.3	0.0	295.8	608.1	894.6
Post-test Response (ppm)	0.1	15.0	30.5	45.2	0.0	296.3	605.3	894.1
Calibration Error (%AGV)	N.A.	0.67	0.00	-0.44	N.A.	-0.40	1.35	-2.12
Calibration Drift (%Span)	0.00	-0.20	0.20	-0.20	0.00	0.05	-0.28	-0.05

18' Hull Flow/Chopper Lamination, 42% Resin

Date	15-Apr-97							
Run Number	0415-02	Test Number		NMMA-15-1				
		Inlet			Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	15.4	31.1	45.7	-0.1	294.5	599.5	883.0
Post-test Response (ppm)	0.0	15.3	30.5		0.0	288.3	590.5	
Calibration Error (%AGV)	N.A.	2.67	2.30	0.44	N.A.	-0.84	-0.08	-3.39
Calibration Drift (%Span)	0.00	-0.20	-1.20	N.A.	0.01	-0.62	-0.90	N.A.

Date	16-Apr-97							
Run Number	0416-02	Test Number		NMMA-15-2				
		Inlet			Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.1	15.3	31.1	45.6	0.0	294.2	600.4	914.4
Post-test Response (ppm)	0.0	15.2	30.4		0.0	294.3	605.9	
Calibration Error (%AGV)	N.A.	2.00	2.30	0.22	N.A.	-0.94	0.07	0.04
Calibration Drift (%Span)	-0.20	-0.20	-1.40	N.A.	0.00	0.01	0.55	N.A.

18' Deck Flow/Chopper Lamination, 42% Resin

Date	15-Apr-97							
Run Number	0415-01	Test Number		NMMA-16-1				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	15.4	31.1	45.7	-0.1	294.5	599.5	883.0
Post-test Response (ppm)	0.0	15.1	30.5		-0.1	288.6	588.7	
Calibration Error (%AGV)	N.A.	2.67	2.30	0.44	N.A.	-0.84	-0.08	-3.39
Calibration Drift (%Span)	0.00	-0.60	-1.20	N.A.	0.00	-0.59	-1.08	N.A.

Date	16-Apr-97							
Run Number	0416-01	Test Number		NMMA-16-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.1	15.3	31.1	45.6	0.0	294.2	600.4	914.4
Post-test Response (ppm)	0.1	15.3	30.3		0.0	290.5	598	
Calibration Error (%AGV)	N.A.	2.00	2.30	0.22	N.A.	-0.94	0.07	0.04
Calibration Drift (%Span)	0.00	0.00	-1.60	N.A.	0.00	-0.37	-0.24	N.A.

Styrene Recovery Tests

Date	01-Apr-97							
Run Number	0401-01							
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	-0.1	15.2	30.6	45.9	0	293.1	600.4	913.4
Post-test Response (ppm)	0.2			45.6	0			917.1
Calibration Error (%AGV)	N.A.	1.33	0.66	0.88	N.A.	-1.31	0.07	-0.07
Calibration Drift (%Span)	0.6	N.A.	N.A.	-0.6	0	N.A.	N.A.	0.37

Date	19-Apr-97							
Run Number	0419-01	Test Number		NMMA-9-2				
	Inlet				Outlet			
Actual Gas Value (ppm)	0	15	30.4	45.5	0	297	600	914
Pre-test Response (ppm)	0.0	14.8	30.6	45.3	0.0	294.9	604.7	914.5
Post-test Response (ppm)	-0.5	14.6	29.6		0.0	295.9	605.9	
Calibration Error (%AGV)	N.A.	-1.33	0.66	-0.44	N.A.	-0.71	0.78	0.05
Calibration Drift (%Span)	-1.00	-0.40	-2.00	N.A.	0.00	0.06	0.07	N.A.

Appendix D

Procedures for and Results of Gel Time Determination

US MARINE

M E M O R A N D U M

DATE: March 1, 1996

TO: PLANT MANAGERS

QA MANAGERS

FROM: STEPHEN CRANE

RE: **RESIN TESTING PROCEDURES**

CC: ROGER CHURCHILL, DAVE GROBE, DENNIS DAHLBERG, HERB KNUDSEN, JOAN SMITHMAN

Recently we have reworked portions of our incoming analysis procedures with our resin supplier. I wanted to bring you up to date on the changes to our resin testing procedure.

The changes to our test procedure center on the measurement of the catalyst. Currently we use a pipette and catalyze volumetrically. In our new testing procedure we will catalyze by weight. To aid you in doing this you have received or will receive new gram scales. In addition we will be sending you a few plastic transfer pipettes for dispensing catalyst.

We are testing to determine geltime, time from geltime to 150°F, and interval from geltime to peak exotherm. The revised procedure will be as follows:

1. Turn on scale and adjust scale to zero[1].

2. Place five ounce waxed paper cup on scale, record weight of cup, **tare**[2] scale . Add resin taken from the top of the tanker to five ounce waxed paper cup until scale reads 100 grams. This is Sample A.

3. Remove cup from scale and zero scale.

4. Place a second cup on the scale and tare scale. Add resin to five ounce waxed paper cup until scale reads 100 grams. This is Sample B. **Do not tare or zero scale.**

5. Employing the constant temperature bath, warm, or cool water around outside of cup, adjust resin samples until they reach 77° F using ASTM glass thermometer to verify temperature. Monitor temperature to ensure temperature has stabilized for a minimum of 60 seconds.

6. Using a dry cloth or paper towel dry the exterior of Sample B and place it on the digital electronic scale. After ensuring the material in the cup remains exactly 100 grams (adding material if necessary), tare scale.

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[1] To zero the scale make sure nothing is on the platform and press "CAL MODE" button.

[2] When you push the "TARE" button, it sets the scale to zero with the sample on the scale enabling you to measure only the material you are adding.

7. Using plastic transfer pipette add catalyst to resin until exactly 1 gram (1.5 grams if MEKP-30 is used) is shown on the scale. Record time.

8. Stir catalyst into resin for one minute using glass stirring rod. Stirring slowly so not to entrap air or froth resin.

9. Place Sample B in constant temperature bath making sure the level of the resin in the cup is below the level of the water in the constant temperature bath.

10. Approximately two minutes after Sample B has been catalyzed, zero scale.

11. Using a dry cloth or paper towel dry the exterior of Sample A and place it on the digital electronic scale. Observe weight. Subtract Sample A's cup weight you recorded in Step 2 from the observed weight and ensure that 100 grams of resin remain in the cup (add if necessary), tare scale.

12. Repeat steps 7,8,9 using Sample A.

13. Do not disturb samples for **ten (10)** minutes. At **ten (10)** minutes after catalyzing samples stir each sample for **thirty (30)** seconds. Stirring slowly so not to entrap air or froth resin.

14. Check resin every **five or six (5 or 6)** minutes after addition of catalyst for any noticeable thickening. **Ten (10)** minutes before minimum geltime specification, begin checking resin on **two (2)** minute intervals.

15. As resin gets close to gel stage (very thick) begin checking continuously. Gel time is achieved when "snap back" is achieved. "Snap back" is defined as; when the glass stirring rod is inserted into the resin and pulled straight out, the resin does not flow, but forms a string which snaps back to the rod. Record geltime.

16. Repeat Step 15 with Sample A.

17. Insert thermocouple probe into Sample B using thermo-couple holding plug. The probe from the thermo-couple should extend to approximately two inches below the bottom of the plastic plug, This will locate the end of the probe in the approximate center of the resin sample.

18. When the thermo-couple temperature reaches 150°F, record time.

19. Monitor temperature until peak temperature is reached and record time. Peak is reached when temperature begins to drop.. The interval time is the time from gel to peak.

US MARINE

POLYESTER RESIN SPECIFICATION

The following represents a specification of performance criteria for general purpose laminating resins for use by US MARINE / BAYLINER.

REACTIVITY

A. GEL TIME

Using USM/B's standard test method with 1% NOROX MEKP-925 the following gel times will apply.

SUMMER GEL TIME*	WINTER GEL TIME*
33 min.- 38 min.	28 min.- 33 min.

Arlington, Cumberland 2, Miami 3, Roseburg, Salisbury, Tallahasse, Valdosta

30 min.- 35 min. 25 min.- 30 min.

Cumberland 1, Dandridge, Miami 1, Miami 2, Pipestone 2, Pipestone 3, Spokane

*Selection to be made by Plant Manager.

B. PEAK EXOTHERM

Using USM/B's standard test method with NOROX MEKP-925 the following peak exotherm will apply. 300°F -330°F

C. INTERVAL (Gel to Peak)

Using USM/B's standard test method with NOROX MEKP-925 the following interval from gel to peak exotherm will apply. 10-16 minutes

VISCOSITY

A. THIXOTROPY

Using Owens Corning Test Method V-01-65 for the RVF the following viscosity will apply.

20 rpm. 600 cps. to 700 cps. Thix index of 2.7 - 3.7.

B. DRAINAGE

Using Owens Corning test method L-06-1, the laminate shall show no drainage for 1 hour.

PHYSICAL

A. WEIGHT PER GALLON

Using Owens Corning Test Method W-04-1 the following weights will be observed.

8.90 lbs./ gallon -9.14lbs./ gallon

B. RULE OF SUBSTITION

US Marine/ Bayliner will be notified of any changes of raw materials of a substantial nature prior to that substitution. The magnitude of the substitution to be determined by changes to the pattern or "foot print" established through IR spectrometry.

CURE

A. BARCOL HARDNESS

Using Owens Corning Test Method C-25-7 (1% NOROX 925) the following values will be obtained. Barcol Hardness of 25 Hb (bottom) to obtained 1.0 hours to 1.5 hours from catalization in quart lid.(40 gram casting) All AOC plants to use the same type quart lid.

B. ULTIMATE CURE

An ultimate cure standard to be determined on quart can lid sample using a DSC (Differential Scanning Calorimeter). Cure standard of 85% to be obtained after 72 hours. Random check after intial check.

MONOMER CONTENT

A. MONOMER

Using Owens Corning Test Method M-09-2 the monomer range will be as follows. 33.5% to 35.0% by weight.

SECONDARY BOND

A. FIBER RUPTURE

Using Owens Corning Test Method B-15-02 the fiber rupture after 72 hours shall be as follows: 80% over entire surface. Random check after intial check.

TEMPERATURE UPON RECEIPT

A. RECIEVING TEMPERATUE

Using Owens Corning Test Method T-07-1 the temperature upon receipt shall be as follows.

70°F - 90°F

MECHANICAL PROPERTIES

A. TENSILE STRENGTH

Using ASTM D 3039 on a laminate comprised of three layer of 1.5 oz. mat with a glass the resin ratio of 33% glass to 67% resin by weight the following tensile properties will be observed: 11,000 psi tensile strength, 1,160,000 psi tensile modulus. Random check after intial check.

4/3/97
Lab analyses

Resin

2% Red 925 Catalyst Skin Coat
19:43 min. gel

1 1/4% Red 925 Catalyst Lam.
28:25 min. gel
35:05 min gel to 150°

Gelcoat

2% Clear 925 Catalyst
16:30 min gel @77°

4/7/97 gel time from the U.S. Marine Lab.

72°

Resin @ 2 1/2 % Gel 15:15 150° 19:08

1 1/2 % Gel. 22:45

4-17/97
JES

42% Styrene - Basin

	1½% catalyst	2% Cat	2½% Cat
	A / B	A / B	A / B
Gel time	23:25 / 23:33	19:08 / 18:15	16:17 / 16:58
Gel to 150°	6 min 17 sec.	5 min 5 sec.	5 min 4 sec
Total time to Peak	35:55	28:47	27:08
Peak temp	320°	352°	367°

35% Styrene - Basin

	1½% Catalyst	2% Cat	2½% Cat
	A / B	A / B	A / B
Gel time	23:10 / 23:15	18:24 / 17:34	15:30 / 15:4[illegible]
Gel to 150°	6 min 5 [illegible]	5 min 6 sec.	3 min 9 sec.
Total time to Peak	33:57	26:18	22:11
Peak temp	350°	360°	376°

Appendix E

Material Safety Data Sheets

AOC
ALPHA/OWENS-CORNING

Prepared: 6 April 1995
MSDS No.: 950405V1

MATERIAL SAFETY DATA SHEET

Section 1: Product and Company Information

Product Name: 80.654 Polyester Resin containing Styrene and Fumed Silica

Manufacturer: Alpha\Owens-Corning L.L.C.,19991 Seaton Ave.,Perris, CA 92570
Telephone: 909-657-5161 (8am-6pm PST weekdays).

Emergency Contacts:
Manufacturer ONLY (24 HOURS/DAY): 909-657-5161,
CHEMTREC (24 hours everyday): 800-424-9300,
CANUTEC (Canada - 24 hours everyday): 613-996-6666.

Health and Technical Contacts:
Health Issues Information (8am-5pm CT): 901-854-2800,
Technical Product Information (8am-5pm PST): 909-657-5161.

Section 2: Composition and Ingredient Information

Common Name	Chemical Name	CAS No.	Wt. %
Polyester Resin	Polyester Resin	64386-66-9	62-67
Styrene Monomer	Vinyl Benzene	100-42-5	33-35
Fumed Silica	Silicon Dioxide Amorphous	112945-52-5	0.5-1.5

Note: See Section 8 of MSDS for exposure limit data for these ingredients.

Section 3: Hazards Identification

Appearance and Odor: Viscous liquid with an aromatic odor.

Primary Route(s) of Exposure: inhalation, skin, eye

AOC
ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Potential Health Effects:

ACUTE (short term):

This product if inhaled may cause upper respiratory irritation and possible central nervous system effects including headaches, nausea, vomiting, dizziness, drowsiness, loss of coordination, impaired judgment, and general weakness. It may cause dryness, cracking, tenderness and irritation of the skin. Direct contact with this product may result in immediate irritation to the eyes with redness, burning, tearing and blurred vision. It may cause mouth, throat and gastrointestinal irritation, nausea, vomiting, and diarrhea if ingested. Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal. See Section 8 for exposure controls.

CHRONIC (long term):

Styrene is a possible cancer hazard (IARC Group 2B). Prolonged exposure may result in nausea, loss of appetite, general weakness, changes in blood chemistry, and peripheral and central nervous system activity. Prolonged or repeated skin contact may result in dermatitis marked by rough, dry cracking skin. Prolonged or repeated eye exposures to vapors may cause irritation to the lining of the eyelids. In laboratory animals, chronic exposure to styrene at high concentrations has been found to cause liver abnormalities, kidney damage and lung damage. In addition, preliminary results of inhalation studies indicate that laboratory rats exposed to 800 ppm styrene via inhalation showed evidence of hearing loss. Relevance to humans remains unclear. See Section 11 of MSDS for additional toxicological data.

Medical Conditions Aggravated by Exposure: Persons with a history of chronic respiratory disease, skin disease, or central or peripheral nervous system disorders may be at increased risk for worsening their conditions from exposure to this product.

Section 4: First Aid Measures

Inhalation: Move person to fresh air. Administer cardiac or pulmonary resuscitation (CPR) if a pulse is not detectable or if unable to breathe. Provide oxygen if breathing is difficult. Obtain immediate medical assistance.

Eye Contact: Flush eyes with running water for at least 15 minutes. Seek medical attention immediately.

Skin Contact: Wash with mild soap and running water. Seek medical attention if irritation persists.

Ingestion: Do not induce vomiting. Prevent aspiration. Transport to hospital immediately.

Note to physician: Perform gastric lavage in accordance with procedures for ingestion of petroleum products.

ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Section 5: Fire Fighting Measures

Flash Point and Method: 87°F (31°C) - 97°F (36°C) Method - Setaflash Closed Cup

Flammability Limits (%): LFL: 0.9 - Styrene
UFL: 6.8 - Styrene

Auto Ignition Temperature: 914°F (490°C) - Styrene

Extinguishing Media: Foam, CO_2 or dry chemical.

Unusual Fire and Explosion Hazards: Product is a NFPA Class 1C flammable liquid. Prevent static and other electrical sparking. Ambient temperatures above 77°C (25°C), or heat from fire may cause polymerization, heat generation, and vapor expansion. Excessive heat may cause closed containers to rupture. Keep cool with water spray.

Fire Fighting Instructions: Treat as a flammable liquid type fire. In a sustained fire wear self-contained breathing apparatus and full protective bunker turnout gear.

Hazardous Combustion Products: Primary combustion products are carbon monoxide, carbon dioxide, and low molecular weight hydrocarbons. Other undetermined compounds could be released in small quantities.

Section 6: Accidental Release Measures

Releases of this product to the land, water and air may require reporting to local, state and federal agencies.

Land Spill: Prevent material from entering sewers or waterways. Remove all sources of ignition (flames, hot surfaces, and electrical static or frictional sparks). Ventilate area. Absorb with inert materials (vermiculite or sand) and place in a closed container for disposal as solid waste. Wash area well with trisodium phosphate and water. Resin that may have been mixed with peroxide initiators prior to spillage should be mixed with inert material and removed to an open area. Allow time to gel and cure.

Water Spill: Material is mostly insoluble. The material will sink to the bottom leaving a styrene monomer sheen. Styrene is harmful to aquatic life in very low concentrations. Notify local environmental, health and wildlife authorities, and water intake operators. Contain with booms to minimize spread on water. Collect floating material with sorbents and vacuum/collect sunken solids. Disperse any remaining residue to reduce aquatic harm.

AOC
ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Air Release: Spills of this material may release styrene and volatile organic compounds into the air. Spills should be cleaned or covered to prevent volatilization of styrene.

Section 7: Handling and Storage

Storage Temperature: Store below 77°F (25°C)

Storage Pressure: N/A

General: Store below 77°F (25°C). Store in a dry area to avoid spillage. The storage drum, when emptied, can contain vapor, liquid or solid residues that may be hazardous. Keep away from heat, sparks, flames and direct sunlight. DO NOT cut, puncture or weld on or near this container. Do not apply air or gas pressure to this container which is not rated for pressure. Containers should be bonded and grounded during transfer of material. In bulk storage, check vent and flame arrestor for plugging by formation of polymer.

Section 8: Exposure Controls and Personal Protection

Ingredient	OSHA PEL	ACGIH TLV
Polyester Resin	None Established	None Established
Styrene Monomer	100 ppm (8-hr TWA) 200 ppm (ceiling) 600 pm, 5 minutes in any 3 hrs (peak)	50 ppm (8-hr TWA) 100 ppm (STEL) (skin notation)
Fumed Silica	20 mpccf * (8-hr TWA)	10 mg/m^3 (PNOC**, 8-hr TWA)

* Million particles per cubic foot of air ** Particulates not otherwise classified

Engineering Controls: General dilution ventilation and/or local exhaust ventilation should be provided as necessary to minimize exposures.

Personal Protection:

Respiratory Protection: If irritation occurs, or if the TLV or PEL is exceeded, use a NIOSH/MSHA approved air purifying respirator with organic vapor cartridges or canisters, or supplied air respirators. Use respiratory protection in accordance with your company's respiratory protection program, local regulations, or OSHA regulations under 29 CFR 1910.134.

ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Skin Protection: Wear long sleeved shirt, long pants and chemical resistant gloves such as polyvinyl alcohol, polyethylene or viton.

Eye Protection: Chemical protective goggles and/or face shield must be worn whenever possibility exists for eye contact.

Work/Hygienic Practices: Handle in accordance with good industrial hygiene and safety practices. These include avoiding unnecessary exposures and proper selection and use of personal protective equipment. Launder contaminated clothing before reuse. Safety showers and eye wash stations should be available. Use explosion proof motors and equipment. Containers should be grounded and/or bonded when material is transferred.

Section 9: Physical and Chemical Properties

Vapor Pressure (mm Hg @ 20°C): N/D

Vapor Density (Air=1): N/D

Specific Gravity (water=1): 1.1

Solubility in Water: Insoluble

pH: N/A

Appearance: Viscous liquid

Odor Type: Aromatic

Evaporation Rate (n-Butyl Acetate=1): N/D

Boiling Point: >95°F (>35°C)

Viscosity: 10 - 1000 mPa·s

Physical State: Liquid

Freezing Point: Not Available

Section 10: Stability and Reactivity

General: Stable below 77°F (25°C)

Incompatible Materials and Conditions to Avoid: Peroxides, oxidizers, acids and bases. Ambient temperatures over 77°F (25°C), or heat from fire situations may cause polymerization, heat generation, and vapor expansion. May cause closed container to rupture.

Hazardous Decomposition Products: Oxides of carbon and low molecular weight hydrocarbons. See Section 5 of MSDS for combustion products statement.

ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Hazardous Polymerization: May occur. Avoid excessive heat, contamination and prolonged storage above 77°F (25°C).

Section 11: Toxicological Information

CARCINOGENICITY: The following table indicates whether or not each agency has listed each ingredient as a carcinogen:

Ingredient	ACGIH	IARC	NTP	OSHA
Polyester Resin	No	No	No	No
Styrene Monomer	No	Yes	No	No
Fumed Silica	No	No	No	No

TOXICITY:

Ingredient	LD_{50} Oral (g/kg)	LD_{50} Dermal (g/kg)	LC60 Inhalation (g/m^3, 4 hrs.)
Polyester Resin	Not Available	Not Available	Not Available
Styrene Monomer	5.0 (rat)	Not Available	24 (rat)
Fumed Silica	Not Available	Not Available	Not Available

Styrene Monomer: In March, 1987, the International Agency for Research on Cancer (IARC) reclassified styrene as possibly carcinogenic to human (Group 2B) due to "inadequate evidence in humans", "limited evidence in animals" and "other relevant data". Previously, styrene was classified as a Group 3 compound (not classified as to carcinogenicity to humans). The IARC working group determined that the weight of data on genetic and related effects, together with the consideration that styrene metabolized in humans and animals to styrene oxide for which there is sufficient evidence of carcinogenicity in experimental animals and has been classified by IARC as probably carcinogenic to humans (Group 2A), was sufficient reason to recommend the change in classification.

Section 12: Ecological Information

This product may cause harm to animals, plants or fish.

Section 13: Disposal Considerations

MATERIAL SAFETY DATA SHEET

RCRA Hazard Class: Characteristic hazardous waste (D001) due to ignitability.

Section 14: Transport Information

DOT Shipping Names: Resin Solution

Hazard Class or Division: 3

Secondary: none

Identification No.: UN1866

Packing Group: III

Label(s) required (if not excepted): Flammable Liquid

Special Provisions: B1, B52
T7, T30

Packaging Exceptions: 173.150

Non-bulk Packaging: 173.203

Bulk packaging: 173.242

EPA Hazardous Substances: Styrene

RQ: 1000 lbs

Quantity Limitations: **Passenger Aircraft:** 60 liters
Cargo Aircraft: 220 liters

Marine Pollutants: Styrene monomer, inhibited

Freight Description: Plastic liquid, NOI (NMFC)

Hazardous Material Shipping Description: Resin solution, 3, UN1866, PG III, RQ (Styrene Monomer), Marine Pollutant (Styrene monomer)

ERG Number: 26

Transportation of Dangerous Goods - Canada

Proper Shipping Name: Resin Solution

TDG Hazard Classification: **(Primary)**: Class 3 **(Secondary)**: None

IMO Classification: Class 3.3

ICAO/IATA Classification: 3

ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Product Identification Number: UN1866

Packing Group: III

Control Temperature: None

Emergency Temperature: None

Schedule XII Quantity Restriction: None

Reportable Quantity for US Shipments: 1000 lbs. (Styrene)

IATA Packing Instructions:
Passenger/Cargo: 309
Cargo Only: 310
Limited Quantity: Y309

Maximum Net Quantity per Package:
Passenger/Cargo: 60 liters
Cargo Only: 220 liters
Limited Quantity: 10 liters

Special Provisions: None

Section 15: Regulatory Information

TSCA Status: Each ingredient is on the Inventory.

NSR Status (Canada): Each ingredient is on the DSL.

SARA Title III:

Hazard Categories:

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactivity Hazard:	Yes

Reportable Ingredients:

Sec. 302/304:	Styrene
Sec. 313:	Styrene

California Proposition 65: Styrene oxide is listed as known to the State of California to cause cancer. Styrene oxide is a metabolite of styrene monomer.

Clean Air Act: Styrene is listed as a hazardous air pollutant.

WHMIS (Canada):
Status: controlled product
WHMIS Classifications: B2 - flammable liquid
D2A - possible carcinogen

MATERIAL SAFETY DATA SHEET

Section 16: Other Information

HMIS and NFPA Hazard Rating:

Category	HMIS	NFPA
Acute Health	2	2
Flammability	3	3
Reactivity	1	1

NFPA Unusual Hazards: None.

HMIS Personal Protection: To be supplied by user depending upon use.

Prepared by: Safety and Environmental Services Department, Alpha/Owens-Corning, L.L.C.

Revision Summary: This MSDS replaces the May 7, 1990 MSDS. This is a new ANSI format with new information in many sections. Read this information carefully.

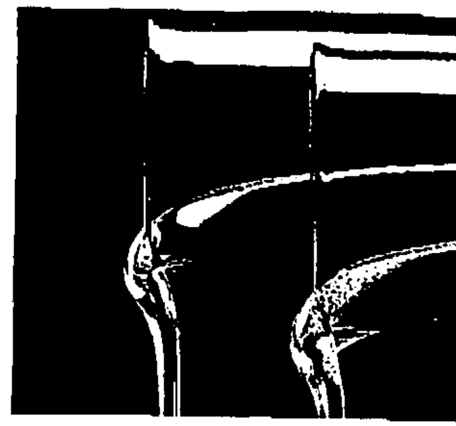
Legal Disclaimer: The information contained in this data sheet is furnished in good faith and without warranty, representation, or inducement or license of any kind, except that it is accurate to the best of Alpha/Owens-Corning's knowledge, or was obtained from sources believed by Alpha/Owens-Corning to be reliable. The accuracy, adequacy or completeness of health and safety precautions set forth herein cannot be guaranteed, and the buyer is solely responsible for ensuring that product is used, handled, stored, and disposed of safely and in compliance with applicable federal, state or provincial, and local laws. Alpha/Owens-Corning disclaims liability for any loss, damage or personal injury that arises from, or is in any way related to, use of the information contained in this data sheet.

AOC
ALPHA/OWENS-CORNING

80-654 Series
Polyester Resin

Product Information

DCPD Based Resin for Hand Lay-up and Spray-up Applications



TYPICAL LIQUID RESIN PROPERTIES*

	Nominal	Test Method
Viscosity at 77°F/25°C, LVF Brookfield Spindle #2 at 20 RPM, cps.	550	QI 003
Thix Index	>2.5	QI 003
Specific Gravity @ 77°F/25°C	1.095	QI 004
Color	Amber	
Non-Volatiles, %	65	QI 005

TYPICAL CURING PROPERTIES* (1) see back page

100 Gram Mass		
Catalyst, 1.25% MEKP-9		
Gel Time @ 77°F/25°C, minutes	15-45	C-100-1
Gel to peak, minutes	12	C-100-1
Peak Exotherm, °F/°C	320/160	C-100-1

TYPICAL CLEAR CAST MECHANICAL PROPERTIES* (2) see back page

Tensile Strength, PSI/MPa	8,500/58.6	ASTM D-638
Tensile Modulus, PSI/GPa	$5.5x10^5$/3.8	ASTM D-638
Tensile Elongation, %	2.0	ASTM D-638
Flexural Strength, PSI/MPa	13,600/103	ASTM D-790
Flexural Modulus, PSI/GPa	$5.6x10^5$/3.9	ASTM D-790
Heat Distortion Temperature, °F/°C @ 264 psi	170/77	ASTM D-648
Barcol Hardness	40	ASTM D-2583

* Typical properties are not to be construed as specifications.

DESCRIPTION

Alpha/Owens-Corning's 80-654 series resins are promoted, thixotropic dicyclopentadiene (DCPD) modified unsaturated polyester resins for non-filled hand lay-up, spray-up applications. The 80-654 series is specifically designed to deliver superior surface aesthetics and provide a proven resin system that reduces VOC emissions when compared to standard orthophthalic resin systems. The 80-654 series were designed to meet the needs of boat builders as they strive for superior cosmetics, improved water resistance, secondary bonding, and toughness.

BENEFITS

Improved Cosmetic Appearance
Alpha/Owens-Corning's 80-654 series provide a unique, uniform curing profile with low shrinkage characteristics. This minimizes the cosmetic imperfections on a gel coat surface caused by print-through or back-up reinforcement members.

Excellent Glass-Wetting Properties
The carefully formulated chemical properties of the 80-654 series provide increased compatibility between glass sizing and the resin system. 80-654's superior glass-wetting ability improves ease of roll-out and enhances the mechanical properties of the glass reinforced composite.

Low Water Absorption
80-654 series are considerably more hydrophobic than orthophthalic polyester resins, and are an excellent choice for applications where water contact is an important factor.

Complies with Rule 1162
Alpha/Owens-Corning's 80-654 series is designed to meet California's AQMD Rule 1162 monomer limitation and has found widespread acceptance by the nation's marine industry.

[redacted]

80-654 Series Polyester Resin

PERFORMANCE RECOMMENDATIONS

A. Keep full strength catalyst levels between 1.0% - 2.0% of the total resin weight.

B. Maintaining shop temperatures between 65°F/ 18°C and 90°F/32°C and humidity between 40% and 90% will help the fabricator make a high quality part. Consistent shop conditions contribute to consistent gel times.

STORAGE STABILITY

Resins are stable for three months from date of production when stored in the original containers away from sunlight at no more than 70°F/21°C. After extended storage, some drift may occur in gel time.

During the hot summer months, no more than two months stability at 86°F/30°C should be anticipated.

SAFETY

See appropriate Alpha/Owens-Corning MSDS for guidelines.

APPLICATION RECOMMENDATIONS

Due to the curing characteristics of the 80-654 series resins, it is desirable to complete all secondary bonding as soon as possible. Exposure of the laminate to sunlight will result in severe secondary bonding problems. After 24 hours of cure, it may become necessary to abrade the laminate to insure good secondary bonding, especially if the surface of the laminate has been allowed to become resin rich. Low fiberglass content and resin puddling should be avoided with this product.

To assure adequate bonding to gel coats, fabricators should pre-wet the gel coat surface with a thin pass of catalyzed resin prior to lamination.

Chemical resistance studies have indicated the dicyclopentadiene resins such as 80-654 series have very poor resistance to certain hydrophobic liquids, such as hydrocarbons. Fuel storage tanks should not be produced with the 80-654 resins.

If your manufacturing needs require a more corrosion resistant resin, please contact your Alpha/Owens-Corning representative for information or technical assistance on Alpha/Owens-Corning's line of isophthalic or vinyl ester resins.

FOOTNOTES

(1)

The gel times shown are typical but may be affected by catalyst, promoter and inhibitor concentrations and resin, mold and shop temperature. Variations in gelling characteristics can be expected between different lots of catalysts and at extremely high humidities. Pigment and fillers can retard or accelerate gelation. *It is recommended that the* fabricator check the gelling characteristics of a small quantity of resin under actual operating conditions prior to use.

(2)

Based on tests at 77°F/25°C and 50% relative humidity. All tests performed on unreinforced cured resin castings. Thixotropic components, if applicable, are excluded from casting samples. Castings were prepared using 1.25% M-50, 0.25% Cobalt 6% post cured for 2 hours at 194°F/90°C using Alpha/Owens-Corning test method X-12Ab.

AOC

ALPHA/OWENS-CORNING
P.O. BOX 610
COLLIERVILLE, TN 38027-0610
(901) 854-2800
FAX (901) 854-1183

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AOC™
ALPHA/OWENS CORNING

19991 Seaton Avenue
Perris, CA 92570
(800) 654-1838

CERTIFICATE OF ANALYSIS

Customer: BAYLINER

Product: 80.654-NMMA

Batch Number: P-5164

Date: 27-Mar-97

B/L#:

Property	Result	Specifications Minimum	Maximum	Test Method
Viscosity, RVF #2 @ 20 rpm	700	700	750	QI-026
Viscosity, RVF #2 @ 2 rpm	3400	2100	3750	QI-026
Thixotropic Index	4.9	3	5	QI-026
Gel Time @77°F with 1.0% 925 RED	34	33	34	QI-010
Total Peak Time	49.2	43	50	QI-010
Peak Temperature	311	300	315	QI-010
Monomer Content	35.1	35	35.3	QI-021
Specific Gravity	1.082	1.08	1.11	QI-023

Tested By: JUNIOR

Approved By: Craig Smarker

ISO 9002 Registered Quality System

CMA MEMBER RESPONSIBLE CARE

AOC
ALPHA/OWENS-CORNING

Prepared: 26 January 1995
MSDS No.: 950126V1

MATERIAL SAFETY DATA SHEET

Section 1: Product and Company Information

Product Name: 80.604 Polyester Resin containing Styrene and Fumed Silica

Manufacturer: Alpha\Owens-Corning L.L.C., 19991 Seaton Ave., Perris, CA 92570
Telephone: 909-657-5161 (8am-6pm PST weekdays).

Emergency Contacts:
Manufacturer ONLY (24 HOURS/DAY): 909-657-5161,
CHEMTREC (24 hours everyday): 800-424-9300,
CANUTEC (Canada - 24 hours everyday): 613-996-6666.

Health and Technical Contacts:
Health Issues Information (8am-5pm CT): 901-854-2800,
Technical Product Information (8am-5pm PST): 909-657-5161.

Section 2: Composition and Ingredient Information

Common Name	Chemical Name	CAS No.	Wt. %
Polyester Resin	Polyester Resin	64386-66-9	40-70
Styrene Monomer	Vinyl Benzene	100-42-5	30-60
Fumed Silica	Silicon Dioxide Amorphous	112945-52-5	0.5-1.5

Note: See Section 8 of MSDS for exposure limit data for these ingredients.

Section 3: Hazards Identification

Appearance and Odor: Viscous liquid with an aromatic odor.

Primary Route(s) of Exposure: inhalation, skin, eye

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Potential Health Effects:

ACUTE (short term):

This product if inhaled may cause upper respiratory irritation and possible central nervous system effects including headaches, nausea, vomiting, dizziness, drowsiness, loss of coordination, impaired judgment, and general weakness. It may cause dryness, cracking, tenderness and irritation of the skin. Direct contact with this product may result in immediate irritation to the eyes with redness, burning, tearing and blurred vision. It may cause mouth, throat and gastrointestinal irritation, nausea, vomiting, and diarrhea if ingested. Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal. See Section 8 for exposure controls.

CHRONIC (long term):

Styrene is a possible cancer hazard (IARC Group 2B). Prolonged exposure may result in nausea, loss of appetite, general weakness, changes in blood chemistry, and peripheral and central nervous system activity. Prolonged or repeated skin contact may result in dermatitis marked by rough, dry cracking skin. Prolonged or repeated eye exposures to vapors may cause irritation to the lining of the eyelids. In laboratory animals, chronic exposure to styrene at high concentrations has been found to cause liver abnormalities, kidney damage and lung damage. In addition, preliminary results of inhalation studies indicate that laboratory rats exposed to 800 ppm styrene via inhalation showed evidence of hearing loss. Relevance to humans remains unclear. See Section 11 of MSDS for additional toxicological data.

Medical Conditions Aggravated by Exposure: Persons with a history of chronic respiratory disease, skin disease, or central or peripheral nervous system disorders may be at increased risk for worsening their conditions from exposure to this product.

Section 4: First Aid Measures

Inhalation: Move person to fresh air. Administer cardiac or pulmonary resuscitation (CPR) if a pulse is not detectable or if unable to breathe. Provide oxygen if breathing is difficult. Obtain immediate medical assistance.

Eye Contact: Flush eyes with running water for at least 15 minutes. Seek medical attention immediately.

Skin Contact: Wash with mild soap and running water. Seek medical attention if irritation persists.

Ingestion: Do not induce vomiting. Prevent aspiration. Transport to hospital immediately.

Note to physician: Perform gastric lavage in accordance with procedures for ingestion of petroleum products.

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MATERIAL SAFETY DATA SHEET

Section 5: Fire Fighting Measures

Flash Point and Method: 87°F (31°C) - 97°F (36°C) Method - Setaflash Closed Cup

Flammability Limits (%): **LFL:** 0.9 - Styrene
UFL: 6.8 - Styrene

Auto Ignition Temperature: 914°F (490°C) - Styrene

Extinguishing Media: Foam, CO_2 or dry chemical.

Unusual Fire and Explosion Hazards: Product is a NFPA Class 1C flammable liquid. Prevent static and other electrical sparking. Excessive heat may cause closed containers to rupture. Keep cool with water spray. Ambient temperatures aobve 77°F (25°C), or heat from fire may cause polymerization, heat generation, and vapor expansion.

Fire Fighting Instructions: Treat as a flammable liquid type fire. In a sustained fire wear self-contained breathing apparatus and full protective bunker turnout gear.

Hazardous Combustion Products: Primary combustion products are carbon monoxide, carbon dioxide, and low molecular weight hydrocarbons. Other undetermined compounds could be released in small quantities.

Section 6: Accidental Release Measures

Releases of this product to the land, water and air may require reporting to local, state and federal agencies.

Land Spill: Prevent material from entering sewers or waterways. Remove all sources of ignition (flames, hot surfaces, and electrical static or frictional sparks). Ventilate area. Absorb with inert materials (vermiculite or sand) and place in a closed container for disposal as solid waste. Wash area well with trisodium phosphate and water. Resin that may have been mixed with peroxide initiators prior to spillage should be mixed with inert material and removed to an open area. Allow time to gel and cure.

Water Spill: Material is mostly insoluble. The material will sink to the bottom leaving a styrene monomer sheen. Styrene is harmful to aquatic life in very low concentrations. Notify local environmental, health and wildlife authorities, and water intake operators. Contain with booms to minimize spread on water. Collect floating material with sorbents and vacuum/collect sunken solids. Disperse any remaining residue to reduce aquatic harm.

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MATERIAL SAFETY DATA SHEET

Air Release: Spills of this material may release styrene and volatile organic compounds into the air. Spills should be cleaned or covered to prevent volatilization of styrene.

Section 7: Handling and Storage

Storage Temperature: Store below 77°F (25°C)

Storage Pressure: N/A

General: Store below 77°F (25°C). The storage drum, when emptied, can contain vapor, liquid or solid residues that may be hazardous. Keep away from heat, sparks, flames and direct sunlight. DO NOT cut, puncture or weld on or near this container. Do not apply air or gas pressure to this container which is not rated for pressure. Containers should be bonded and grounded during transfer of material. In bulk storage, check vent and flame arrestor for plugging by formation of polymer.

Section 8: Exposure Controls and Personal Protection

Ingredient	OSHA PEL	ACGIH TLV
Polyester Resin	None Established	None Established
Styrene Monomer	100 ppm(8-hr TWA)	50 ppm(8-hr TWA) 100 ppm (STEL) (skin notation)
Fumed Silica	20 mpccf * (8-hr TWA)	10 mg/m^3 (PNOC**, 8-hr TWA)

* Million particles per cubic foot of air ** Particulates not otherwise classified

Engineering Controls: General dilution ventilation and/or local exhaust ventilation should be provided as necessary to minimize exposures.

Personal Protection:

Respiratory Protection: If irritation occurs, or if the TLV or PEL is exceeded, use a NIOSH/MSHA approved air purifying respirator with organic vapor cartridges or canisters, or supplied air respirators. Use respiratory protection in accordance with your company's respiratory protection program, local regulations, or OSHA regulations under 29 CFR 1910.134.

Skin Protection: Wear long sleeved shirt, long pants and chemical resistant gloves such as polyvinyl alcohol, polyethylene or viton.

MATERIAL SAFETY DATA SHEET

Eye Protection: Chemical protective goggles and/or face shield must be worn whenever possibility exists for eye contact.

Work/Hygienic Practices: Handle in accordance with good industrial hygiene and safety practices. These include avoiding unnecessary exposures and proper selection and use of personal protective equipement. Launder contaminated clothing before reuse. Safety showers and eye wash stations should be available. Use explosion proof motors and equipment. Containers should be grounded and/or bonded when material is transferred.

Section 9: Physical and Chemical Properties

Vapor Pressure (mm Hg @ 20°C): N/D

Vapor Density (Air=1): N/D

Specific Gravity (water=1): 1.1

Solubility in Water: Insoluble

pH: N/A

Appearance: Viscous liquid

Odor Type: Aromatic

Evaporation Rate (n-Butyl Acetate=1): N/D

Boiling Point: >95°F (>35°C)

Viscosity: 10 - 1000 mPa·s

Physical State: Liquid

Freezing Point: Not Available

Section 10: Stability and Reactivity

General: Stable below 77°F (25°C)

Incompatible Materials and Conditions to Avoid: Peroxides, oxidizers, acids and bases. Ambient temperatures over 77°F (25°C), or heat from fire situations may cause polymerization, heat generation, and vapor expansion. May cause closed container to rupture.

Hazardous Decomposition Products: Oxides of carbon and low molecular weight hydrocarbons. See Section 5 of MSDS for combustion products statement.

Hazardous Polymerization: May occur. Avoid excessive heat, contamination and prolonged storage above 77°F (25°C).

N/A = Not Applicable N/D = Not Determined

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ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Section 11: Toxicological Information

CARCINOGENICITY: The following table indicates whether or not each agency has listed each ingredient as a carcinogen:

Ingredient	ACGIH	IARC	NTP	OSHA
Polyester Resin	No	No	No	No
Styrene Monomer	No	Yes	No	No
Fumed Silica	No	No	No	No

TOXICITY:

Ingredient	LD_{50} Oral (g/kg)	LD_{50} Dermal (g/kg)	LC_{50} Inhalation (g/m^3, 4 hrs.)
Polyester Resin	Not Available	Not Available	Not Available
Styrene Monomer5.0 (rat)	Not Available	24 (rat)	
Fumed Silica	Not Available	Not Available	Not Available

Styrene Monomer: In March, 1987, the International Agency for Research on Cancer (IARC) reclassified styrene as possibly carcinogenic to human (Group 2B) due to "inadequate evidence in humans", "limited evidence in animals" and "other relevant data". Previously, styrene was classified as a Group 3 compound (not classified as to carcinogenicity to humans). The IARC working group determined that the weight of data on genetic and related effects, together with the consideration that styrene metabolized in humans and animals to styrene oxide for which there is sufficient evidence of carcinogenicity in experimental animals and has been classified by IARC as probably carcinogenic to humans (Group 2A), was sufficient reason to recommend the change in classification.

Section 12: Ecological Information

This product may cause harm to animals, plants or fish.

Section 13: Disposal Considerations

ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

RCRA Hazard Class: Characteristic hazardous waste (D001) due to ignitability.

Section 14: Transport Information

DOT Shipping Names: Resin Solution

Hazard Class or Division: 3 **Secondary:** none

Identification No.: UN1866 **Packing Group:** III

Label(s) required (if not excepted): Flammable Liquid

Special Provisions: B1, B52
T7, T30

Packaging Exceptions: 173.150

Non-bulk Packaging: 173.203 **Bulk packaging:** 173.242

EPA Hazardous Substances: Styrene **RQ:** 1000 lbs

Quantity Limitations: **Passenger Aircraft:** 60 liters
Cargo Aircraft: 220 liters

Marine Pollutants: Styrene monomer, inhibited

Freight Description: Plastic liquid, NOI (NMFC)

Hazardous Material Shipping Description: Resin solution, 3, UN1866, PG III, RQ (Styrene Monomer), Marine Pollutant (Styrene monomer)

ERG Number: 26

Transportation of Dangerous Goods - Canada

Proper Shipping Name: Resin Solution

TDG Hazard Classification: **(Primary):** Class 3 **(Secondary):** None

IMO Classification: Class 3.3

ICAO/IATA Classification: 3

Product Identification Number: UN1866

ALPHA/OWENS-CORNING

MATERIAL SAFETY DATA SHEET

Packing Group: III

Control Temperature: None

Emergency Temperature: None

Schedule XII Quantity Restriction: None

Reportable Quantity for US Shipments: 1000 lbs. (Styrene)

IATA Packing Instructions:
Passenger/Cargo: 309
Cargo Only: 310
Limited Quantity: Y309

Maximum Net Quantity per Package:
Passenger/Cargo: 60 liters
Cargo Only: 220 liters
Limited Quantity: 10 liters

Special Provisions: None

Section 15: Regulatory Information

TSCA Status: Each ingredient is on the Inventory.

NSR Status (Canada): Each ingredient is on the DSL.

SARA Title III:

Hazard Categories:

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactivity Hazard:	Yes

Reportable Ingredients:

Sec. 302/304:	Styrene
Sec. 313:	Styrene

California Proposition 65: Styrene oxide is listed as known to the State of California to cause cancer. Styrene oxide is a metabolite of styrene monomer.

Clean Air Act: Styrene is listed as a hazardous air pollutant.

WHMIS (Canada): **Status:** controlled product
WHMIS Classifications: B2 - flammable liquid
D2A - possible carcinogen

MATERIAL SAFETY DATA SHEET

Section 16: Other Information

HMIS and NFPA Hazard Rating:

Category	HMIS	NFPA
Acute Health	2	2
Flammability	3	3
Reactivity	1	1

NFPA Unusual Hazards: None.

HMIS Personal Protection: To be supplied by user depending upon use.

Prepared by: Safety and Environmental Services Department, Alpha/Owens-Corning, L.L.C.

Revision Summary: This MSDS replaces the May 7, 1990 MSDS. This is a new ANSI format with new information in many sections. Read this information carefully.

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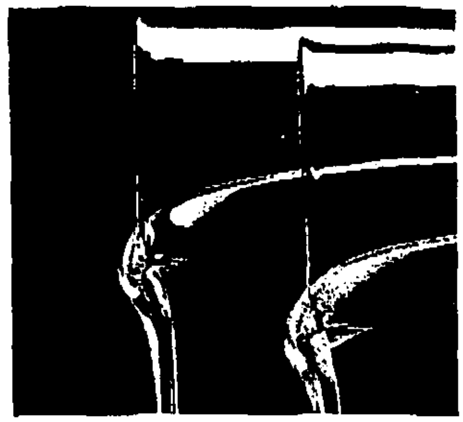
AOC
ALPHA/OWENS-CORNING

80-604 Series Polyester Resin

Product Information

DCPD Based Resin for Hand Lay-up and Spray-up Applications



TYPICAL LIQUID RESIN PROPERTIES*	Nominal	Test Method
Viscosity at 77°F/25°C, RVF Brookfield Spindle #2 at 20 RPM, cps.	550	QI 003
Thix Index	>2.5	QI 003
Specific Gravity @ 77°F/25°C	1.090	QI 004
Color	Amber	
Non-Volatiles, %	62	QI 005

TYPICAL CURING PROPERTIES* (1) see back page		
100 Gram Mass		
Catalyst, 1.25% MEKP-9		
Gel Time @ 77°F/25°C, minutes	15-45	C-100-1
Gel to peak, minutes	12	C-100-1
Peak Exotherm, °F/°C	325/163	C-100-1

TYPICAL CLEAR CAST MECHANICAL PROPERTIES* (2) see back page		
Tensile Strength, PSI/MPa	8,500/58.6	ASTM D-638
Tensile Modulus, PSI/GPa	5.5×10^5/3.8	ASTM D-638
Tensile Elongation, %	2.0	ASTM D-638
Flexural Strength, PSI/MPa	13,600/103	ASTM D-790
Flexural Modulus, PSI/GPa	5.6×10^5/3.9	ASTM D-790
Heat Distortion Temperature, °F/°C @ 264 psi	172/78	ASTM D-648
Barcol Hardness	40	ASTM D-2583

* Typical properties are not to be construed as specifications.

DESCRIPTION

Alpha/Owens-Corning's 80-604 series resins are promoted, thixotropic dicyclopentadiene (DCPD) modified unsaturated polyester resins for non-filled hand lay-up, spray-up applications. The 80-604 series were designed to meet the needs of boat builders as they strive for superior cosmetics, improved water resistance, secondary bonding, and toughness. It has a slightly lower viscosity than the Alpha/Owens-Corning 80-654 series and minimizes time consuming roll-out.

BENEFITS

Improved Cosmetic Appearance
Alpha/Owens-Corning's 80-604 se[illegible] provide a unique, uniform curing p[illegible] with low shrinkage characteristics. This minimizes the cosmetic imperfections on a gel coat surface caused by print-through or back-up reinforcement members.

Excellent Glass-Wetting Properties
The carefully formulated chemical properties of the 80-604 series provide increased compatibility between glass sizing and the resin system. 80-604's lower viscosity and superior glass-wetting ability improves ease of roll-out and enhances the mechanical properties of the glass reinforced composite.

Low Water Absorption
80-604 series are considerably more hydrophobic than orthophthalic polyester resins, and are an excellent choice for applications where water contact is an important factor.

[redacted]

80-604 Series Polyester Resin

PERFORMANCE RECOMMENDATIONS

A. Keep full strength catalyst levels between 1.0% - 2.0% of the total resin weight.

B. Maintaining shop temperatures between 65°F/ 18°C and 90°F/32°C and humidity between 40% and 90% will help the fabricator make a high quality part. Consistent shop conditions contribute to consistent gel times.

STORAGE STABILITY

Resins are stable for three months from date of production when stored in the original containers away from sunlight at no more than 70°F/21°C. After extended storage, some drift may occur in gel time.

During the hot summer months, no more than two months stability at 86°F/30°C should be anticipated.

SAFETY

See appropriate Alpha/Owens-Corning MSDS for guidelines.

APPLICATION RECOMMENDATIONS

Due to the curing characteristics of the 80-604 series resins, it is desirable to complete all secondary bonding as soon as possible. Exposure of the laminate to sunlight will result in severe secondary bonding problems. After 24 hours of cure, it may become necessary to abrade the laminate to insure good secondary bonding, especially if the surface of the laminate has been allowed to become resin rich. Low fiberglass content and resin puddling should be avoided with this product.

To assure adequate bonding to gel coats, fabricators should pre-wet the gel coat surface with a thin pass of catalyzed resin prior to lamination.

Chemical resistance studies have indicated the dicyclopentadiene resins such as 80-604 series have very poor resistance to certain hydrophobic liquids, such as hydrocarbons. Fuel storage tanks should not be produced with the 80-604 resins.

If your manufacturing needs require a more corrosion resistant resin, please contact your Alpha/Owens-Corning representative for information or technical assistance on Alpha/Owens-Corning's line of isophthalic or vinyl ester resins.

FOOTNOTES

(1)

The gel times shown are typical but may be affected by catalyst, promoter and inhibitor concentrations and resin, mold and shop temperature. Variations in gelling characteristics can be expected between different lots of catalysts and at extremely high humidities. Pigment and fillers can retard or accelerate gelation. It is recommended that the fabricator check the gelling characteristics of a small quantity of resin under actual operating conditions prior to use.

(2)

Based on tests at 77°F/25°C and 50% relative humidity. All tests performed on unreinforced cured resin castings. Thixotropic components, if applicable, are excluded from casting samples. Castings were prepared using 1.25% M-50, 0.25% Cobalt 6% post cured for 2 hours at 194°F/90°C using Alpha/Owens-Corning test method X-12Ab.

The information contained in this data sheet is based on laboratory data and field experience. We believe this information to be reliable, but do not guarantee its applicability to the user's process or assume any liability for occurrences arising out of its use. The user, by accepting the products described herein, agrees to be responsible for thoroughly testing any application before committing to production. Our recommendations should not be taken as inducements to infringe any patent or violate any law, safety code or insurance regulation.

AOC

ALPHA/OWENS-CORNING
P.O. BOX 610
COLLIERVILLE, TN 38027-0610
(901) 854-2800
FAX (901) 854-1183

Pub. No. 1-AOC-20244 Printed in U.S.A., August 1995

AOC™
ALPHA/OWENS CORNING

19991 Seaton Avenue
Perris, CA 92570
(800) 654-1838

CERTIFICATE OF ANALYSIS

Customer: BAYLINER
Product: 80.604-NMMA
Batch Number: P-5163
Date: 25-Mar-97
B/L#:

Property	Result	Specifications Minimum	Specifications Maximum	Test Method
Viscosity, RVF #2 @ 20 rpm	700	700	750	QI-026
Viscosity, RVF #2 @ 2 rpm	4000	2100	4500	QI-026
Thixotropic Index	5.71	4	6	QI-026
Gel Time @77°F with 1.0% 925 RED	33.2	33	34	QI-010
Total Peak Time	49.1	43	50	QI-010
Peak Temperature	308	300	315	QI-010
Monomer Content	42.2	42	42.3	QI-021
Specific Gravity	1.09	1.08	1.11	QI-023

Tested By: E. LYNCH
Approved By: Craig Smarker

ISO 9002 Registered Quality System

Appendix F

Certifications for Gas Standards and Equipment Calibrations

Eric - Gas specs for Air needed @ US Marine
Darrell

NATIONAL SPECIALTY GASES
(919) 544 - 3772
630 UNITED DRIVE
DURHAM, NC
27713

Eric @ Cascade Air Gas
252 [illegible] 2311
3211

CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER:	National Welders Raleigh, N.C.	REFERENCE #:	88-51868
		CYLINDER #:	CC92650
		ORDER #:	1272716
		DATE REPORTED:	3/17/97

MATERIAL SUBMITTED: AIR, SCIENTIFIC GRADE

INFORMATION REQUESTED: PURITY ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION*	METHOD
CO2		1PPM	INFRARED
CO		1PPM	INFRARED
THC		0.1PPM	THC ANALYZER
H20		5PPM	MOISTURE ANALYZER
AIR		BALANCE (O2: 20.5% - 21.5%)	OXYGEN ANALYZER

*ALL CONCENTRATIONS ARE PPM MAX

Traci A. Savoy
AUTHORIZED SIGNATURE

"THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF THE ESTABLISHED CHARGE FOR THE SERVICE."

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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: NATIONAL WELDERS
RALEIGH, N.C.

REFERENCE #: 01960-88
CYLINDER #: 98060
ORDER #: 1272716
DATE REPORTED: 3/13/97

MATERIAL SUBMITTED: HYDROGEN, UHP

INFORMATION REQUESTED: PURITY ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION*	METHOD
N2		5 PPM	GAS CHROMATOGRAPH
O2		1 PPM	OXYGEN ANALYZER
THC		0.2 PPM	TOTAL HYDROCARBON ANALYZER
H2O		3 PPM	TRACE MOISTURE ANALYZER
HE		0.5 PPM	GAS CHROMATOGRAPH
CO & CO2		0.5 PPM	INFRARED ANALYZER
H2		99.999% MINIMUM ASSAY	

*ALL CONCENTRATIONS ARE PPM MAX

Richard Sykes

AUTHORIZED SIGNATURE

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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER:	National Welders	REFERENCE #:	88-51869
	Raleigh, N.C.	CYLINDER #:	CC92741
		ORDER #:	1272716
		DATE REPORTED:	3/17/97

MATERIAL SUBMITTED: NITROGEN, UHP

INFORMATION REQUESTED: PURITY ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION*	METHOD
AR		5 PPM	GAS CHROMATOGRAPH
H2		2 PPM	GAS CHROMATOGRAPH
O2		1 PPM	OXYGEN ANALYZER
CO & CO2		0.5 PPM	INFRARED ANALYZER
THC		0.2 PPM	TOTAL HYDROCARBON ANALYZER
H20		1 PPM	TRACE MOISTURE ANALYZER
N2		99.999% MINIMUM ASSAY	

*ALL CONCENTRATIONS ARE PPM MAX

Traci A. Savage
AUTHORIZED SIGNATURE

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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER:	National Welders	REFERENCE #:	88-51868
	Raleigh, N.C.	CYLINDER #:	CC92869
		ORDER #:	1272716
		DATE REPORTED:	3/17/97

MATERIAL SUBMITTED: AIR, SCIENTIFIC GRADE

INFORMATION REQUESTED: PURITY ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION*	METHOD
CO2		1PPM	INFRARED
CO		1PPM	INFRARED
THC		0.1PPM	THC ANALYZER
H20		5PPM	MOISTURE ANALYZER
AIR		BALANCE (O2: 20.5% - 21.5%)	OXYGEN ANALYZER

*ALL CONCENTRATIONS ARE PPM MAX

Jaci A. Savag
AUTHORIZED SIGNATURE

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DURHAM, NC
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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51865
CYLINDER #: CC61479
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Styrene in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Styrene	60 ppm	59.2 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Traci A. Savidge
AUTHORIZED SIGNATURE

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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51866
CYLINDER #: CC61452
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Styrene in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Styrene	120 ppm	122 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Traci A. Savage
AUTHORIZED SIGNATURE

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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51867
CYLINDER #: CC61454
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Styrene in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Styrene	200 ppm	204 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Jraci A. Savage
AUTHORIZED SIGNATURE

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DURHAM, NC
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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51861
CYLINDER #: CC103657
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Propane in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Propane	45 ppm	45.5 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Jose A. Savage
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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51859
CYLINDER #: CC92668
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Propane in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Propane	15 ppm	15.0 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Traci A. Savoye

AUTHORIZED SIGNATURE

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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51860
CYLINDER #: CC92795
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Propane in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Propane	30 ppm	30.4 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Traci A. Savag

AUTHORIZED SIGNATURE

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DURHAM, NC
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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51862
CYLINDER #: CC103402
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Propane in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Propane	300 ppm	297 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Marie A. Savage
AUTHORIZED SIGNATURE

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DURHAM, NC
27713

CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51864
CYLINDER #: CC103388
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Propane in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Propane	900 ppm	914 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Traci A. Savage
AUTHORIZED SIGNATURE

NATIONAL SPECIALTY GASES
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CERTIFICATE OF ANALYSIS

CERTIFIED MIXTURE

CUSTOMER: National Welders
Raleigh, N.C.

REFERENCE #: 88-51863
CYLINDER #: CC103517
ORDER #: 1272716
DATE REPORTED: 3/17/97

MATERIAL SUBMITTED: Propane in Air

INFORMATION REQUESTED: RATIO ANALYSIS

COMPONENT	SPECIFICATION	CONCENTRATION	METHOD
Propane	600 ppm	600 ppm	Total Hydrocarbon Analyzer
Air		Balance	

Traci A. Savage
AUTHORIZED SIGNATURE

E[illegible]ment Log

MODEL ______________________

DATE OF PURCHASE ______________________

MAINTENANCE RECORD

1. ________ 2. ________ 3. ________
4. ________ 5. ________ 6. ________
7. ________ 8. ________ 9. ________
10. ________ 11. ________ 12. ________

CALIBRATION CONSTANTS

S1	S2	OFF3	DATE

NOTES: ______________________

ALNOR INSTRUMENT COMPANY
7555 N. LINDER AVE.
SKOKIE ILLINOIS USA 60077
TELEPHONE (708) 677-3500
TELEFAX (708) 677-3539

AUGUST 1990
Printed in USA

Manual #116-159-013 REV 3

ALNOR®

CompuFlow®
ThermoAnemometer
model 8565
OWNER'S MANUAL

SPECIFICATIONS

INSTRUMENT DISPLAY	4-digit, 5/16" high LED's. Separate indication for FPM, m/s, °F, °C and HOLD
AIR VELOCITY RANGE	20 to 3000 FPM (0.1 to 15 m/s)
INSTRUMENT TEMP MEASURING RANGE	32 to 158°F (0 to 70°C)
OPERATIONAL RANGE	
Instrument:	32 to 122°F (0 to 50°C)
Probe:	32 to 158°F (0 to 70°C)

ACCURACY

Air velocity † (Air Temp. 75-79°F, 24-26°C):

20-100 FPM	± 5 FPM (± .03 m/s)
100-600 FPM	± 3% of reading ± 2 FPM (± .01 m/s)
600-3000 FPM	± 3% of reading ± 20 FPM) (± 0.1 m/s)
Temperature:	± 0.8°F (± 0.4°C)
Temperature Drift †:	± 1/4% of reading or 1/4 FPM (whichever is greater) for each °C change in Air Temperature

RESOLUTION

Air Velocity:	1 FPM from 20 to 700 FPM (.01 m/s from .1 to 3.55 m/s)
	10 FPM from 700 to 3000 FPM (.1 m/s from 3.55 m/s to 15 m/s)
Temperature:	0.1°

† These specifications are valid only if measurements are taken in a 4" dia. or larger duct or free air, the temperature gradient across the duct is less than 0.1°C, and the turbulence level is less than 1.5%.

SPECIFICATIONS

BATTERIES	Three 1.2V C-size rechargeable 2200 mAH NiCd cells
BATTERY RECHARGE TIME	12 to 14 hours
BATTERY LIFE	Minimum 6 hours continuous service (without printer in use)
INSTRUMENT DIMENSIONS	2 3/4"x4"x7 1/2" (70x102x190 mm)
INSTRUMENT WEIGHT WITHOUT PROBE	1 lb. 7 oz. (651 grams) with batteries
CARRYING CASE	Black plastic, foam padded; 17 1/4"x4 5/8"x14" (430x117x356 mm), with handle
TELESCOPIC PROBE	.355" (9 mm) max diameter Handle 3 1/2" long x 1 1/2" wide Length 20" closed, extendible to 45". (508 mm extendible to 1143 mm) Flexible cable 7 ft. (2.1 M) long Pivoting section 4.5" (114 mm) long at tip end, lockable in straight or either 90° position. Flex life: 2000 cycles minimum.
PRINTER PORT	For use with ALNOR CompuFlow Microprinter P/N 638-493-000 or CompuFlow RS232 interface module P/N 639-000-000
FIELD CALIBRATION ADJUSTMENT RANGE	± 20% change from factory calibration.

Specifications subject to change without notice.

original in file at KIP

ALNOR®

Certificate of Traceability

EQUIPMENT LIST

PART NUMBER	MODEL NUMBER	TYPE	SERIAL NUMBER
634-493-400	8565	COMPUFLOW THERMOANEMOMETER	2529

The Alnor Instrument Company hereby Certifies that the above designated equipment was found to meet or exceed manufacturing specifications. This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (NIST) within the limits of the institute's calibration service. Our calibration system complies with the requirements of MIL STD 45662A.

Standard.
Used: QA311
QA635

NIST
Test No. 836/252398

Date Tested: 02/18/94

Tested By: S. BYRON

Reviewed By: [signature]
Quality Assurance

Review Date: 02/18/94

S.O.	615797
P.O.	00229670

ALNOR INSTRUMENT COMPANY
7555 N. LINDER AVENUE
SKOKIE ILLINOIS 60077
TELEPHONE (708) 677-3500
TELEFAX (708) 677-3539

FORM 115-656-020 REV 11

ALNOR

ALNOR CALIBRATION STANDARDS

Your thermal anemometer has been calibrated using the latest standards traceable to the National Institute for Standards and Technology (NIST). Alnor is working with NIST and industry in a Round Robin test to develop a uniform and consistent standard for thermal anemometer calibration. Previous to January 1, 1993, a pitot static probe traceable to NIST was used as the primary transfer standard for calibration of CompuFlow and System 1 thermal anemometer probes. After January 1, 1993, CompuFlow and System 1 thermal anemometers are calibrated using a NIST traceable thermal anemometer. Under very low turbulence conditions (0.1%), there is good matching between these standards. For moderate turbulence conditions, differences of 10% between these standards may be observed. (Turbulence is a measure of how much fluctuation there is in the air flow.)

Call The **ALNOR Customer Service** Department for additional assistance at (708-677-3500).

p/n 116-159-070

ALNOR INSTRUMENT COMPANY
7555 North Linder Avenue
Skokie, Illinois 60077

Telephone (708) 677-3500
Telefax (708) 677-3539

WEIGH-TRONIX

Certificate of Inspection

For:

Co.: Air Tech Environmental At: U.S. Marine / Bayliner

Make: Weigh Tronix S/N: [illegible]

Inspected By: [illegible] Date: 3-28-97

This certifies that the above scale met all State Highway Weighing Requirements when tested on the above date with [illegible] lbs. of test weights.

Weight Applied:	0	300.0	600.0
Indicator Reading:	0	300.0	600.0

Next Inspection Date: 9/2/97

Appendix G

Bag Standards

Initial Wt 668.2

Bag 1 Std:

MMA Fw: 100.12 Target = 50 ppm

50 = $\frac{100.12\,g}{mole} \cdot \frac{mole}{22.4\,l} \cdot \frac{ml}{sample}$

50 = $10^6 \cdot$ mole/100.12 g $\cdot \frac{22.4\,l}{mole} \cdot \frac{ml}{sample} \cdot \frac{sample}{Bag\,(30)\,l} \cdot .95\,g/ml$

.0071 ml

Flow	1035	7.0 μl MMA	1069
	1038	θ = 31''	1071
	1037		1064
Initial	1036.7	Final	1068

V_{Bag} = 32.6 l

C_{Bag} = 45.6 ppm

4/3/97 Bag 2 MMA STD

Initial flow 1094

1098

1088

$\overline{1093.3}$ initial fill rate

ml MMA: 0.016

Bag fill Time = 33"

Final Flow 1051

1048

1048

$\overline{1049}$ Final fill rate

Average fill rate: 1071.2 ml/min

Bag Vol = 35.35 l

$$C_{mma} = \frac{.016}{35.35} \cdot \frac{.95}{100.12} \cdot \frac{22.4}{10^{-6}}$$

= 96.2 ppm

4/3/97

BAG 1A

Initial Flow 1076

1079

1076 $\overline{1077}$

50 μl Styrene

$\Theta = 25''$

Final Flow 1074

1080

1076 $\overline{1077}$

$\bar{Q} = 1077$

$V_{BAG} = 26.9$

$C_{STY} = 364$ ppm

BAG 3 4/4/97 0803 am

Initial Flow 1090

1090

1089 $\overline{1090}$

20 μl MMA

$\Theta = 34$

Final Flow 1068

1070

1068 $\overline{1069}$

$\bar{Q} = 1079$

$V_{Bag} = 36.7$ l

$C_{MMA} = 115.9$ ppm

Bag 4. STD

Made in Air

4/7/97

Initial Q 1095

1091

1095 = $\overline{1094}$

25 µl injected

Final Q: 1069

1071

1071 $\overline{1070}$

Θ: 34"

V_{BAG} = 36.8 l

C_{MMA} = ~~138~~ 144 ppm

Bag 5 4/10/97

Initial flow 1039

1040

1039

1039 $\overline{1039}$

Injection made w/50µl syringe — difficult syringe to use

35µl MMA injected

$\theta = 35''$

Final Flow = 1075

1075

1078

1072 $\overline{1075}$

$\overline{Q} = 1057$

$V_{BAG} = 37.0$

$$C_{MMA} = \frac{.035 \mu l}{bag} \cdot \frac{.95 g}{mL} \cdot \frac{mole}{100.12 g} \cdot \frac{22.4 L}{mole} \cdot \frac{bag}{37.0 L} \cdot 10^6 = 201.1 \text{ ppm}$$

4/4/97

Bag 6

Q_I = 1102

1105

1108

1105 $\overline{Q_I}$ = 1106

V_{mma} ~ .025 ml

Θ = 30"

Q_F = 1347

1347

1348

1349 $\overline{Q_F}$ = 1348

V_{BAG} = 1227 x 30 = 36.8

C_{mma} = 144.4

Flow increased as coils became exposed.

4/19/97 mma std, Bag 7

$\Theta = 35''$

$Q_I = 1088$ $\qquad$ $Q_F = \sout{1088}$ 1086

1089 $\qquad$ 1086 $\qquad$ $\bar{Q} = 1087$

1089 $\qquad$ 1085 $\qquad$ $V_{BAG} = 38.05\,l$

$V_{MMA} = .025\,ml$

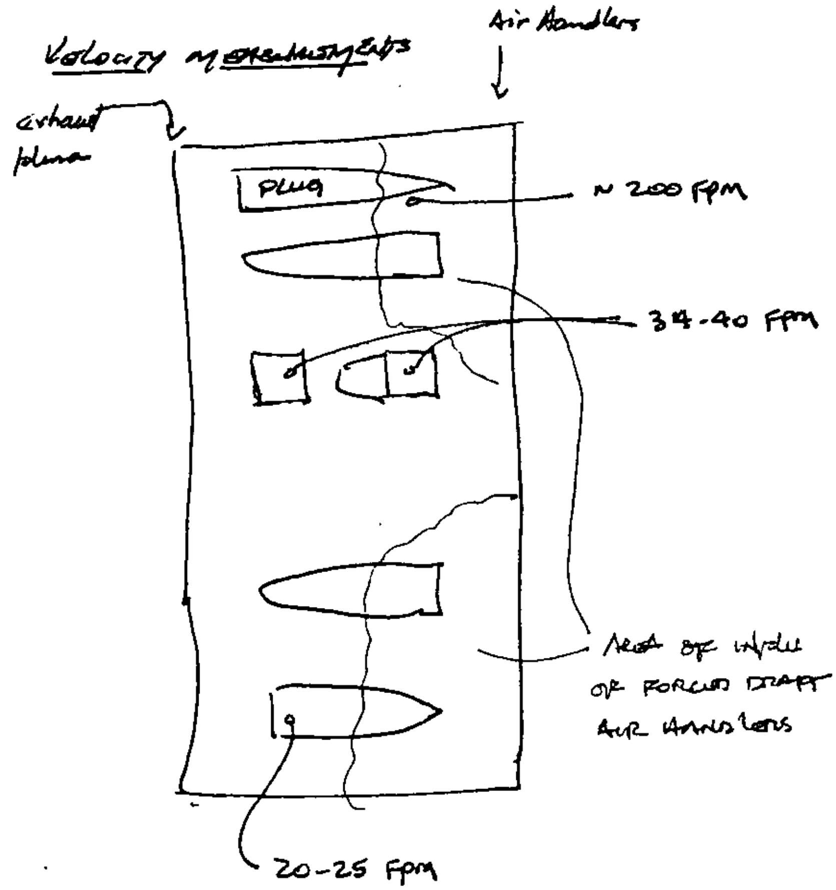
$$C_{MMA} = \frac{.025}{100.12} \cdot \frac{.95}{38.05} \cdot \frac{22.4}{10^{6}} = 139.6\,ppm$$

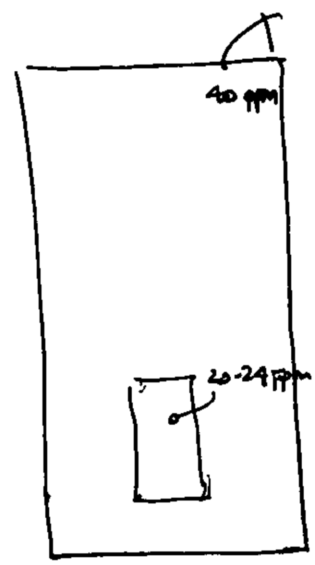
Appendix H

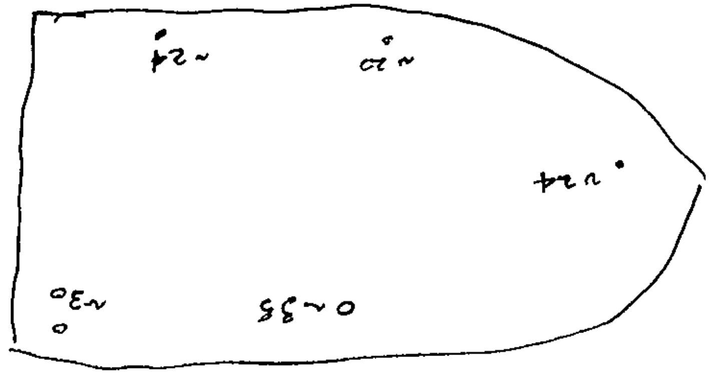
Location and Results of Air Flow Over the Mold Measurements

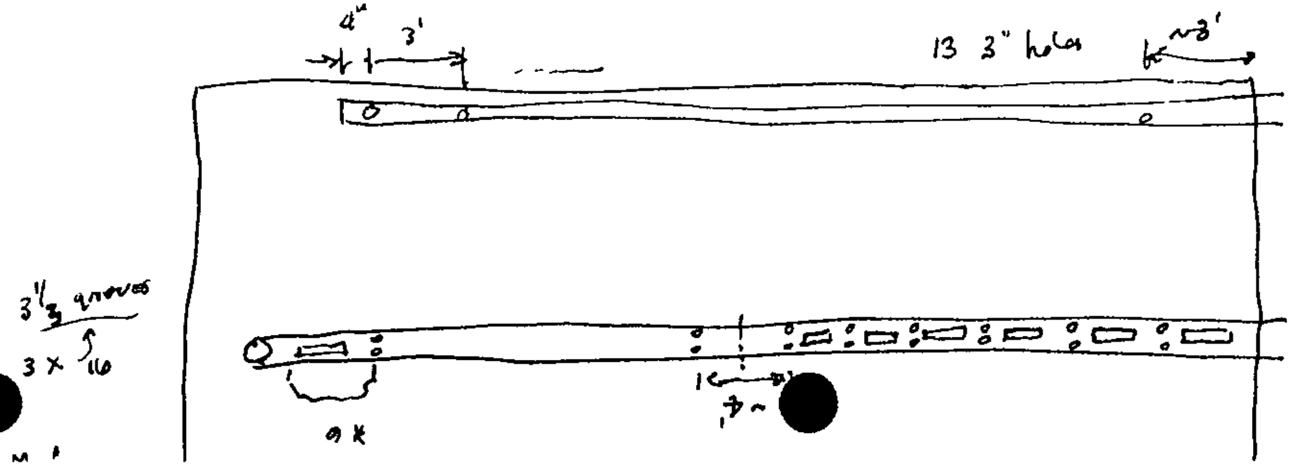
230p. 4/1/97

Velocity Measurements

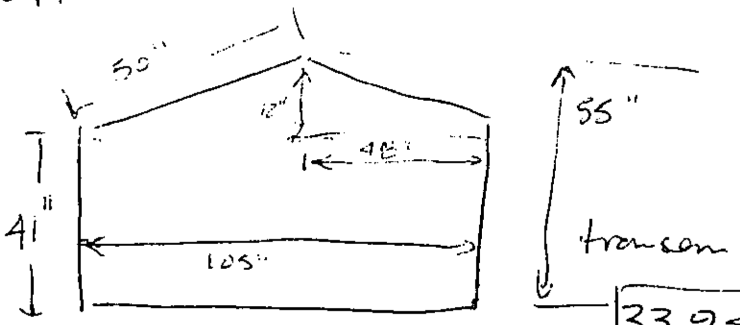



40 ppm
20-24 ppm

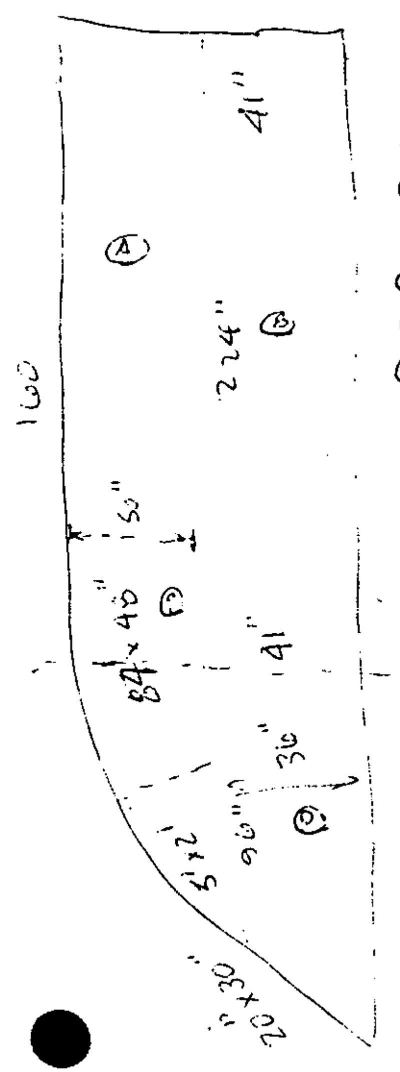

~24
~20
~24
~30
0~35


4"
3'
13 3" holes
~3'
3 1/3 grooves
3 × 1/16
~4'
9 k

28-FT HULL MEASUREMENTS



33.9 SF



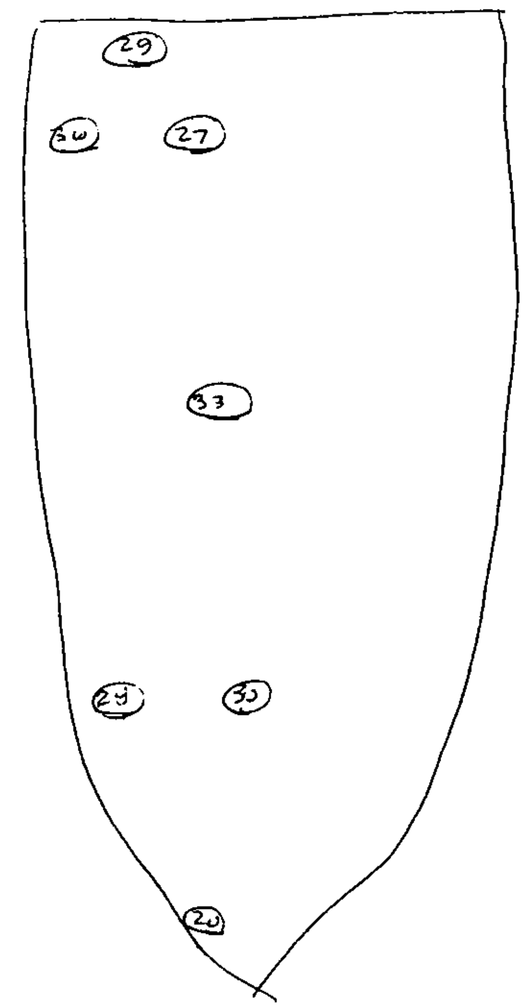
Ⓐ (50 x 160) 2
Ⓑ (41 x 224) 2
Ⓒ (84 x 48) 2
Ⓓ (36 x 96) 2
Ⓔ (60 x 24) 2
Ⓕ (20 x 30) 1

366.83
33.9

400.73 SF

RF mould/pattern 1.375

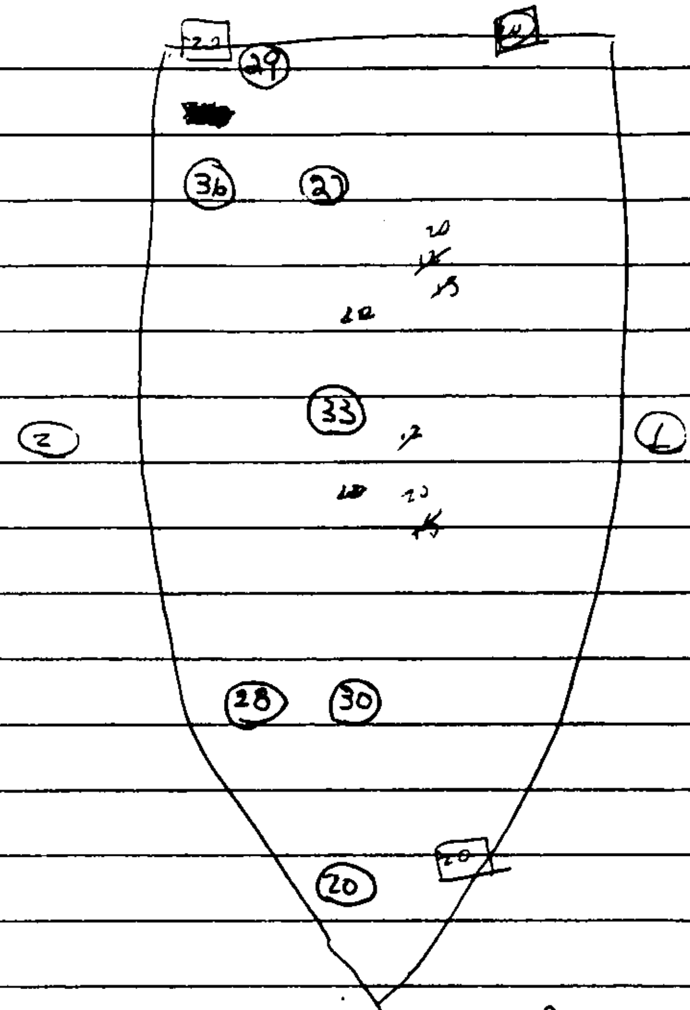
28'
V.G. check



NMMA-8-1, 4/3/97
28' Gel coat

	Time	Mass
0	1031	348.2
	2	345.4
	3	343.0
	4	340.2
	5	338.0
	1036	335.2
	7	333.6
	8	331.0
	9	328.2
	1040	325.8
	1	323.6
	2	321.8
	3	319.0
	4	317.0
	5	315.0
	1046	312.2 *
	7	311.4
	8	309.8
	9	[illegible].2
done side rotating tool →	1050	30[illegible].4
	1	305.8
	2	305.3
start →	3	303.8
	4	301.2
	5	298.- *
	1056	296.0
	7	295.2

348.2
278.6
69.6

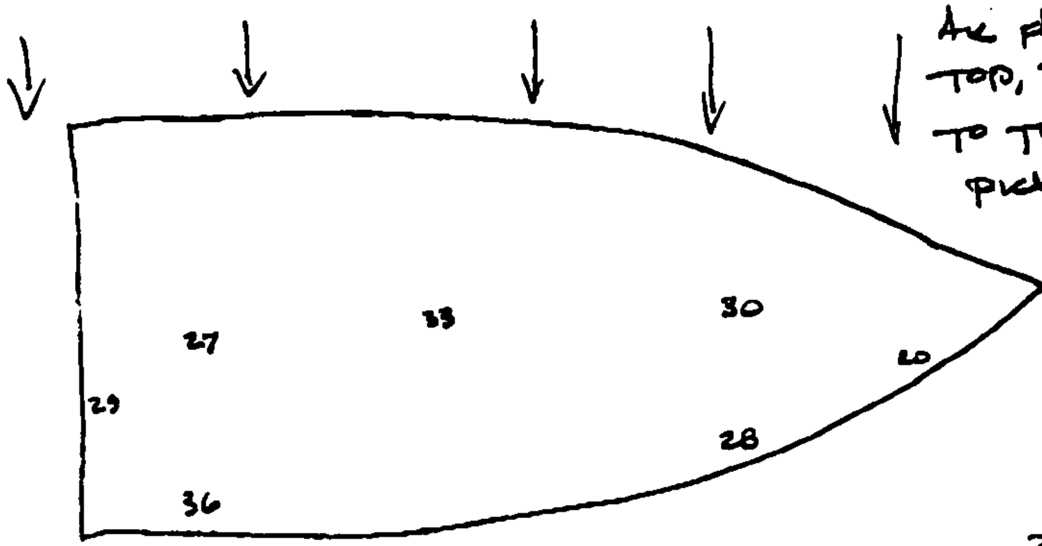


○ = Air flow @ surface

1058	293.4	1109
9	*	1110
1100	291.0	1
1	288.0	2
2	285.6	3
3	283.0	4
4	281.0	1115
1105	279.2	6
done 6 :21	278.6	7
7		8
8		9

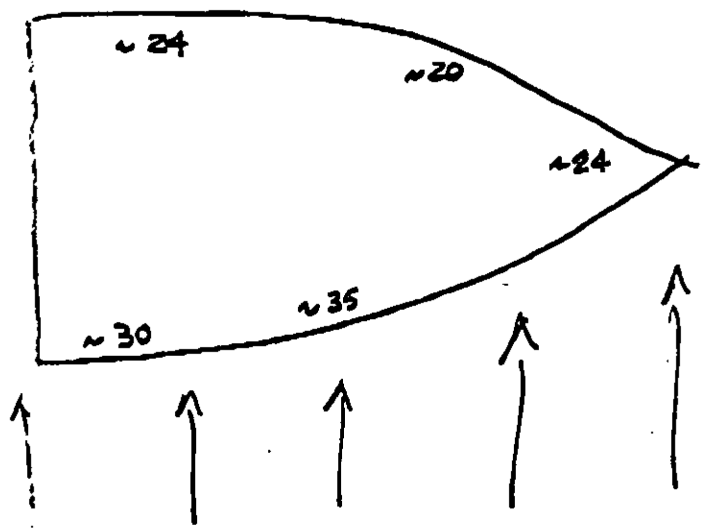
To: David Albert? /MRI 816 531 0315

From: John Stelling



Air flows from top, down tool to this floor pickups —

28-FT AWW



AIR FLOW

Post-it® Fax Note 7671	Date 5/14	# of pages ▸ 2
To JOHN STELLING	From DAVE ALBURTY	
Co./Dept.	Co. MRI	
Phone # 919 419 0395	Phone # 816 753 7600	
Fax # 919 489-2264	Fax # 816 531 0315	

22(a) 4/16/96

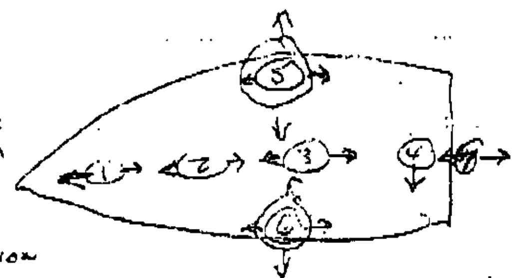
TIME = 1515

AMBIENT TEST TEMP = 75.5°F

18' HULL ANEMOMETER TEST

FOLLOWING SPRAYUP & ROLLOUT

ASSUMED AIRFLOW MARKED BY ARROWS (MAXIMUM READING) OF ⟷ OR ↕ ORIENTATION



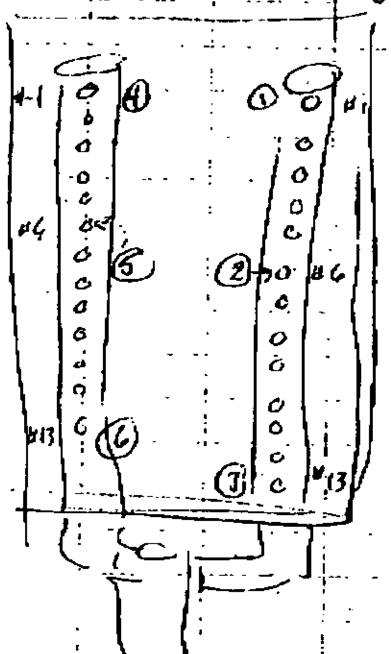
	3"	12"		3"	12"		3"	12"
1	BONKREL	24	3	42	18	5	26	28
1	16	36	3	34	13	5	28	32
1	24	34	3	30	9	5	30	30
1	14	32	3	12	24	5	37	37
1	20	26	3	9	50	5	47	24
1	25	25	3	12	51	5	46	30
2	26	11	4	28	26	6	3 ~~48~~ OR	32
2	24	19	4	25	24	6	33	78
2	8	22	4	22	30	6	41	14
2	11	24	4	17	27	6	27	6
2	9	15	4	20	28	6	21	27
2	7	20	4	22	30	6	17	23
						7	23	22
						7	27	24
						7	30	23

HAND HELD

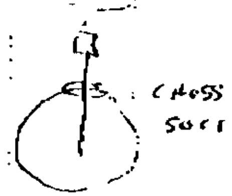
(21a)

4/16/97 [illegible]

HOT WIRE ANEMOMETER
OUTLET DUCT VELOCITY



HOLES 3" DIA.



WITH [illegible] DOOR OPEN

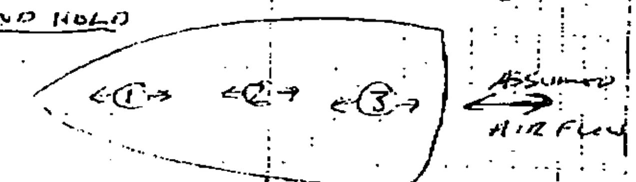
(1) 110 FT/MIN
(2) 750 FT/MIN
(3) 2020 FT/MIN
(4) 500 FT/MIN
(5) 920 FT/MIN
(6) 2090 FT/MIN

(21)

4/16/97 [illegible]

18' HULL TEST 2
HOT WIRE ANEMOMETER
READINGS ABOVE MOLD
AMBIENT AIR T = 74 °F @ 1316

HAND HOLD



DIST. ABOVE MOLD

	3"	12"	OUT		3"	12"	OUTSIDE
1	[illegible]	1	16	3	24	7	10
1	8	2	7	3	1	4	13
1	2	1	14	3	3	14	24
1	1	0	5	3	12	7	07
1	1	8	1	3	5	2	19
1	3	3	3	3	3	14	18
2	3	14	2				
2	3	24	4				
2	2	13	25				
2	2	7	16				
2	1	2	7				
2	2	1	14				

1 min / 3 min

15 SEC AT EACH POINT TO STABILIZE THEN READING EVERY 5 SEC FOR 30 SEC.

Table 2-2. Resin Scale Calibration

Run#	Mass of weight added	Cumulative Total weight		DAS reading	Scale reading	Difference (±lb)
		grams	pounds			
0 (Tare)	0	0	0	-1.92	0.0	-1.92
1	+1g	1	2.2×10^{-3}	-1.94	0.0	-1.94
2	+5g	6	0.0132	-1.96	0.0	-1.97
3	+10g	16	0.0352	-1.99	0.0	-2.02
4	+50g	66	0.146	-1.89	0.0	-2.04
5	+100g	166	0.366	-1.65	0.0	-2.02
6	+1000g	1166	2.57	0.55	2.2	-2.02
7	+2000g	3166	6.98	5.06	6.6	-1.92
8	+50lb	25,846	57.0	54.90	56.4	-2.10
9	+2×50lb	71,206	157	154.74	156.0	-2.26
10	+6×50lb	207,286	457	454.89	455.4	-2.11
11	-2×50lb	161,926	357	354.95	355.8	-2.05
12	-4×50lb	71,206	157	154.89	156.2	-2.11
13	-2×50lb	25,846	57.0	54.96	56.4	-2.04
14	-50lb	3166	6.98	4.97	6.6	-2.01
15	-2000g	1166	2.57	0.51	2.2	-2.06

2.2.10 Air Flow over Tool

Air flow measurement over the tool surface was conducted on at least one occasion by Stelling Engineering. Information on the measurements was provided to MRI by fax on 5/14/97 (see Appendix L). From this information, it cannot be determined whether the Quality Assurance Objectives of the QAPjP, Table 3.1 were met; i.e., that flow did not vary more than 20% from established flows. More information should be provided in the technical report. Air flow over the tool surface was measured by MRI using the same calibrated hot-wire anemometer as Stelling Engineering, per ASTM Method D 3464-96 (see Appendices G and H). Air flow measurements were taken over the 28' hull by MRI on 4/16/97. Six measurements (rather than 18 specified by the QAPjP) were taken by MRI at each height over a three minute period at each location. Measurements were taken at two heights, 3" and 12" above the surface. Measurements were taken at three locations prior to spray up, and seven locations on the 28' hull following spray up and roll out, which are depicted in Figure 2-1 . The data collected are presented in Figures 2-2 and 2-3.

MRI measurements seemed to indicate that air flowed on a vertical axis at points near the center of the hull, 12" from the hull, while flow seemed to be horizontal along the centerline. This was determined by turning the instrument 90° at each point and observing which direction gave the higher reading before taking the measurements. At points along the keel of the hull (locations 1-4), average air flow was higher at 12 inches above the tool than at three inches. At points near the top of the sides and stern, air flow was higher near the surface of the tool. This is as expected, since the hull tool forms a pocket shielded from the direct path from the NDOs at the top of the TTE to the exhaust duct intakes along the bottom sides of the TTE.

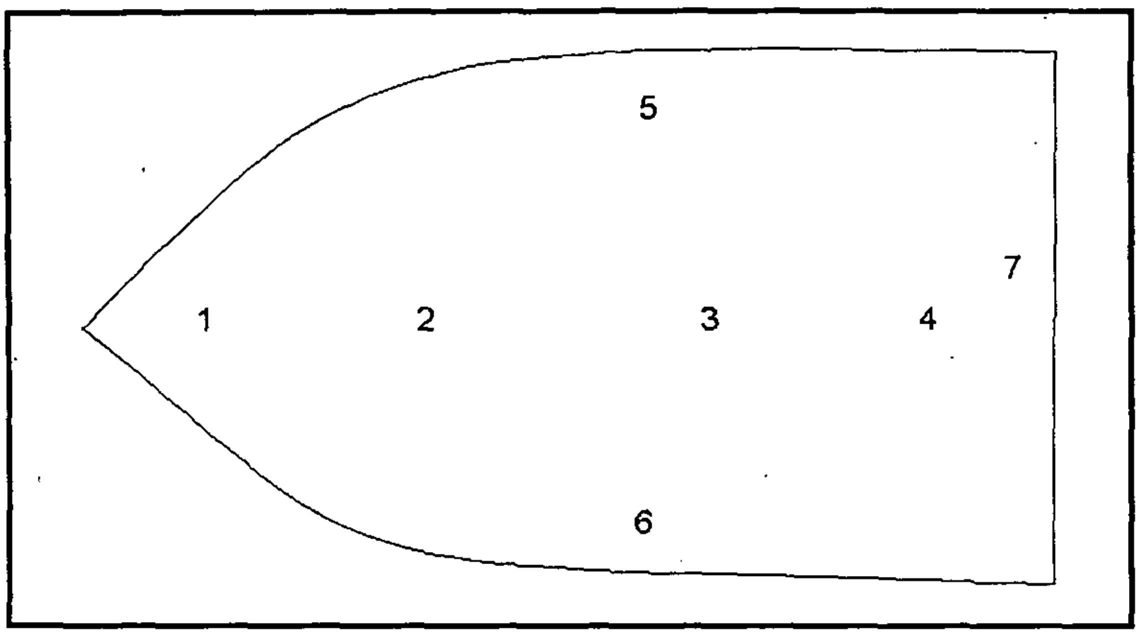
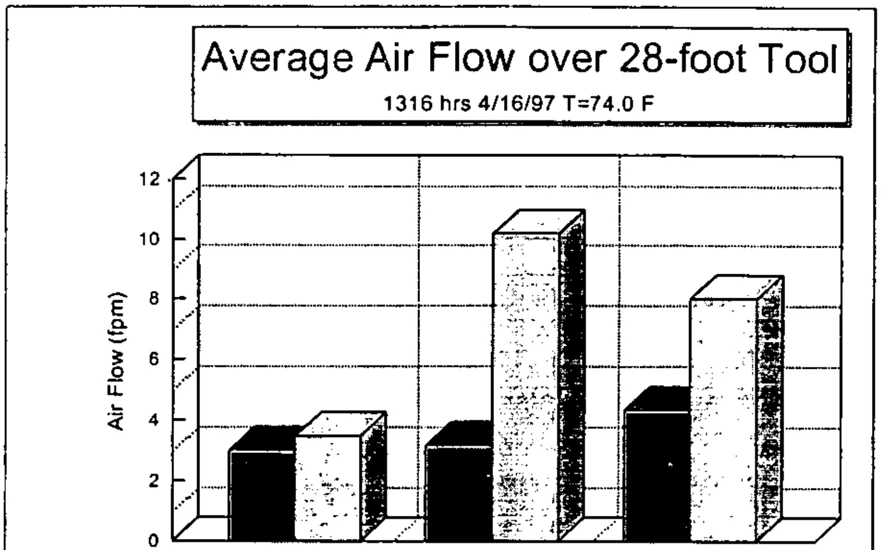
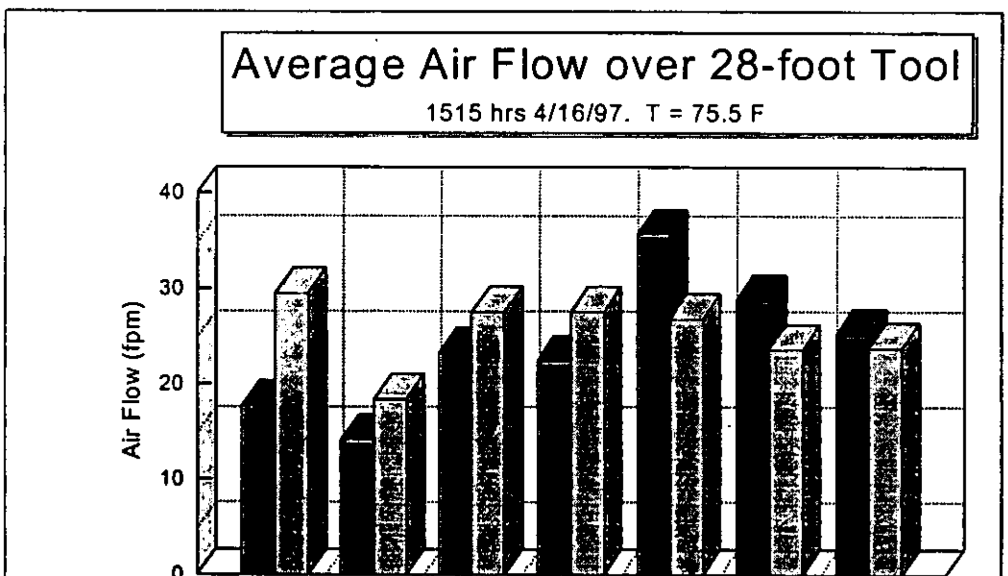


Figure 2-1. 28' Hull; MRI Air Flow Measurement Locations
Upright - Top View



X-Axis	Pt. 1	Pt. 2	Pt. 3
3 inches	3	3	4
12 inches	4	10	8

Figure 2-2. Air Flow Over 28-foot Tool Prior to Spray Up; MRI Data



	Pt. 1	Pt. 2	Pt. 3	Pt. 4	Pt. 5	Pt. 6	Pt. 7
3 inches	18	14	23	22	36	29	25
12 inches	30	19	28	28	27	24	24

Figure 2-3. Air Flow over 28-Foot Hull Tool Following Spray Up; MRI Data

APPENDIX I

COMPARISON OF NMMA RESULTS WITH THOSE FROM OTHER STUDIES

COMPARISON OF NMMA RESULTS WITH THOSE FROM OTHER STUDIES

Gelcoating

Emissions from gelcoating based on 1997 National Marine Manufacturers Association (NMMA) testing to characterize emissions from fiberglass boat manufacturing operations are greater than what is published in the U.S. Environmental Protection Agency's (EPA) compendium of emission factors AP-42 (Figure I-1). The AP-42 values range from 26 to 35 percent of available styrene; the results from this program indicate that the loss of total available volatile materials ranges from 45 to 53 percent, with an average of about 49 percent of total available volatiles.

As the more detailed results of this testing indicate, this loss factor is dominated by the loss of styrene, the primary reactive monomer in the gelcoat. Losses of styrene were about 46 percent of available styrene in the gelcoat and made up approximately 81 percent of the total loss of volatile materials from gelcoating.

Marine gelcoat contains some fraction of methyl methacrylate (MMA) as a ultraviolet (UV) light inhibitor, typically 5-10 percent by weight. MMA is more highly volatile, as evinced by the greater measured emissions as a percentage of available monomer. An average of 69 percent of available MMA was lost from gelcoat application. The vapor pressure of neat MMA is 35 mm Hg at 20°C, compared to that of neat styrene (4.5 mm Hg at 20°C). Also, the diffusion coefficient for these compounds illustrates the greater volatility of MMA; the coefficient for MMA is 0.077 $cm^2/gmol$, compared with

0.072 $cm^2/gmol$ for styrene. [Diffusion coefficients were estimated using the method of Fuller, Schettler, and Giddings (Reid, Prausnitz, and Sherwood, *The Properties of Gases and Liquids*, 1977).]

Figure I-1
Reported Emission Values for Gelcoating

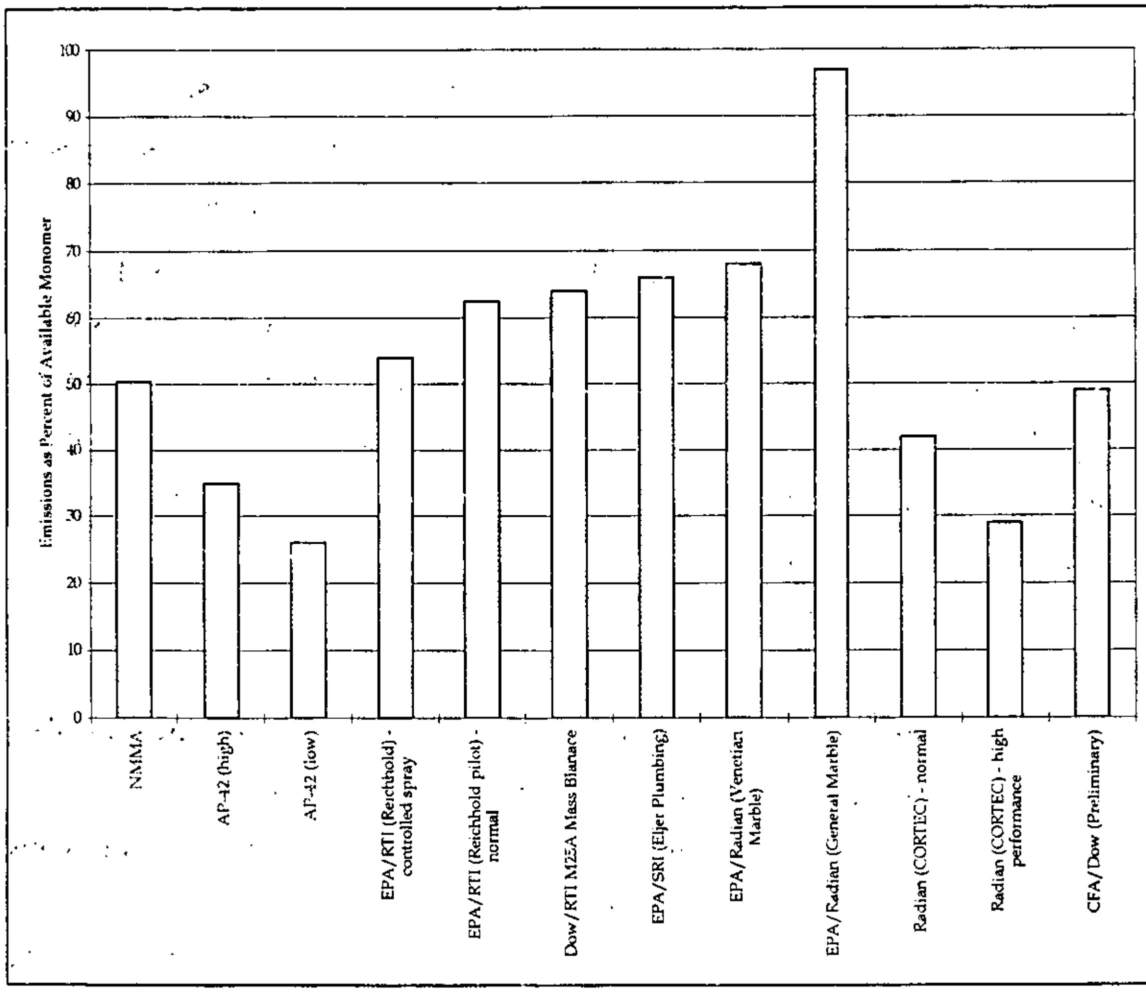


Figure I-1 also includes results from other studies, several conducted under contract with the EPA and other groups. The NMMA results are within the range of results published from other recent studies for a variety of part sizes and shapes. In particular, the range of results from this study are at the lower end of the range of values from the Composite Fabricators Association

(CFA)/Dow Chemical Phase I study and the EPA/Research Triangle Institute (RTI) studies. Previous studies in the bathroom fixture manufacturing industry reported emissions from gelcoating at the higher end of the spectrum, with a single test report showing emissions as great as 96 percent of available styrene.

Resin Lamination

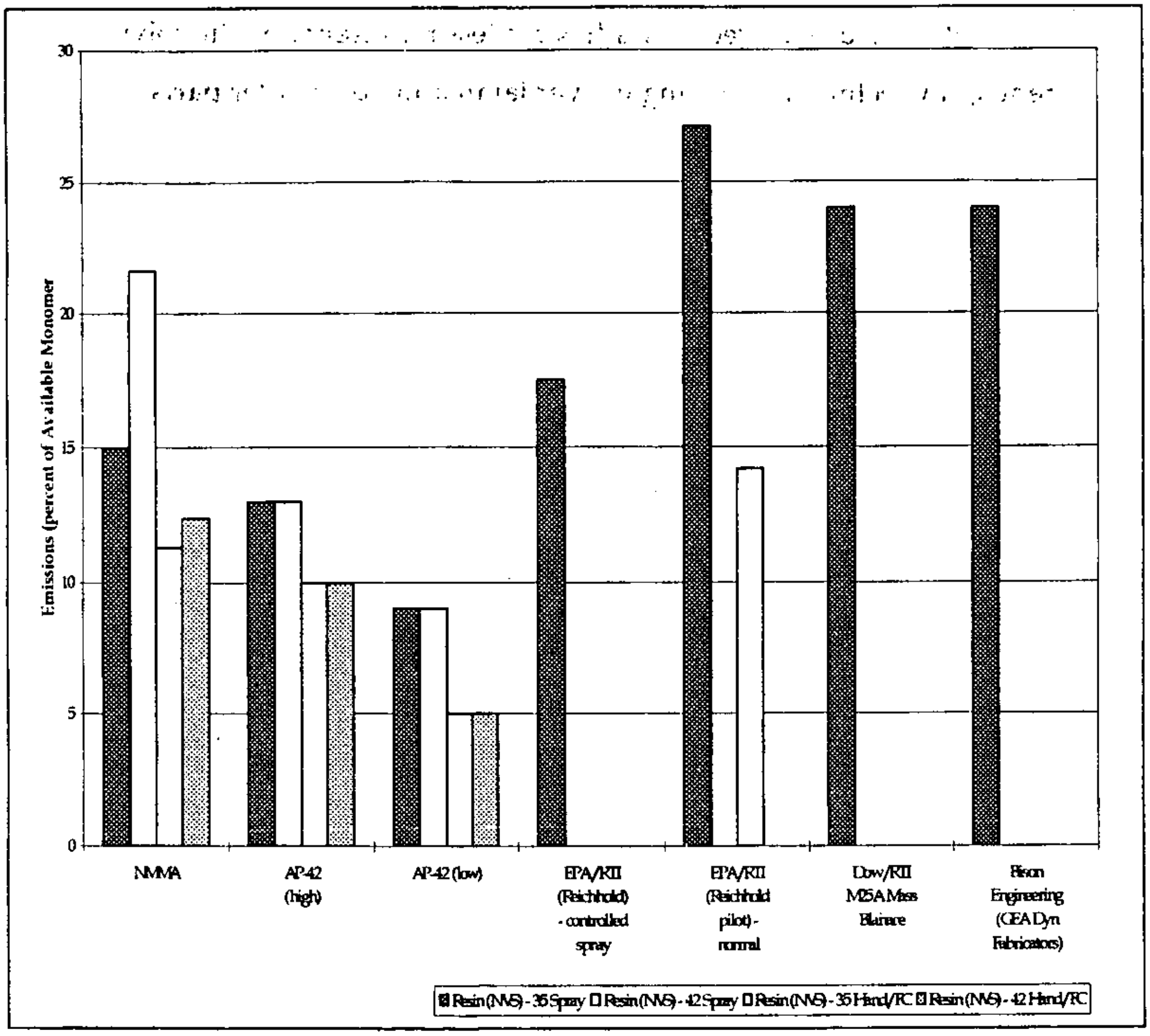
Variables in the resin lamination testing included resin styrene content (nominally 35 percent and 42 percent as representative of those in use by the marine industry), mold size (including basically two lengths and two shapes), and application technique (spray up lamination and flow chopper application). All testing was conducted during use of non-vapor suppressed resins. The resin with the greater styrene content was selected to represent the upper bound on that typically used by the industry for bulk laminating resins. Higher styrene content resins are used for applying skin coats between the gelcoat and bulk resin layers at some facilities to enhance the laminate strength and gelcoat durability.

The results from the NMMA testing in terms of percent of available styrene are at the upper range of the values presented in AP-42 for resin lamination (Figure I-2). The values from AP-42 are 9 to 13 percent for emissions from spray application and 5 to 10 percent for emissions from "hand lay-up lamination." Results of testing during spray up lamination in the NMMA studies ranged from 14 to 17 percent (average of 15.3 percent) of available styrene for the 35 percent styrene resin and from 21 to 23 percent (average of 21.3 percent) of available styrene for the 42 percent styrene resin. Testing during use of a flow chopper was conducted because it represents a portion of the industry using non-atomized resin application techniques including to hand lay-up lamination.

These results for both resins ranged from 11 to 13 percent of available styrene loss in lamination.

Figure I-2

Reported Emission Values for Resin Lamination



The results from the EPA/RTI studies for uncontrolled (or "normal") spraying were the greatest emissions presented in the literature. The EPA/RTI results were greater than all the NMMA results. Emissions reported as controlled in the EPA/RTI study are comparable to those measured in this study for emissions from lamination, albeit slightly greater. Comparable differences were seen in the results of testing using a flow chopper, with NMMA results showing about 11 percent of available styrene emitted compared with about 14 percent of available styrene reported from the EPA/RTI tests for a comparable resin. The results show that emissions from boat lamination more closely resemble the values reported by the EPA's AP-42 than the more recent studies, likely because the recent studies are less representative (involving different spray technique and single layer lamination of smaller parts).