Hazardous Material Awareness Training

First-in Engine Incident Action Plan

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National Trainers’ Exchange
OAI, Inc.
National Institute of Environmental Health Sciences
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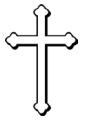
Indianapolis, Indiana



National Trainers' Exchange
First-in Engine Training Objectives

1. Review **competencies** in NFPA 470 and OSHA 1910.120(q) for an Awareness level response to a hazardous materials incident
2. Employ the **RINSED** mnemonic to comply with the competencies for an Awareness level response
3. Use the current **DOT ERG** to gather information to accomplish objectives for an Awareness level response
4. Complete the **First-in Responder Incident Action Plan** to document and demonstrate objectives for an Awareness level response

Agenda

- Definition of a hazardous material
- Emergency response objectives
- DOT ERG Overview
  - First responder awareness level
    - OSHA 29CFR1910.120(q)(6)(i)
  - Competencies for Awareness Level Personnel
    - NFPA 470 (2022 Ed.) Chapter 4
- RINSED mnemonic
- First-in Responder Incident Action Plan
- Tabletop awareness level exercises

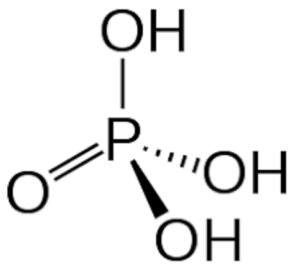
A hazardous material is defined as…

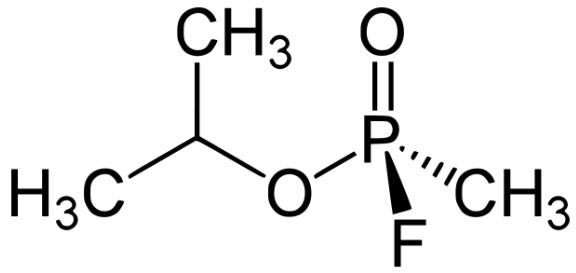
- any substance or material in any form or quantity that poses an unreasonable risk to safety and health and property when transported in commerce (Source: U.S. Department Of Transportation [DOT], 49 Code Of Federal Regulations (CFR) 171).

NFPA 470 (2022 Ed.) Chapter 4.2.1(1)
OSHA 29CFR 1910.120(q)(6)(i)(A)

HazMat versus WMD Incident

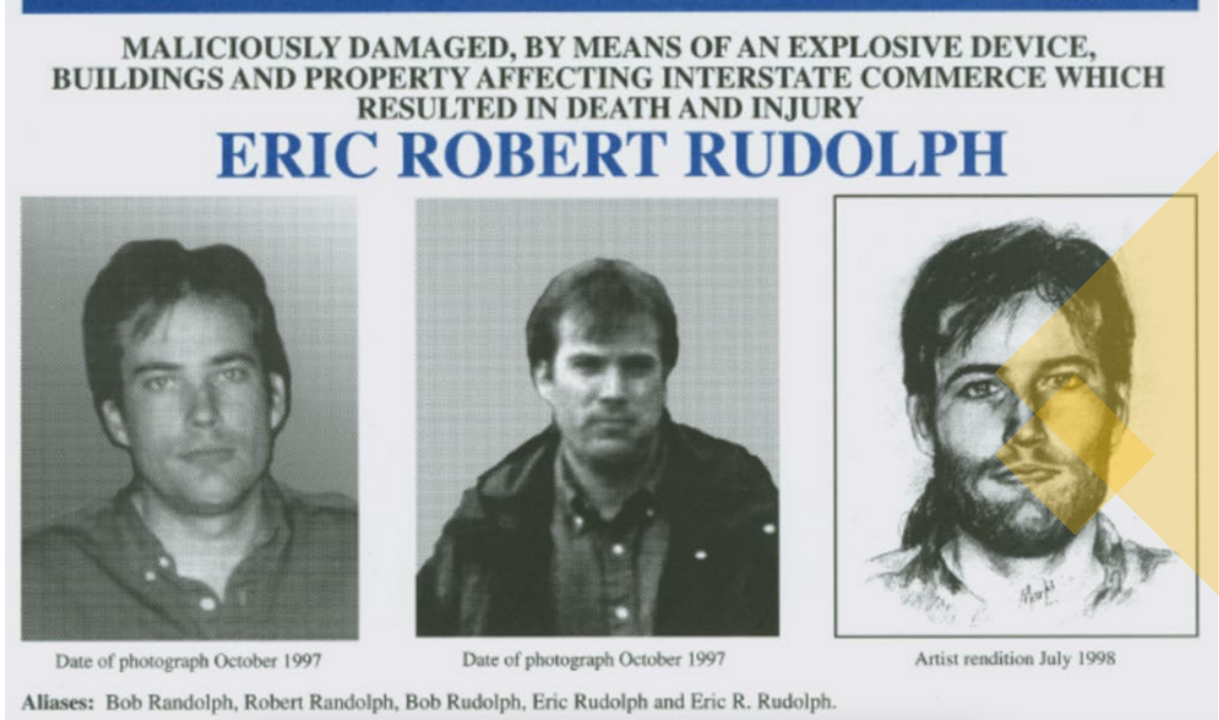
- Intentional versus accident
- Potential for secondary hazards to emergency responders
  - Explosive devices
  - Active shooter
- More agencies involved (HSEM, FBI, etc.)
- Example: phosphoric acid versus sarin





Eric Robert Rudolph

- **January 16, 1997 -** A bomb explodes at an abortion clinic in the Atlanta suburb of Sandy Springs. An hour later, a second bomb explodes. Seven people are injured.



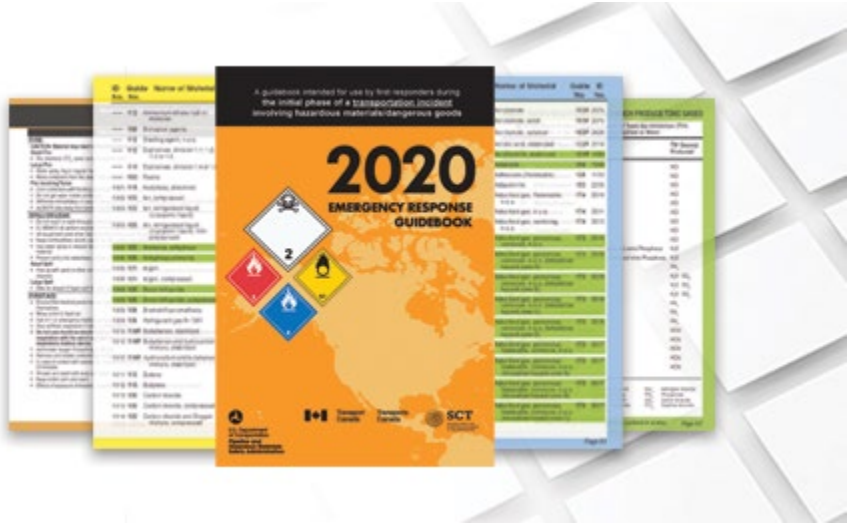
Emergency Response Objectives

- Life
- Incident stabilization
- Property
- Environment

Using the 2020 DOT ERG

- **NOTE: The Emergency Response Guidebook is intended for use by first responders during the initial phase of a transportation incident involving hazardous materials/dangerous goods.**

OSHA 29CFR1910.120(q)(6)(i)(B)
OSHA 29CFR 1910.120(q)(6)(i)(E)
NFPA 470 (2022 Ed.) Chapter 4.1.2.2(1)(c)
NFPA 470 (2022 Ed.) Chapter 4.2.3
NFPA 470 (2022 Ed.) Chapter 4.4.1(7)



DOT ERG Spill Definition

NFPA 470 (2022 Ed.) Chapter 4.4.1(7)

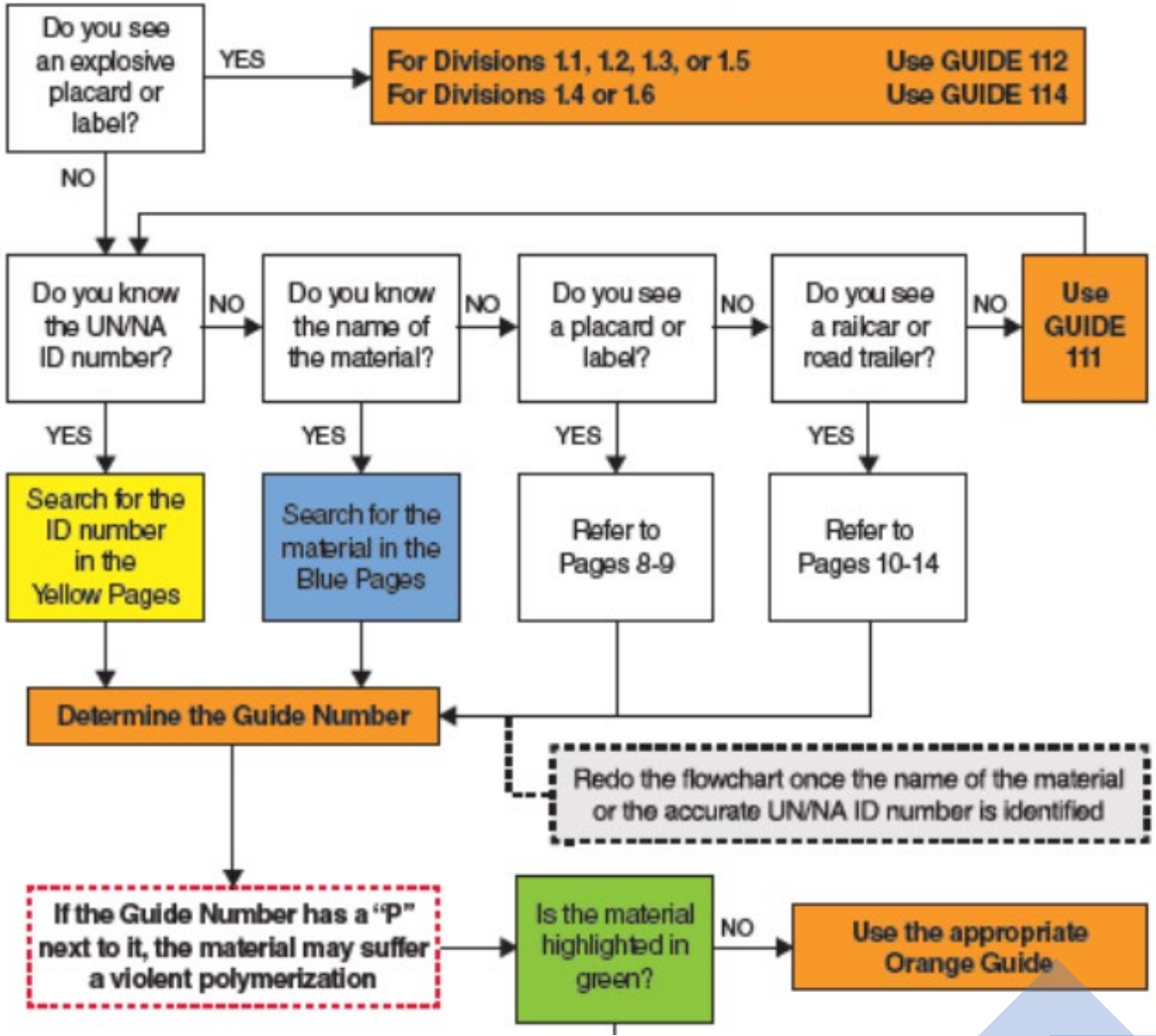
Small
< 55 gallons

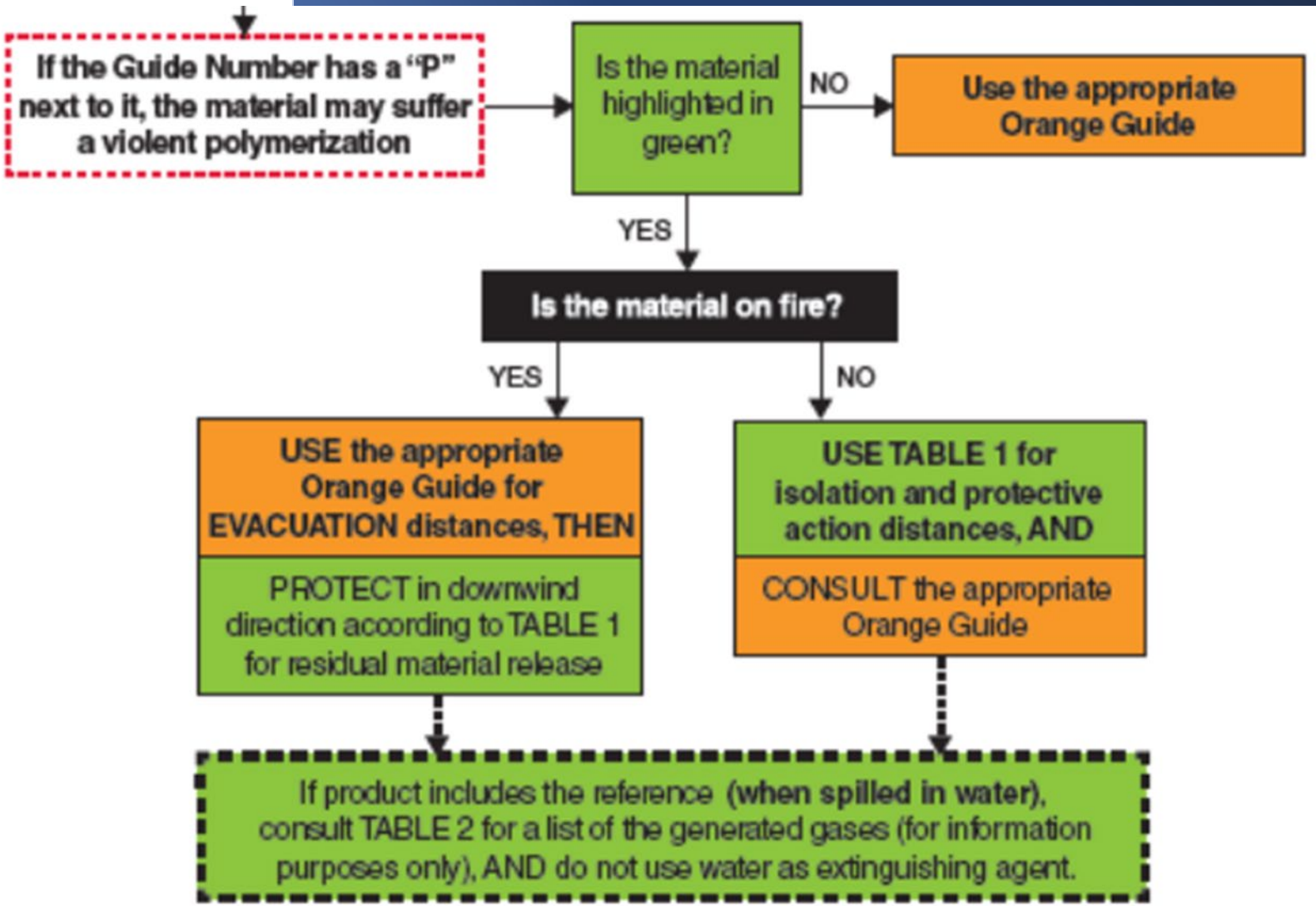
Large
>55 gallons

HOW TO USE THIS GUIDEBOOK

RESIST RUSHING IN!
APPROACH INCIDENT FROM UPWIND, AND UPHILL AND/OR UPSTREAM
STAY CLEAR OF ALL SPILLS, VAPORS, FUMES, SMOKE, AND POTENTIAL HAZARDS

WARNING: DO NOT USE THIS FLOWCHART if more than one hazardous material/dangerous good is involved. Immediately call the appropriate emergency response agency telephone number listed on the inside back cover of this guidebook.





BEFORE AN EMERGENCY - BECOME FAMILIAR WITH THIS GUIDEBOOK!

First responders must be trained in the use of this guidebook.

Accessing a DOT Guide (Orange Section)

1. If you see a placard with a UN/NA number, use the Yellow Section to determine the appropriate Guide Number in the Orange Section.
    1. The Yellow Section will also provide the DOT name of the hazardous material

2. If you know the DOT name of the hazardous material, use the Blue Section to determine the appropriate Guide Number in the Orange Section.
    1. The Blue Section will also provide the UN/NA number for the hazardous material

ID No.	Guide No.	Name of Material
2478	155	Isocyanates, flammable, toxic, n.o.s.
2480	155P	Methyl isocyanate
2481	155	Ethyl isocyanate
2482	155P	n-Propyl isocyanate
2483	155P	Isopropyl isocyanate
2484	155	tert-Butyl isocyanate
2485	155P	n-Butyl isocyanate
2486	155P	Isobutyl isocyanate
2487	155	Phenyl isocyanate
2488	155	Cyclohexyl isocyanate
2490	153	Dichloroisopropyl ether
2491	153	Ethanolamine
2491	153	Ethanolamine, solution
2491	153	Monoethanolamine
2493	132	Hexamethyleneimine
2495	144	Iodine pentafluoride
2496	156	Propionic anhydride
2498	129	1,2,3,6-Tetrahydrobenzaldehyde
2501	152	Tris-(1-aziridinyl)phosphine oxide, solution
2502	132	Valeryl chloride
2503	137	Zirconium tetrachloride
2504	159	Acetylene tetrabromide
2504	159	Tetrabromoethane
2505	154	Ammonium fluoride
2506	154	Ammonium hydrogen sulfate
2506	154	Ammonium hydrogen sulphate
2507	154	Chloroplatinic acid, solid
2508	156	Molybdenum pentachloride
2509	154	Potassium hydrogen sulfate
2509	154	Potassium hydrogen sulphate
2511	153	2-Chloropropionic acid
2512	152	Aminophenols
2513	156	Bromoacetyl bromide
2514	130	Bromobenzene
2515	159	Bromoform
2516	151	Carbon tetrabromide
2517	115	1-Chloro-1,1-difluoroethane
2517	115	Difluorochloroethanes
2517	115	Refrigerant gas R-142b
2518	153	1,5,9-Cyclododecatriene
2520	130P	Cyclooctadienes
2521	131P	Diketene, stabilized
2522	153P	2-Dimethylaminoethyl methacrylate
2524	129	Ethyl orthoformate
2525	156	Ethyl oxalate
2526	132	Furfurylamine
2527	129P	Isobutyl acrylate, stabilized
2528	130	Isobutyl isobutyrate
2529	132	Isobutyric acid
2531	153P	Methacrylic acid, stabilized
2533	156	Methyl trichloroacetate
2534	119	Methylchlorosilane
2535	132	4-Methylmorpholine
2535	132	N-Methylmorpholine
2536	127	Methyltetrahydrofuran
2538	133	Nitronaphthalene
2541	128	Terpinolene
2542	153	Tributylamine
2545	135	Hafnium powder, dry
2546	135	Titanium powder, dry
2547	143	Sodium superoxide

Name of Material	Guide No.	ID No.
Methyl bromide and Chloropicrin mixture	123	1581
Methyl bromide and Ethylene dibromide mixture, liquid	151	1647
Methyl bromoacetate	155	2643
2-Methylbutanal	129	3371
3-Methylbutan-2-one	127	2397
2-Methyl-1-butene	128	2459
2-Methyl-2-butene	128	2460
3-Methyl-1-butene	128	2561
N-Methylbutylamine	132	2945
Methyl tert-butyl ether	127	2398
Methyl butyrate	129	1237
Methyl chloride	115	1063
Methyl chloride and Chloropicrin mixture	119	1582
Methyl chloride and Methylene chloride mixture	115	1912
Methyl chloroacetate	155	2295
Methyl chloroformate	155	1238
Methyl chloromethyl ether	131	1239
Methyl 2-chloropropionate	129	2933
Methylchlorosilane	119	2534
Methylcyclohexane	128	2296
Methylcyclohexanols	129	2617
Methylcyclohexanone	128	2297
Methylcyclopentane	128	2298
Methyl dichloroacetate	155	2299
Methyldichloroarsine	152	1556
Methyldichlorosilane	139	1242
Methylene chloride	160	1593
Methylene chloride and Methyl chloride mixture	115	1912
Methyl ethyl ether	115	1039
Methyl ethyl ketone	127	1193
2-Methyl-5-ethylpyridine	153	2300
Methyl fluoride	115	2454
Methyl formate	129	1243
2-Methylfuran	128	2301
2-Methyl-2-heptanethiol	131	3023
5-Methylhexan-2-one	127	2302
Methylhydrazine	131	1244
Methyl iodide	151	2644
Methyl isobutyl carbinol	129	2053
Methyl isobutyl ketone	127	1245
Methyl isocyanate	155P	2480
Methyl isopropenyl ketone, stabilized	127P	1246
Methyl isothiocyanate	131	2477
Methyl isovalerate	130	2400
Methyl magnesium bromide in Ethyl ether	138	1928
Methyl mercaptan	117	1064
Methyl methacrylate monomer, stabilized	129P	1247
4-Methylmorpholine	132	2535
N-Methylmorpholine	132	2535
Methyl nitrite	116	2455
Methyl orthosilicate	155	2606
Methylpentadiene	128	2461
2-Methylpentan-2-ol	129	2560
Methylphenyldichlorosilane	156	2437
Methyl phosphonic dichloride	137	9206
Methyl phosphonous dichloride	135	2845
1-Methylpiperidine	132	2399
Methyl propionate	129	1248
Methyl propyl ether	127	2612

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks, etc.).
- Vapors may travel to source of ignition and flash back.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

HEALTH

- **TOXIC**; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- **Bromoacetates and chloroacetates are extremely irritating/lachrymators (cause eye irritation and flow of tears).**
- Reaction with water or moist air will release toxic, corrosive or flammable gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause environmental contamination.

PUBLIC SAFETY

- **CALL 911. Then call emergency response telephone number on shipping paper.** If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Ventilate closed spaces before entering, but only if properly trained and equipped.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer **when there is NO RISK OF FIRE**.
- Structural firefighters' protective clothing provides thermal protection **but only limited chemical protection**.

EVACUATION

Immediate precautionary measure

- Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

Spill

- For highlighted materials: see Table 1 - Initial Isolation and Protective Action Distances.
- For non-highlighted materials: increase the immediate precautionary measure distance, in the downwind direction, as necessary.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the ERAP Program Section (page 390).

EMERGENCY RESPONSE

FIRE

- Note: Most foams will react with the material and release corrosive/toxic gases.

CAUTION: For Acetyl chloride (UN1717), use CO_2 or dry chemical only.

Small Fire

- CO_2, dry chemical, dry sand, alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- **FOR CHLOROSILANES, DO NOT USE WATER**; use AFFF alcohol-resistant medium-expansion foam.
- If it can be done safely, move undamaged containers away from the area around the fire.
- Avoid aiming straight or solid streams directly onto the product.

Fire Involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor-suppressing foam may be used to reduce vapors.
- **FOR CHLOROSILANES**, use AFFF alcohol-resistant medium-expansion foam to reduce vapors.
- **DO NOT GET WATER on spilled substance or inside containers.**
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean, non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRST AID

- Call 911 or emergency medical service.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air if it can be done safely.
- Give artificial respiration if victim is not breathing.
- **Do not perform mouth-to-mouth resuscitation if victim ingested or inhaled the substance; wash face and mouth before giving artificial respiration. Use a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim calm and warm.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

DOT ERG Guide Information

- Potential Hazards (primary hazard listed first)
  - Health
  - Fire or Explosion
- Public Safety
  - Protective clothing recommendation (TO/SCBA or CPC)
  - Evacuation
    - Isolate in all directions distance (Hot Zone)
    - Downwind evacuation or shelter-in-place distance (Warm Zone)
    - May have to refer to the Green section for detailed evacuation guidelines

NFPA 470 (2022 Ed.) Chapter 4.2.3(2)

DOT ERG Guide Information Emergency Response

- Fire
  - Small/Large/Rail or Motor Carrier
- Spill or Leak
  - Ignition sources
  - Vapor suppression with foam
  - Water fog to suppress vapors
  - Contact with water precaution
- First Aid
  - General recommendations

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

ID No.	Guide	NAME OF MATERIAL	SMALL SPILLS (From a small package or small leak from a large package) First ISOLATE in all Directions Meters	(Feet)	Then PROTECT persons Downwind during DAY Kilometers	(Miles)	NIGHT Kilometers	(Miles)	LARGE SPILLS (From a large package or from many small packages) First ISOLATE in all Directions Meters	(Feet)	Then PROTECT persons Downwind during DAY Kilometers	(Miles)	NIGHT Kilometers	(Miles)
2478	155	Isocyanate solution, flammable, poisonous, n.o.s. Isocyanate solution, flammable, toxic, n.o.s. Isocyanates, flammable, poisonous, n.o.s. Isocyanates, flammable, toxic, n.o.s.	60 m	(200 ft)	0.8 km	(0.5 mi)	1.8 km	(1.1 mi)	400 m	(1250 ft)	4.4 km	(2.7 mi)	7.0 km	(4.3 mi)
2480	155P	Methyl isocyanate	150 m	(500 ft)	1.7 km	(1.1 mi)	5.0 km	(3.1 mi)	1000 m	(3000 ft)	11.0+ km	(7.0+ mi)	11.0+ km	(7.0+ mi)
2481	155	Ethyl isocyanate	150 m	(500 ft)	2.0 km	(1.2 mi)	5.1 km	(3.2 mi)	1000 m	(3000 ft)	11.0+ km	(7.0+ mi)	11.0+ km	(7.0+ mi)
2482	155P	n-Propyl isocyanate	100 m	(300 ft)	1.3 km	(0.8 mi)	2.7 km	(1.7 mi)	600 m	(2000 ft)	7.4 km	(4.6 mi)	10.8 km	(6.7 mi)
2483	155P	Isopropyl isocyanate	150 m	(500 ft)	1.5 km	(0.9 mi)	3.2 km	(2.0 mi)	1000 m	(3000 ft)	11.0 km	(6.9 mi)	11.0+ km	(7.0+ mi)
2484	155	tert-Butyl isocyanate	60 m	(200 ft)	0.8 km	(0.5 mi)	1.8 km	(1.1 mi)	400 m	(1250 ft)	4.4 km	(2.7 mi)	7.0 km	(4.3 mi)
2485	155P	n-Butyl isocyanate	60 m	(200 ft)	0.6 km	(0.4 mi)	1.1 km	(0.7 mi)	200 m	(600 ft)	2.6 km	(1.7 mi)	4.0 km	(2.5 mi)
2486	155P	Isobutyl isocyanate	60 m	(200 ft)	0.6 km	(0.4 mi)	1.2 km	(0.8 mi)	300 m	(1000 ft)	3.1 km	(1.9 mi)	4.7 km	(3.0 mi)
2487	155	Phenyl isocyanate	100 m	(300 ft)	0.9 km	(0.6 mi)	1.4 km	(0.9 mi)	300 m	(1000 ft)	3.7 km	(2.3 mi)	5.4 km	(3.4 mi)

Physical and Chemical Properties of MeNCO

- LEL = 5.3%
- UEL = 26%
- Boiling point = 102 – 104°F
- Flash point = 19°F

DOT ERG

- Specific isolate and evacuate guidance for
  - Ammonia
  - Chlorine
  - Ethylene oxide
  - Hydrogen chloride
  - Hydrogen fluoride
  - Sulfur dioxide
- BLEVE Evacuation Data

Table 3 lists Toxic Inhalation Hazard materials that may be more commonly encountered.

The selected materials are:

- Ammonia (UN1005)
- Chlorine (UN1017)
- Ethylene oxide (UN1040)
- Hydrogen chloride (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- Hydrogen fluoride (UN1052)
- Sulfur dioxide/Sulphur dioxide (UN1079)

The materials are presented in alphabetical order and provide Initial Isolation and Protective Action Distances for large spills (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day time and night time situations and different wind speeds.

TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR LARGE SPILLS FOR DIFFERENT QUANTITIES OF SIX COMMON TIH (PIH in the US) GASES

	First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during									
			DAY						NIGHT			
			Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)		Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)	
	Meters	(Feet)	km	(Miles)	km	(Miles)	km	(Miles)	km	(Miles)	km	(Miles)	km	(Miles)
TRANSPORT CONTAINER	**UN1005 Ammonia, anhydrous: Large Spills**													
Rail tank car	300	(1000)	1.9	(1.2)	1.5	(0.9)	1.1	(0.6)	4.5	(2.8)	2.5	(1.5)	1.4	(0.9)
Highway tank truck or trailer	150	(500)	0.9	(0.6)	0.5	(0.3)	0.4	(0.3)	2.0	(1.3)	0.8	(0.5)	0.6	(0.4)
Agricultural nurse tank	60	(200)	0.5	(0.3)	0.3	(0.2)	0.3	(0.2)	1.4	(0.9)	0.3	(0.2)	0.3	(0.2)
Multiple small cylinders	30	(100)	0.3	(0.2)	0.2	(0.1)	0.1	(0.1)	0.7	(0.5)	0.3	(0.2)	0.2	(0.1)

BLEVE Evacuation Data

(USE WITH CAUTION)																					
Capacity		Diameter		Length		Propane Mass		Minimum time to failure for severe torch	Approximate time to empty for engulfing fire	Fireball radius		Emergency response distance		Minimum evacuation distance		Preferred evacuation distance		Cooling water flow rate	
Litres	(Gallons)	Meters	(Feet)	Meters	(Feet)	Kilograms	(Lbs)	Minutes	Minutes	Meters	(Feet)	Meters	(Feet)	Meters	(Feet)	Meters	(Feet)	Litres/min	USgal/min
100	(38.6)	0.3	(1)	1.5	(4.9)	40	(88)	4	8	10	(33)	90	(295)	154	(505)	307	(1007)	94.6	25
400	(154.4)	0.61	(2)	1.5	(4.9)	160	(353)	4	12	16	(53)	90	(295)	244	(801)	488	(1601)	189.3	50
2000	(772)	0.96	(3.2)	3	(9.8)	800	(1764)	5	18	28	(92)	111	(364)	417	(1368)	834	(2736)	424	112
4000	(1544)	1	(3.3)	4.9	(16.1)	1600	(3527)	5	20	35	(115)	140	(459)	525	(1722)	1050	(3445)	598	158
8000	(3088)	1.25	(4.1)	6.5	(21.3)	3200	(7055)	6	22	44	(144)	176	(577)	661	(2169)	1323	(4341)	848	224
22000	(8492)	2.1	(6.9)	6.7	(22)	8800	(19400)	7	28	62	(203)	247	(810)	926	(3038)	1852	(6076)	1404	371
42000	(16212)	2.1	(6.9)	11.8	(38.7)	16800	(37037)	7	32	77	(253)	306	(1004)	1149	(3770)	2200	(7218)	1938	512
82000	(31652)	2.75	(9)	13.7	(45)	32800	(72310)	8	40	96	(315)	383	(1257)	1435	(4708)	2200	(7218)	2710	716
140000	(54040)	3.3	(10.8)	17.2	(56.4)	56000	(123457)	9	45	114	(374)	457	(1499)	1715	(5627)	2200	(7218)	3539	935

UNITED STATES
DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29CFR 1910.120(q)(6)(i)
Hazardous Waste Operations and Emergency Response
First Responder Awareness Level

NFPA 470 (2022 Ed.) Chapter 4
Competencies for Hazardous Materials/WMD Awareness Level Personnel

NFPA
NATIONAL FIRE PROTECTION ASSOCIATION
The leading information and knowledge resource on fire, electrical and related hazards

First responder awareness level 29CFR1910.120(q)(6)(i)

- First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

29CFR1910.120(q)(6)(i) Competencies

- An understanding of what hazardous substances are, and the risks associated with them in an incident.
- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- The ability to identify the hazardous substances, if possible.
- An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.
- The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

Competencies for Awareness Level Personnel
NFPA 470 (2022 Ed.) Chapter 4.1.1.1

- Awareness level personnel shall be persons who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous material/WMD, protect themselves, call for trained personnel, and secure the area.

Competencies for Awareness Level Personnel NFPA 470 (2022 Ed.) Chapter 4.1.2.2

- Awareness level personnel shall be able to perform the following tasks:
  - Recognize the presence of hazardous materials/WMD
  - Identify the name, UN/NA identification number, marking/label/placard, container shape included in the ERG, or other distinctive marking applied for the hazardous materials/WMD involved from a safe location
  - Identify potential hazards from the current edition of the Emergency Response Guidebook (ERG), safety data sheets (SDS), shipping papers, and other approved reference sources
  - Isolate the hazard area (Hot Zone and Downwind Evacuation)
  - Initiate required notifications

How do you remember the competencies?

Minimum Response Criteria – RINSED mnemonic Awareness Level Responders

Recognize

Identify

Notify

Scene security

Evacuate

Decontaminate

Incident Action Plan

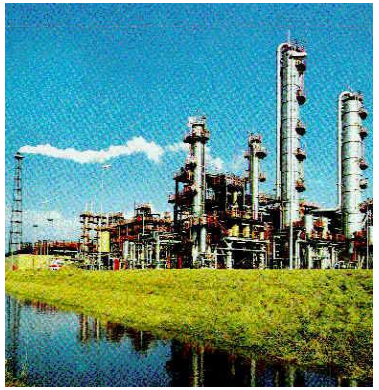
Recognize and Identify Clues

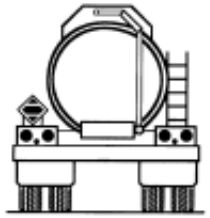
- Occupancy and Location
- Size and Shape of Container
- Markings and Colors

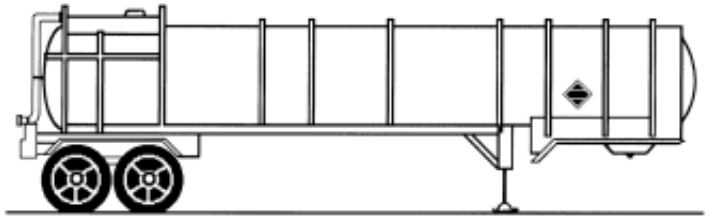
- Placards and Labels
- Shipping Papers and Safety Data Sheets
- Senses

Recognize clues:

- **Occupancy and Location**
- **Size and Shape of Container**
- **Markings and Colors**







OSHA 29CFR 1910.120(q)(6)(i)(C)
NFPA 470 (2022 Ed.) Chapter 4.2.1

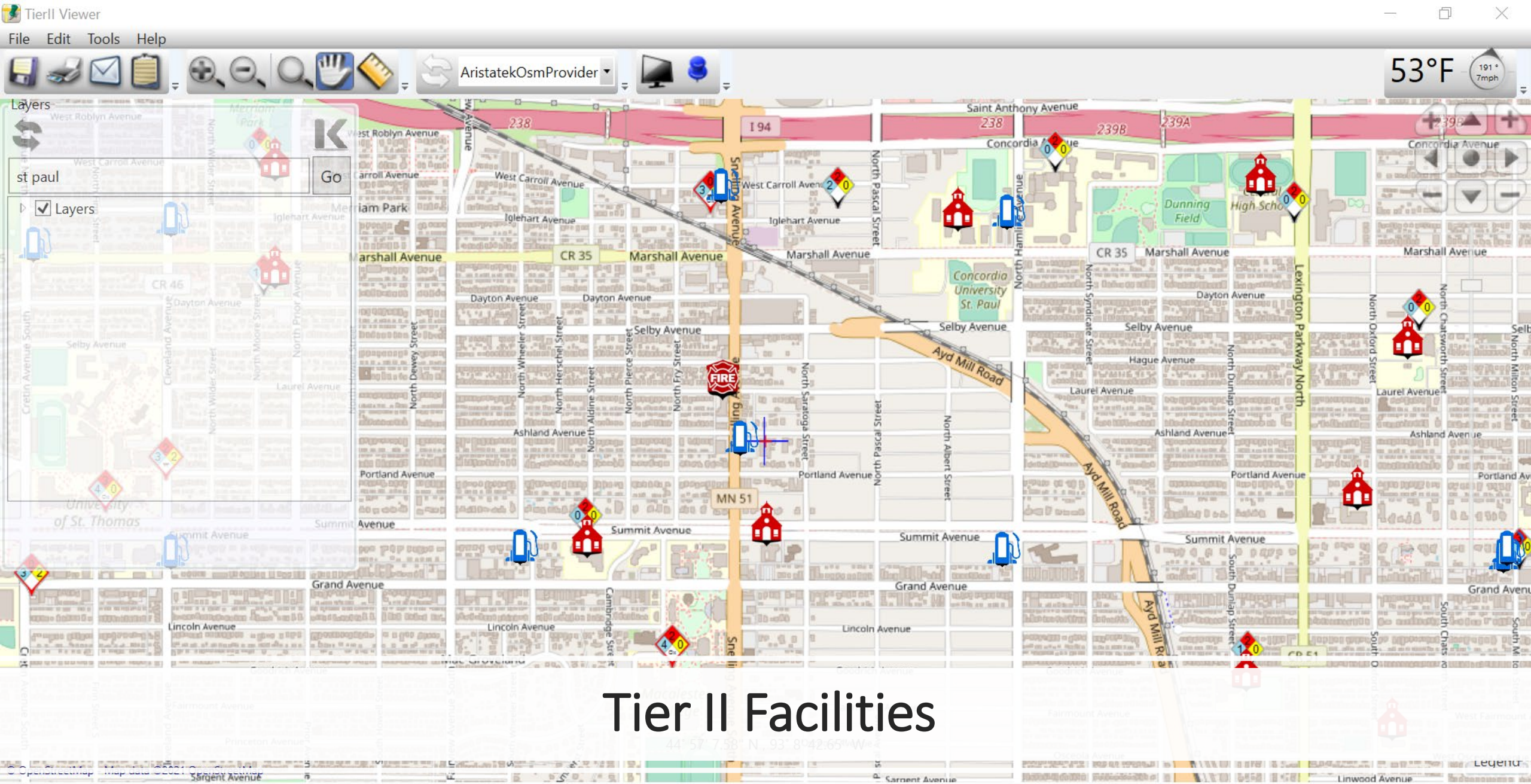
Occupancy and Location

NFPA 470 (2022 Ed.) Chapter 4.2.1(5)

ANGUS®


DOW
WELCOME
Presented by : ABHINAV K
MBA 1ST SEM


ACE
One of the Three
Best Places
to Buy Paint
By a Leading Consumer Magazine
PAINT STUDIO @ ACE

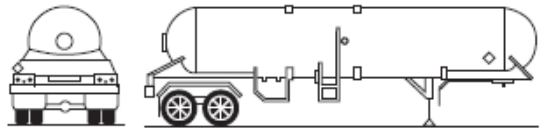


Tier II Facilities

Size and Shape of Container

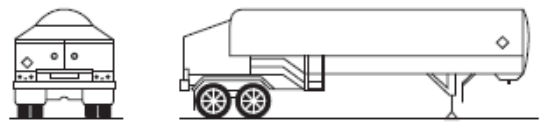
DOT Silhouettes

117 MC331, TC331, SCT331



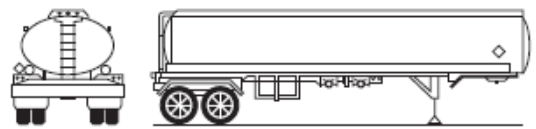
- For liquefied compressed gases (e.g., LPG, ammonia)
- Rounded heads
- Design pressure between 100-500 psi

117 MC338, TC338, SCT338, TC341, CGA341



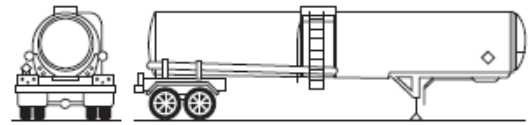
- For refrigerated liquefied gases (cryogenic liquids)
- Similar to a "giant thermo-bottle"
- Fitting compartments located in a cabinet at the rear of the tank
- MAWP between 25-500 psi

131 DOT406, TC406, SCT306, MC306, TC306



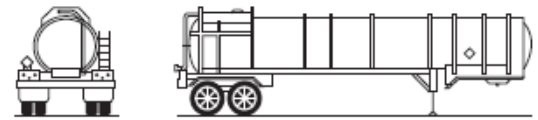
- For flammable liquids (e.g., gasoline, diesel)
- Elliptical cross-section
- Rollover protection at the top
- Bottom outlet valves
- MAWP between 3-15 psi

137 DOT407, TC407, SCT307, MC307, TC307



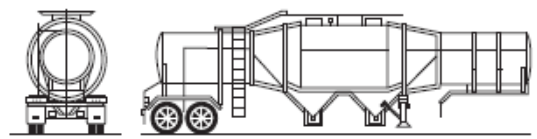
- For toxic, corrosive, and flammable liquids
- Circular cross-section
- May have external ring stiffeners
- MAWP of at least 25 psi

137 DOT412, TC412, SCT312, MC312, TC312



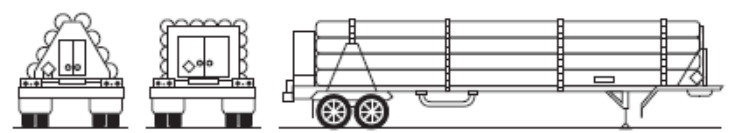
- Usually for corrosive liquids
- Circular cross-section
- External ring stiffeners
- Tank diameter is relatively small
- MAWP of at least 15 psi

112 TC423



- For emulsion and water-gel explosives
- Hopper-style configuration
- MAWP between 5-15 psi

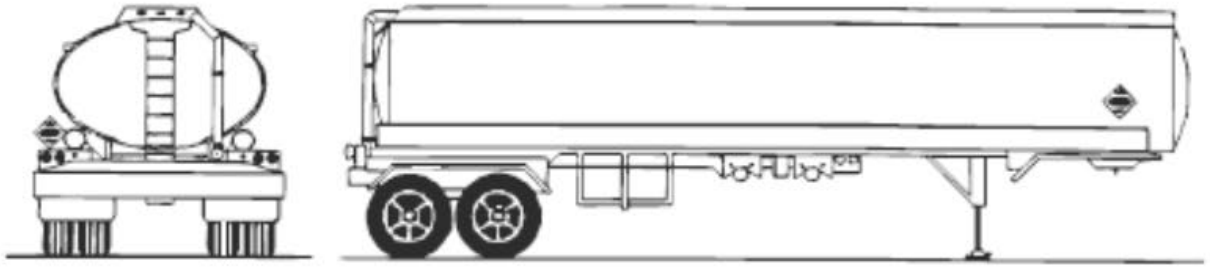
117 Compressed Gas/Tube Trailer



NFPA 470 (2022 Ed.) Chapter 4.2.1(6)

Tank Truck Silhouettes
Gasoline, Flammable liquids

131 **DOT406, TC406, SCT306, MC306, TC306**

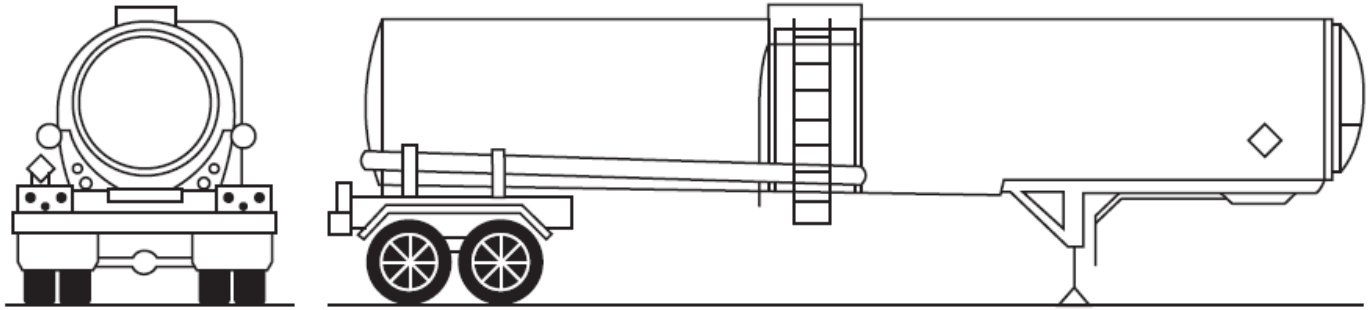


- For flammable liquids (e.g., gasoline, diesel)
- Elliptical cross-section
- Rollover protection at the top
- Bottom outlet valves
- MAWP between 3-15 psi**

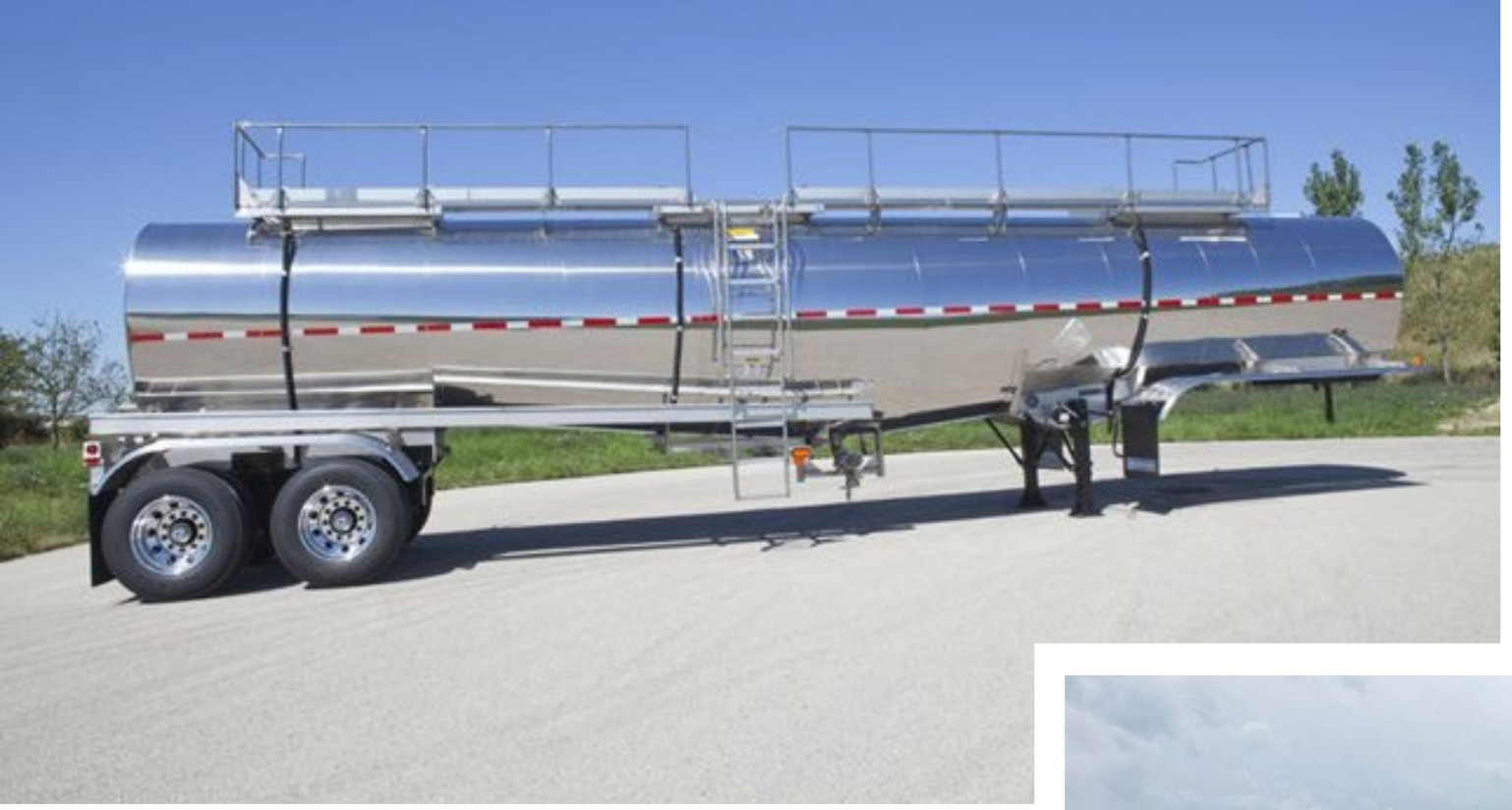

1255
1255
1993
1255
1255
77 069
FLAMMABLE

Tank Truck Silhouettes
Flammable liquids, low density corrosives
Non-hazardous materials such as milk and eggs

137 **DOT407, TC407, SCT307, MC307, TC307**



- For toxic, corrosive, and flammable liquids
- Circular cross-section
- May have external ring stiffeners
- MAWP of at least 25 psi

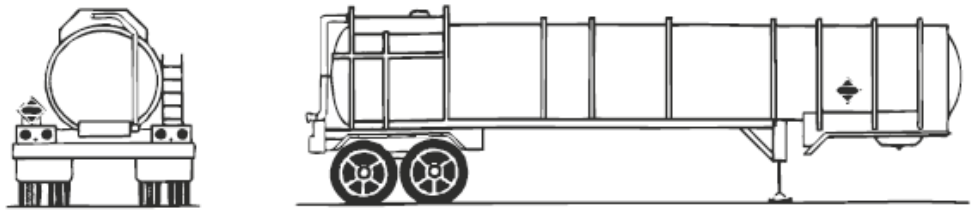



Milk
709765
ers.blogspot.com


STAR TRANSPORT
KRAFT
KRAFT

Tank Truck Silhouettes
Corrosives (sulfuric acid, hydrochloric acid, nitric acid)

137 **DOT412, TC412, SCT312, MC312, TC312**

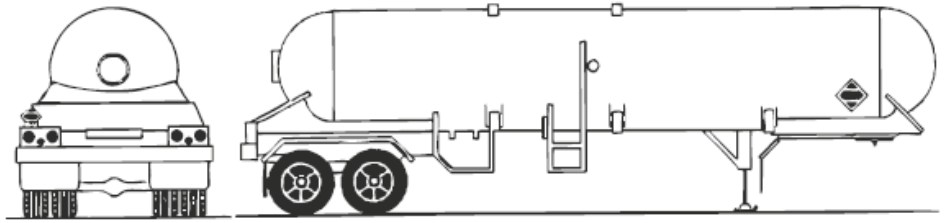


- Usually for corrosive liquids
- Circular cross-section
- External ring stiffeners
- Tank diameter is relatively small
- MAWP of at least 15 psi**


POLAR
POLAR
POLAR
POLAR

Tank Truck Silhouettes
Propane, Anhydrous Ammonia, Chlorine, Butane

117 **MC331, TC331, SCT331**

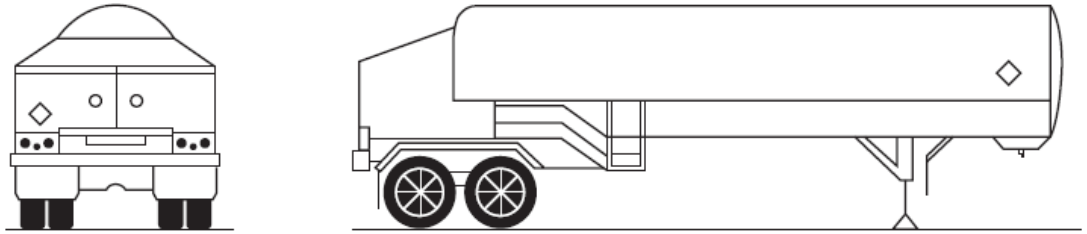


- For liquefied compressed gases (e.g., LPG, ammonia)
- Rounded heads
- Design pressure between 100-500 psi**


1005
2

Tank truck silhouettes
Cryogenic liquids (nitrogen, oxygen, carbon dioxide)

117 **MC338, TC338, SCT338, TC341, CGA341**

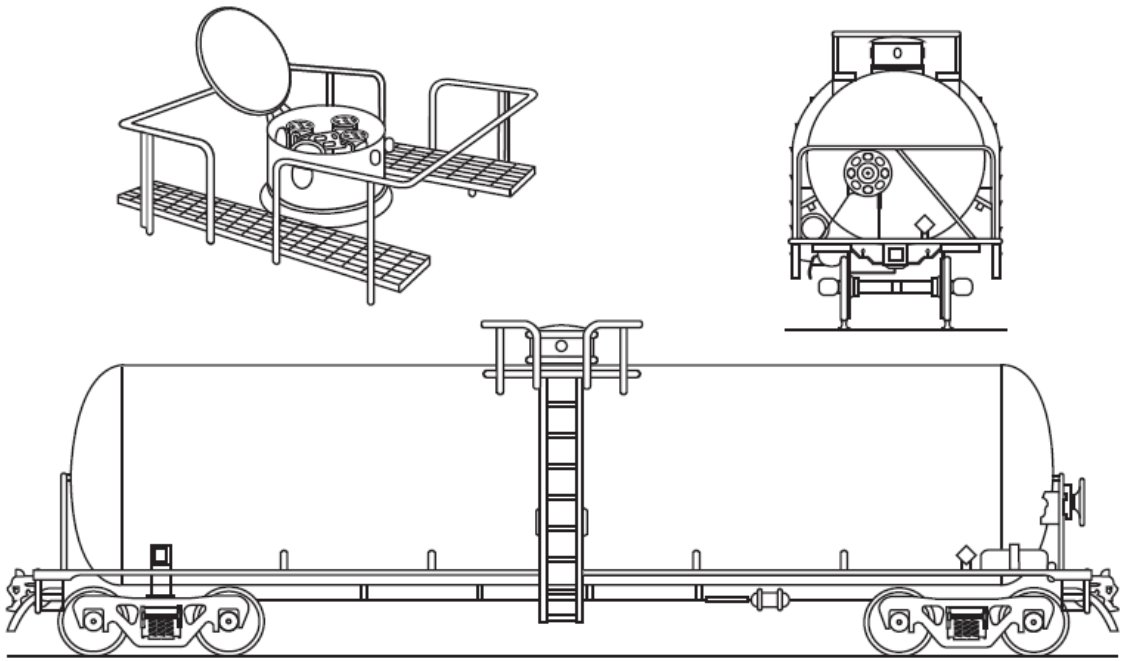


- For refrigerated liquefied gases (cryogenic liquids)
- Similar to a "giant thermo-bottle"
- Fitting compartments located in a cabinet at the rear of the tank
- MAWP between 25-500 psi


1977
NITROGEN
REFRIGERATED
LIQUID

Railcar Silhouettes 2020 DOT ERG

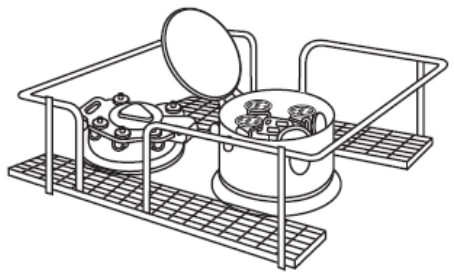
117 **Pressure tank car**

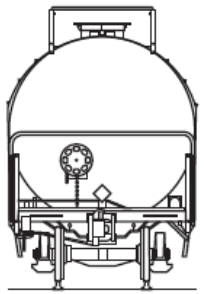


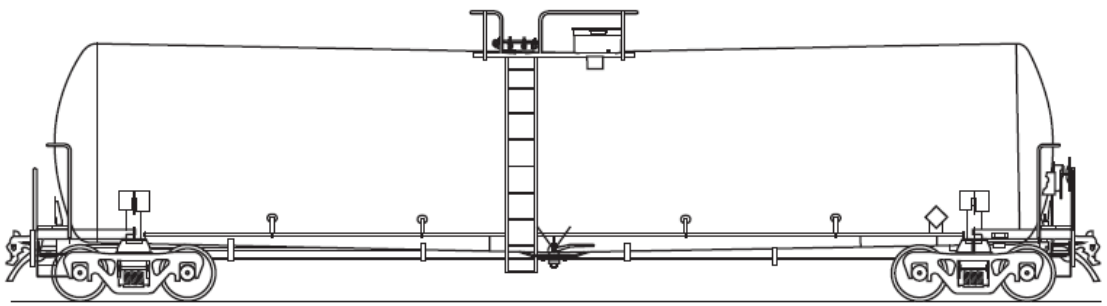
- For flammable, non-flammable, toxic and/or liquefied compressed gases
- Protective housing
- No bottom fittings
- Pressures usually above 40 psi


GATX 63163
CAPY 33647 GALS
CAPY 127358 LITERS
GATX 63163

128 Non-pressure / low pressure tank car (TC117, DOT117)





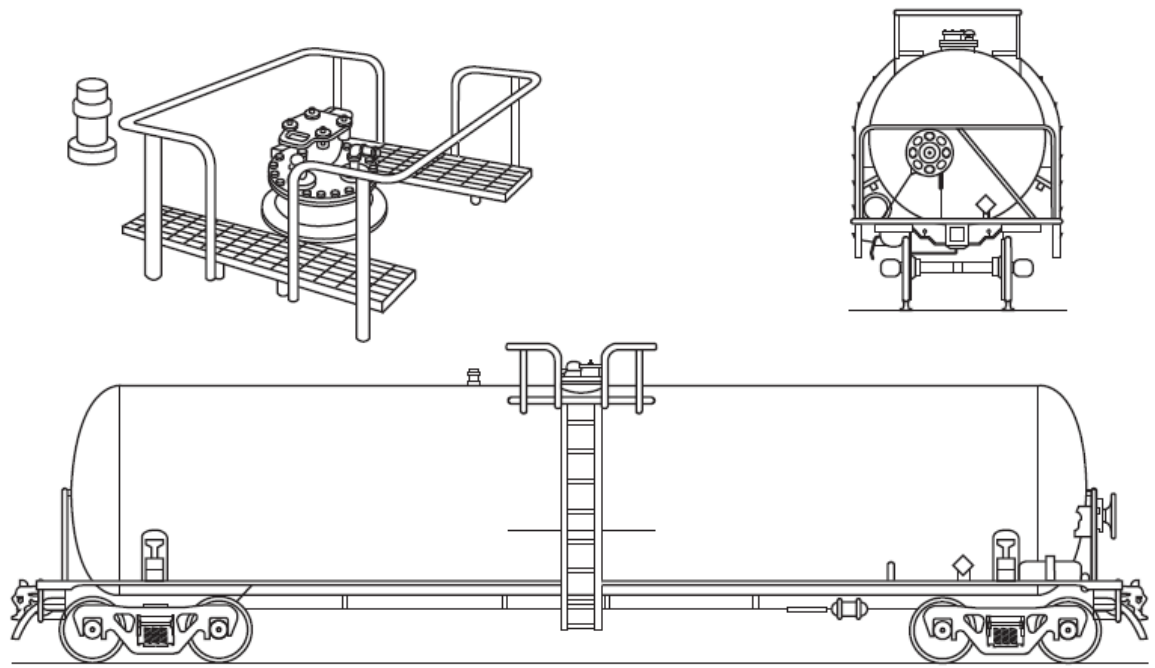


- For flammable liquids (e.g.,
- Petroleum crude oil, ethanol)
- Protective housing separate from manway
- Bottom outlet valve
- Pressures usually below 25 psi


1267
3


4685
4685
BNSF

131 Non-pressure / low pressure tank car



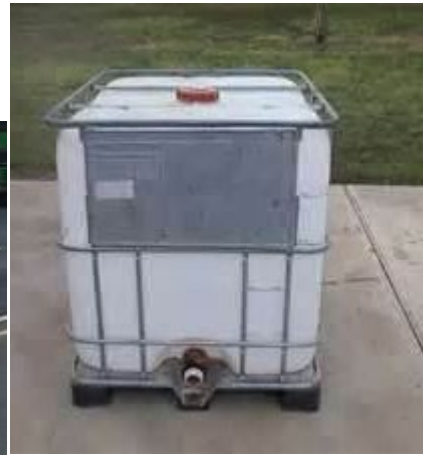
- Known as **general service tank car**
- For variety of hazardous and non-hazardous materials
- Fittings and valves normally visible at the top of the tank
- Some may have bottom outlet valve
- Pressures usually below 25 psi


PROCOR
PROX 15358
LD LMT 203900LB 92500KG
LT WT 59100LB 26800KG
P-75 02-94
INTERIOR COATING
LITHCOTE LC-73H
P-75 12-84
EXTERIOR - P-556
P-75 12-84
613-996-6666
800-424-9300
SULFURIC ACID
1830
8

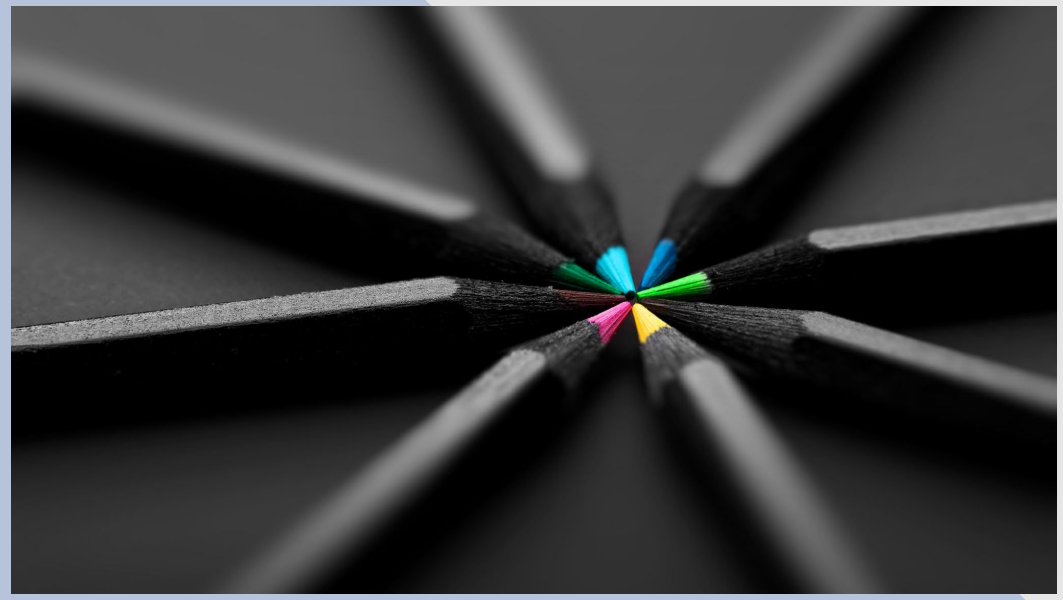

1017


AMMONIUM NITRATE
FUEL OIL MIXTURE
LADSHAW EXPLOSIVES, INC.
1.5
NA 0331
DOT. E11156


FreeFoto.com

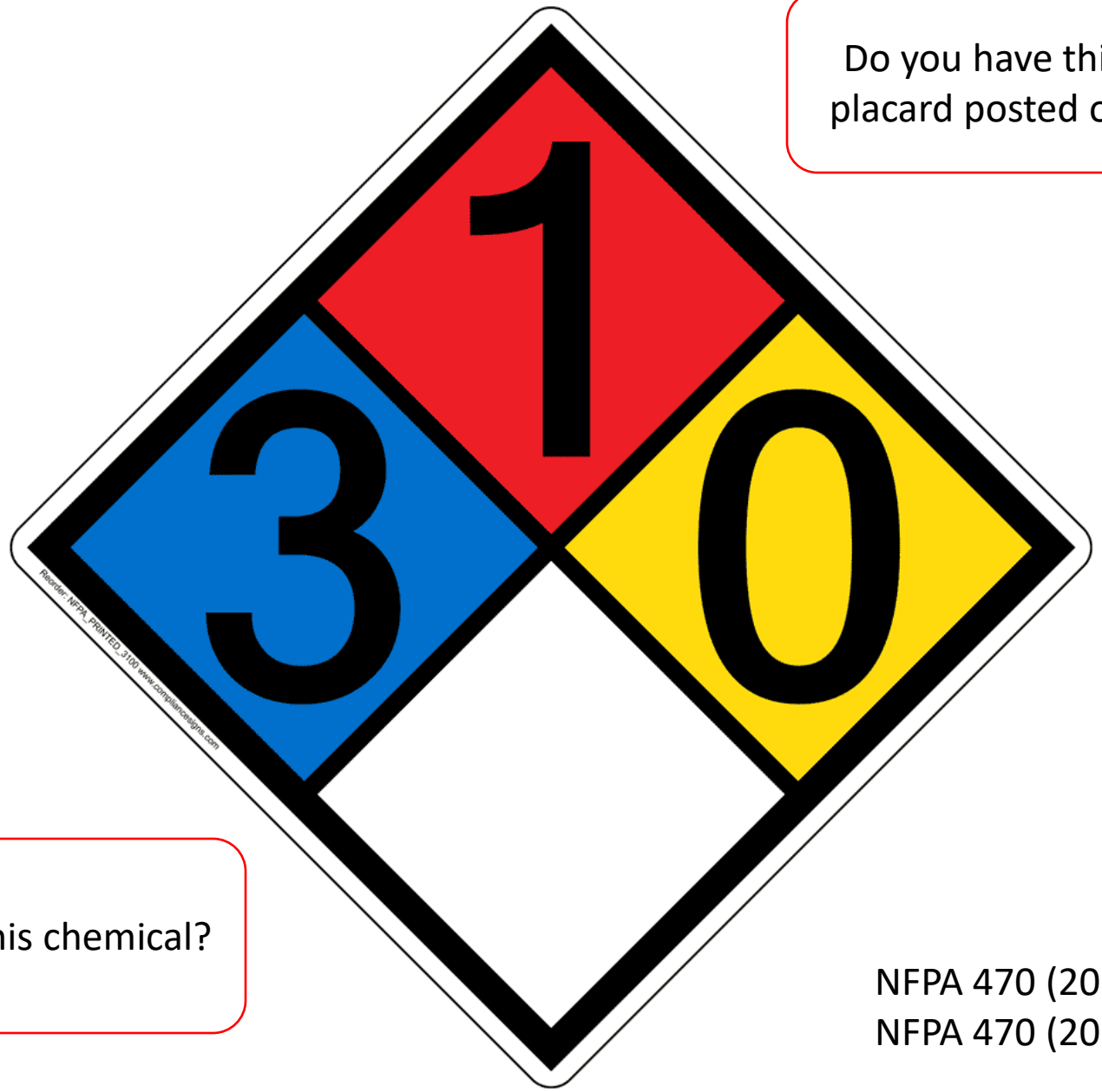



Lead Nitrate
$Pb(NO_3)_2$
CAS: 10099-74-8
MW: 331.23
Solubility: 520 g/l at 20 C
OXIDIZER
5.1



Markings and Colors

Do you have this NFPA 704 placard posted on your site?



What is this chemical?

NFPA 470 (2022 Ed.) Chapter 4.2.1(7)(b)
NFPA 470 (2022 Ed.) Chapter 4.2.1(8)

This NFPA Diamond 3-3-0 is designed to provide a clear hazard warning for employees in food processing plants, manufacturing plants, and cold storage facilities. Signs can help identify ammonia refrigeration systems, containers, storage locations and other areas where ammonia is in use.

NFPA Rating Explanation Guide

RATING NUMBER	HEALTH HAZARD	FLAMMABILITY HAZARD	INSTABILITY HAZARD
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitiation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No hazard	Will not burn	Stable

RATING SYMBOL	SPECIAL HAZARD
ALK	Alkaline
ACID	Acidic
COR	Corrosive
OX	Oxidizing
	Radioactive
₩	Reacts violently or explosively with water
₩ OX	Reacts violently or explosively with water and oxidizing


Shore


2
0
0
0
3
2


ChemTreat, Inc.
CL-4882
EMERGENCY TELEPHONE
(800) 424-9300
3
0
1
55 GALLONS
ChemTreat, Inc.
CL-4910
EMERGENCY TELEPHONE
(800) 424-9300
3
0
1
60 GALLONS

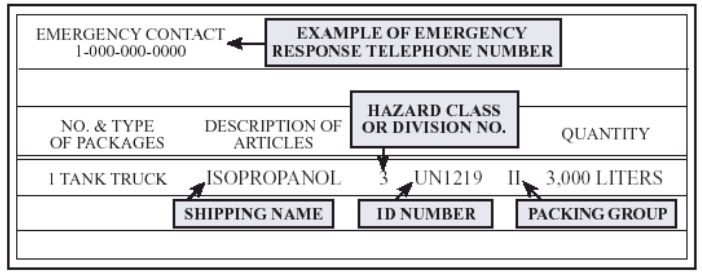

8
HEALTH 3
FLAMMABILITY 0
REACTIVITY 1
1824
HEALTH HAZARD
4 Deadly
3 Extreme danger
2 Hazardous
1 Slightly hazardous
0 Normal material
FIRE HAZARD
Flash Points
4 Below 73°F (Boiling pt. below 100°F)
3 Below 73°F (Boiling pt. at/above 100°F) and/or at/above 73°F - not exceeding 100°F
2 Above 100°F, Not exceeding 200°F
1 Above 200°F
0 Will not burn
3
0
1
CORROSIVE
8
SPECIFIC HAZARD
Oxidizer
Use NO WATER
Simple Asphyxiant
OX
W
SA
INSTABILITY
4 May detonate
3 Shock and heat may detonate
2 Violent chemical change
1 Unstable if heated
0 Stable
1500
45
IN
1400
1300
1200
1100
35
1000
900
30
IN
800

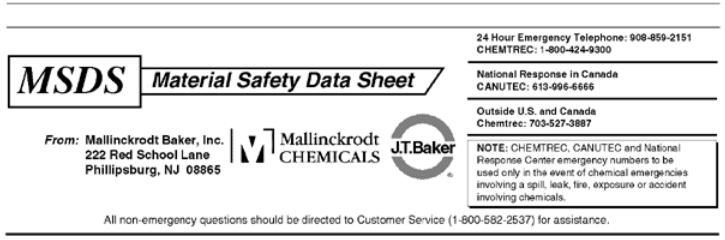
Identify

OSHA 29CFR 1910.120(q)(6)(i)(C)
OSHA 29CFR 1910.120(q)(6)(i)(D)

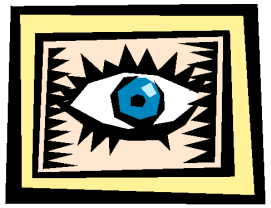
Placards and Labels

Shipping Papers and SDS





Senses



Placards and Labels

EXAMPLE OF PLACARD AND PANEL WITH ID NUMBER

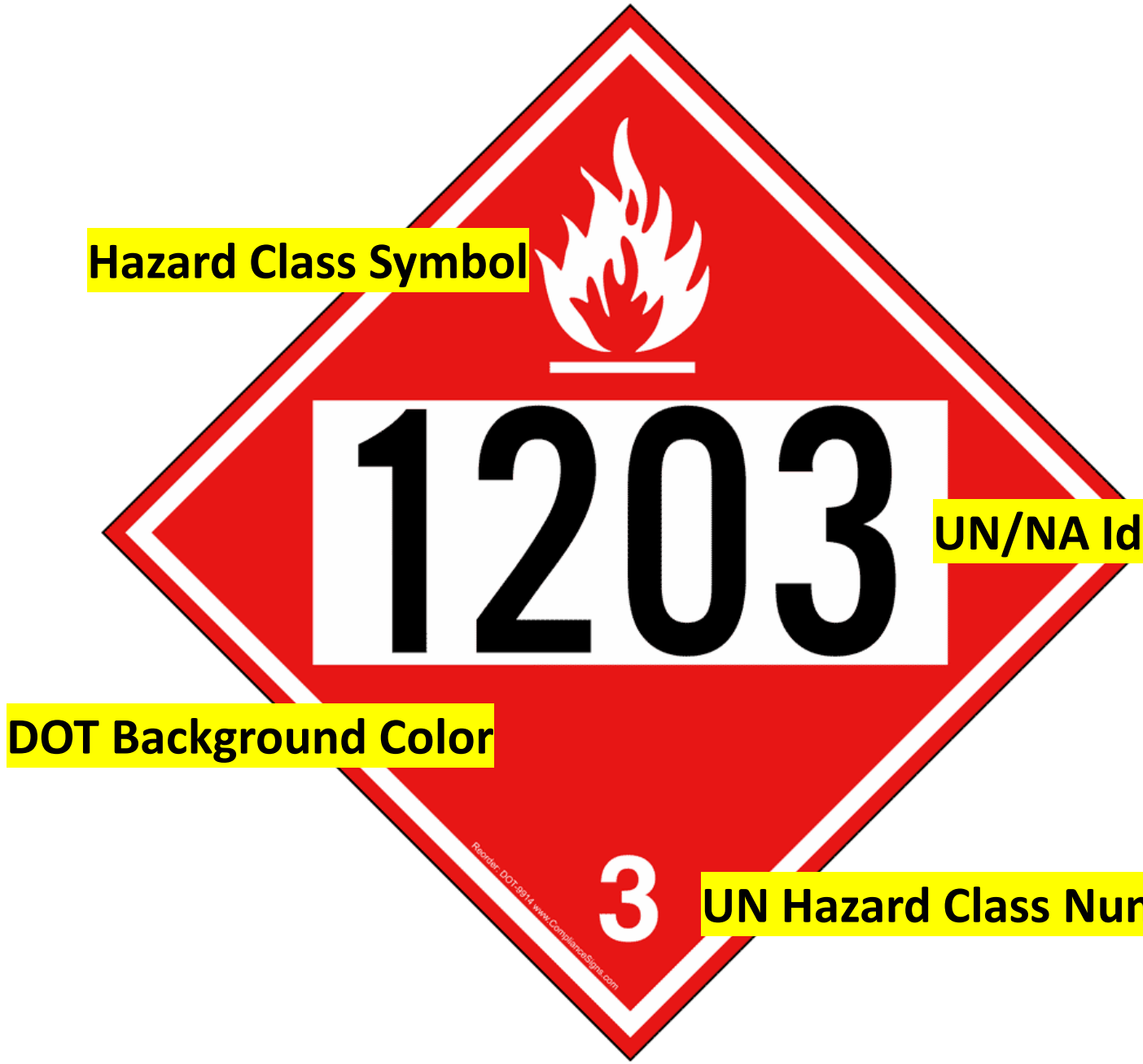
The 4-digit ID Number may be shown on the diamond-shaped placard or on an adjacent orange panel displayed on the ends and sides of a cargo tank, vehicle or rail car.

A Numbered Placard

OR

A Placard and an Orange Panel

- NFPA 470 (2022 Ed.) Chapter 4.2.1(7)(a)



Hazard Class Symbol

UN/NA Identification Number

DOT Background Color

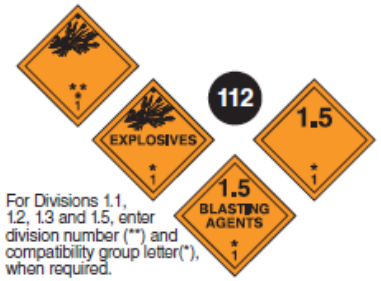
UN Hazard Class Number

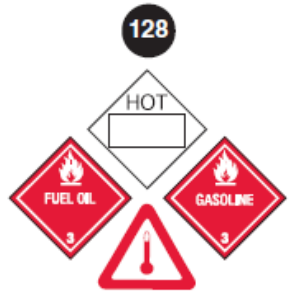
Class 1 -	**Explosives**	
	Division 1.1	Explosives which have a mass explosion hazard
	Division 1.2	Explosives which have a projection hazard but not a mass explosion hazard
	Division 1.3	Explosives which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
	Division 1.4	Explosives which present no significant hazard
	Division 1.5	Very insensitive explosives with a mass explosion hazard
	Division 1.6	Extremely insensitive articles which do not have a mass explosion hazard
Class 2 -	**Gases**	
	Division 2.1	Flammable gases
	Division 2.2	Non-flammable, non-toxic* gases
	Division 2.3	Toxic* gases
Class 3 -	**Flammable liquids (and Combustible liquids [U.S.])**	
Class 4 -	**Flammable solids; Substances liable to spontaneous combustion; Substances which, on contact with water, emit flammable gases**	
	Division 4.1	Flammable solids, self-reactive substances and solid desensitized explosives
	Division 4.2	Substances liable to spontaneous combustion
	Division 4.3	Substances which in contact with water emit flammable gases
Class 5 -	**Oxidizing substances and Organic peroxides**	
	Division 5.1	Oxidizing substances
	Division 5.2	Organic peroxides
Class 6 -	**Toxic* substances and Infectious substances**	
	Division 6.1	Toxic* substances
	Division 6.2	Infectious substances
Class 7 -	**Radioactive materials**	
Class 8 -	**Corrosive substances**	
Class 9 -	**Miscellaneous hazardous materials/dangerous goods and articles**	

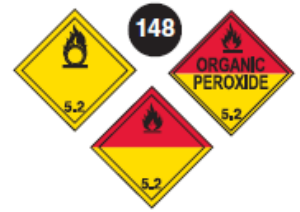
* The words "poison" or "poisonous" are synonymous with the word "toxic".

DOT Hazard Classes and Divisions

NFPA 470 (2022 Ed.) Chapter 4.2.1(2)







138 Lithium metal batteries (UN3090, UN3091)

147 Lithium ion batteries (UN3480, UN3481)

Class 1 - Explosives

Division 1.1	Explosives with a mass explosion hazard
Division 1.2	Explosives with a projection hazard
Division 1.3	Explosives with predominantly a fire hazard
Division 1.4	Explosives with no significant blast hazard
Division 1.5	Very insensitive explosives with a mass explosion hazard
Division 1.6	Extremely insensitive articles

Class 2 - Gases

Division 2.1	Flammable gases
Division 2.2	Non-flammable, non-toxic* gases
Division 2.3	Toxic* gases

Class 3 - Flammable liquids (and Combustible liquids [U.S.])

Class 4 - Flammable solids; Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances

Division 4.1	Flammable solids
Division 4.2	Spontaneously combustible materials
Division 4.3	Water-reactive substances/Dangerous when wet materials

Class 5 - Oxidizing substances and Organic peroxides

Division 5.1	Oxidizing substances
Division 5.2	Organic peroxides

Class 6 - Toxic* substances and Infectious substances

Division 6.1	Toxic*substances
Division 6.2	Infectious substances

Class 7 - Radioactive materials

Class 8 - Corrosive substances

Class 9 - Miscellaneous hazardous materials/Products, Substances or Organisms

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Office of Hazardous Material Safety

2020 (All Column Values) Hazmat Summary by Hazardous Materials Class

Hazard Division	Hazard Class	Incidents	Hospitalized	Non-Hospitalized	Fatalities	Damages
3	FLAMMABLE - COMBUSTIBLE LIQUID	11,061	14	11	3	$43,449,615
8	CORROSIVE MATERIAL	6,397	16	25	0	$9,310,937
5.1	OXIDIZER	1,234	1	12	0	$1,428,086
9	MISCELLANEOUS HAZARDOUS MATERIAL	793	2	8	0	$9,788,602
2.2	NONFLAMMABLE COMPRESSED GAS	534	0	0	0	$128,544
5.2	ORGANIC PEROXIDE	259	0	1	0	$621,486
6.1	POISONOUS MATERIALS	229	0	0	0	$701,024
2.2	FLAMMABLE GAS	179	0	0	0	$8,000
2.1	FLAMMABLE GAS	127	4	2	0	$3,209,739
4.1	FLAMMABLE SOLID	82	0	0	0	$65,971
6.2	INFECTIOUS SUBSTANCE (ETIOLOGIC)	63	0	0	0	$0
3	COMBUSTIBLE LIQUID	55	0	1	0	$371,832
1.4	EXPLOSIVE NO BLAST HAZARD	48	0	0	0	$0
1.1	EXPLOSIVE NO BLAST HAZARD	21	0	0	0	$0
4.2	SPONTANEOUSLY COMBUSTIBLE	15	0	0	0	$5,500
2.3	NONFLAMMABLE COMPRESSED GAS	11	0	0	0	$416,377
2.3	POISONOUS GAS	7	0	0	0	$28,796
OTHER REGULATED MATERIAL,CLASS	OTHER REGULATED MATERIAL,CLASS D	7	0	0	0	$0
1.1	EXPLOSIVE MASS EXPLOSION HAZARD	5	0	0	0	$47,500
7	RADIOACTIVE MATERIAL	5	0	0	0	$15,005
1.2	EXPLOSIVE NO BLAST HAZARD	3	0	0	0	$0
4.3	DANGEROUS WHEN WET MATERIAL	3	0	0	0	$0
1.3	EXPLOSIVE FIRE HAZARD	2	0	0	0	$0
1.2	EXPLOSIVE PROJECTION HAZARD	1	0	0	0	$0

DOT ERG Exercise using UN/NA numbers

- Use the DOT ERG and find the following information:
  - DOT Hazard Class (number and name)
  - DOT name of the chemical
  - DOT ERG Guide number


A
1942
5.1


2078
6

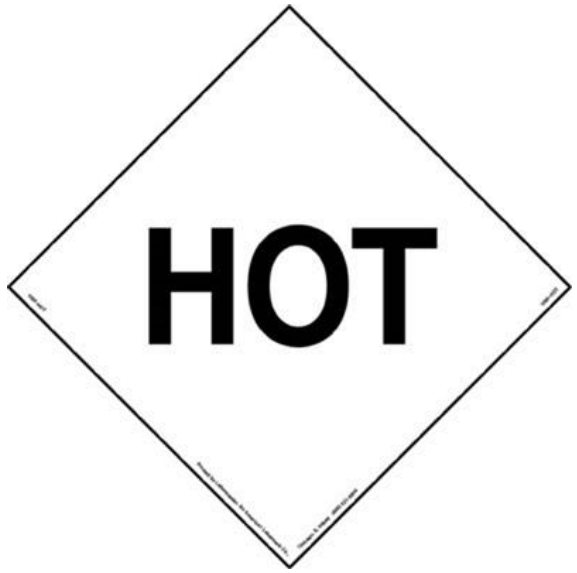

367
1824


1987
3


556
1830

Answers to previous slide…

UN ID Number	DOT Hazard Class	DOT ERG Guide Number	DOT Name
1942	5.1	140	Ammonium nitrate, < 0.2% combustible
2078	6	156	Toluene diisocyanate
1824	8	154	Caustic soda, soln, Sodium hydroxide soln
1987	3	127	Denatured alcohol, Alcohols, n.o.s.
1830	8	137	Sulfuric acid



UN 2304: Napthalene, molten (Flammable solid)

Bulk packaging that contains an elevated temperature material (except molten sulfur or molten aluminum) must have a HOT marking in compliance with requirements of 49 CFR, Part 172.325(c) and 172.336(b).

NFPA 470 (2022 Ed.) Chapter 4.2.1(7)(a)


SULFURIC ACID 66 DEG.
IC
UN1830 SULFURIC ACID
RETURNABLE
$45.00 DEPOSIT
NET WEIGHT:
700.00 LBS
317.51 KGS
CORROSIVE
8
SULFURIC ACID 66 DEG.
IC
CORROSIVE
DO NOT FREEZE
HYDRISEQ 1752

Globally Harmonized System (GHS) Pictograms

GHS Pictograms	Physical hazards	GHS Pictograms	Health and Environmental hazards
	Explosive; Self-reactive; Organic peroxide		Skin corrosion; Serious eye damage
	Flammable; Pyrophoric; Self-reactive; Organic peroxide; Self-heating; Emits flammable gases when in contact with water		Acute toxicity (harmful); Skin sensitizer; Irritant (skin and eye); Narcotic effect; Respiratory tract irritant; Hazardous to ozone layer (environment)
	Oxidizer		Respiratory sensitizer; Mutagen; Carcinogen; Reproductive toxicity; Target organ toxicity; Aspiration hazard
	Gas under pressure		Hazardous to aquatic environment
	Corrosive to metals		Acute toxicity (fatal or toxic)

Shipping Papers

Safety Data Sheets

NFPA 470 (2022 Ed.) Chapter 4.2.1(12)(a-d)

Match the name of the shipping paper with the mode of transportation.

Mode of Transportation

- Highway
- Railroad
- Water
- Air

Shipping Paper Name

- Dangerous Cargo Manifest
- Airbill
- Bill of Lading
- Waybill and/or Consist

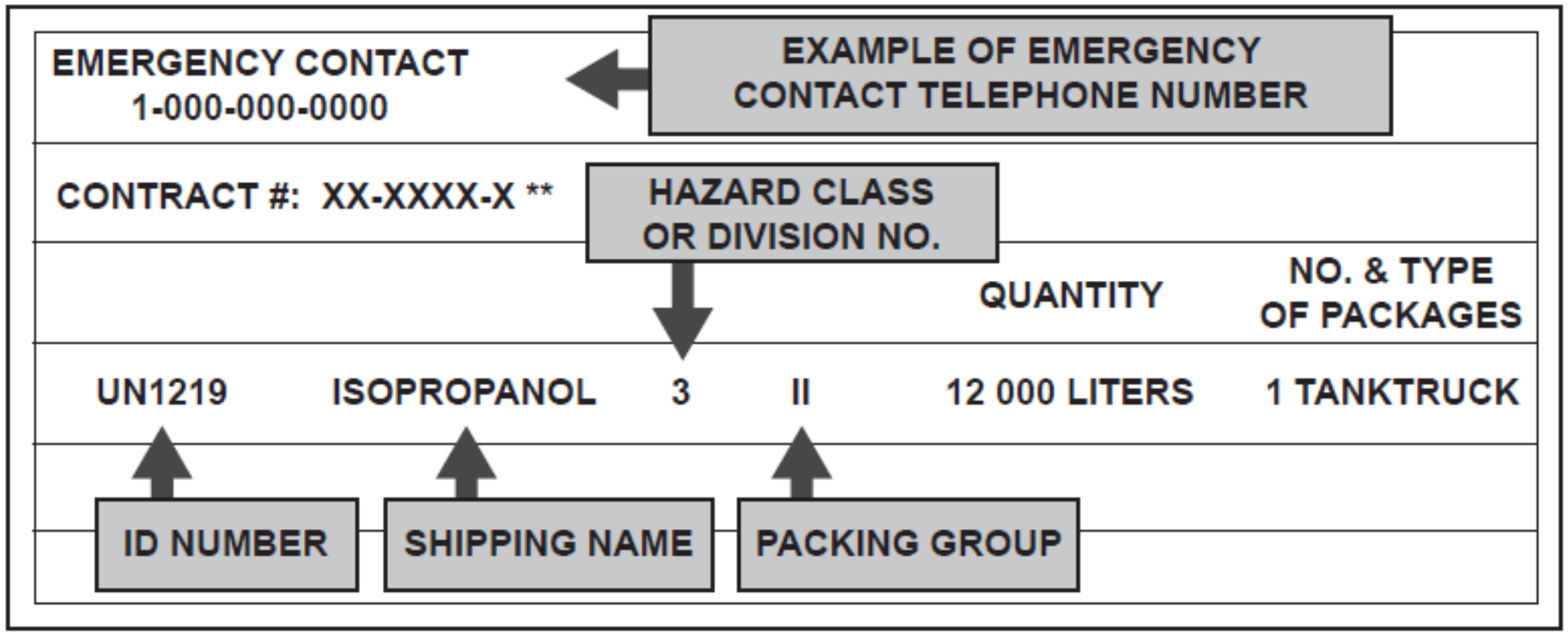
NFPA 470 (2022 Ed.) Chapter 4.2.1(11)

Location of Shipping Papers

- **Road**: kept in cab of motor vehicle
- **Rail**: kept in possession of crew member
- **Aviation**: kept in possession of the pilot or aircraft employees
- **Marine**: kept in a holder on the bridge of the vessel

Information provided:

- 4-digit identification number, UN or NA (go to yellow pages)
- Proper shipping name (go to blue pages)
- Hazard class or division number of material
- Packing group
- Emergency response telephone number
- Information describing the hazards of the material (entered on or attached to the shipping paper)*



SAFETY DATA SHEET

MURIATIC ACID 20 DEG. F.G.
Product ID: AC002301
Revised: 02-26-2014
Replaces: 12-04-2009

1. IDENTIFICATION

Product Name:	MURIATIC ACID 20 DEG. F.G.
Synonyms:	Hydrochloric Acid; Hydrogen Chloride
CAS Number:	MIXTURE
Recommended Use:	Acidification (activation) of petroleum wells, scale removal, ore reduction, metal cleaning, industrial acidification.
Restrictions on Use:	No data available.

Hydrite Chemical Co.
300 N. Patrick Blvd.
Brookfield, WI 53008-0948
(262) 792-1450

EMERGENCY RESPONSE NUMBERS:
24 Hour Emergency #: (414) 277-1311
CHEMTREC Emergency #: (800) 424-9300

2. HAZARD(S) IDENTIFICATION

NFPA 470 (2022 Ed.) Chapter 4.1.2.2(1)(c) and Chapter 4.2.3

Signal Word:	Danger
GHS Classification:	Substance or mixture corrosive to metals Category 1 Skin Corrosion/Irritation Category 1A Serious Eye Damage/Eye Irritation Category 1 Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 2 Specific Target Organ Systemic Toxicity (STOT) - Repeated Exposure Category 2
Hazard Statements:	May be corrosive to metals. Causes severe skin burns and eye damage. May cause damage to organs (respiratory system by inhalation). May cause damage to organs (teeth, respiratory system) through prolonged or repeated exposure (by inhalation).

Precautionary Statements:

Prevention:	Keep only in original container. Do not breathe dust, fume, gas, mist, vapors or spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear gloves, eye and face protection and protective clothing.
Response:	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Notify

- 29CFR 1910.120(q)(6)(i)(F)
- NFPA 470 (2022 Ed.) Chapter 4.1.2.2(2)(b)

Notify

- Law enforcement
- EMS
- Chemical Assessment Team
- MN State Fire Marshall
- MPCA/EPA
- Shipper
- FBI (WMD, Terrorism)
- Other ?

Scene security (Hot Zone)

NFPA 470 (2022 Ed.) Chapter 4.1.2.2(2)(a)

GUIDE 128 FLAMMABLE LIQUIDS (WATER-IMMISCIBLE)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks, etc.).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids will float on water.
- Substance may be transported hot.
- For hybrid vehicles, GUIDE 147 (lithium ion batteries) or GUIDE 138 (sodium batteries) should also be consulted.
- **If molten aluminum is involved, refer to GUIDE 169.**

HEALTH

CAUTION: Petroleum crude oil (UN1267) may contain **TOXIC** hydrogen sulphide gas.

- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or asphyxiation.
- Runoff from fire control or dilution water may cause environmental contamination.

PUBLIC SAFETY

- **CALL 911. Then call emergency response telephone number on shipping paper.** If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Ventilate closed spaces before entering, but only if properly trained and equipped.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing provides thermal protection **but only limited chemical protection.**

EVACUATION

Immediate precautionary measure

- Isolate spill or leak area for at least 50 meters (150 feet) in all directions.

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the ERAP Program Section (page 390).

ERG Isolate in all directions distance:

- **Solids 75’**
- **Liquids 150’**
- **Gases 330’**

GUIDE 128 Flammable Liquids (Water-Immiscible)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
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Evacuate (Warm Zone)

NFPA 470 (2022 Ed.) Chapter 4.1.2.2(2)(a)
NFPA 470 (2022 Ed.) Chapter 4.4.1(5-6)

- **CALL 911. Then call emergency response telephone number on shipping paper.** If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
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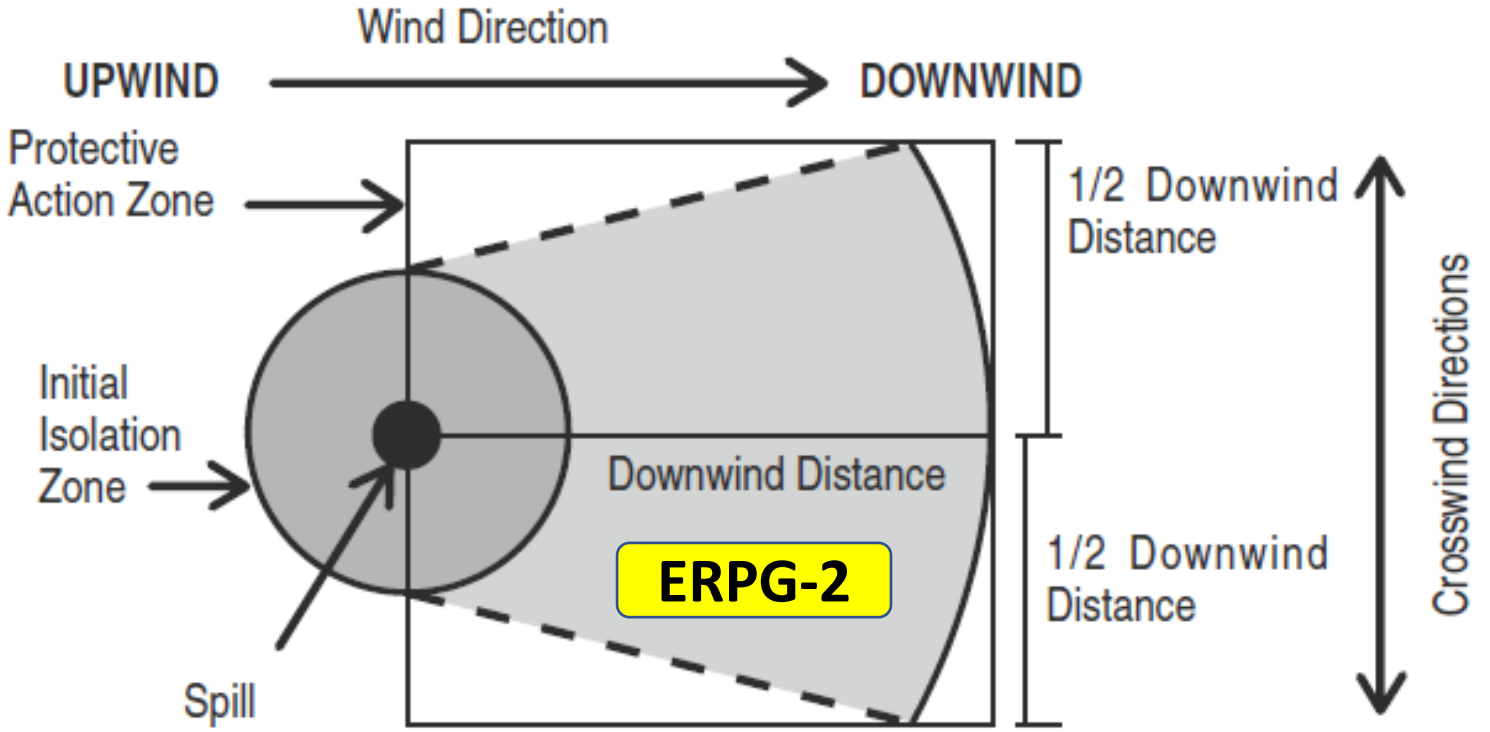
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

What is the Shape and Size of the DOT Evacuation Zone?



NOTE 1: See "Introduction To Green Tables - Initial Isolation And Protective Action Distances" under "Factors That May Change the Protective Action Distances" (page 289)

NOTE 2: When a product in Table 1 has the mention "(when spilled in water)", refer to Table 2 – Water-Reactive Materials which Produce Toxic Gases for the list of gases produced when these materials are spilled in water.

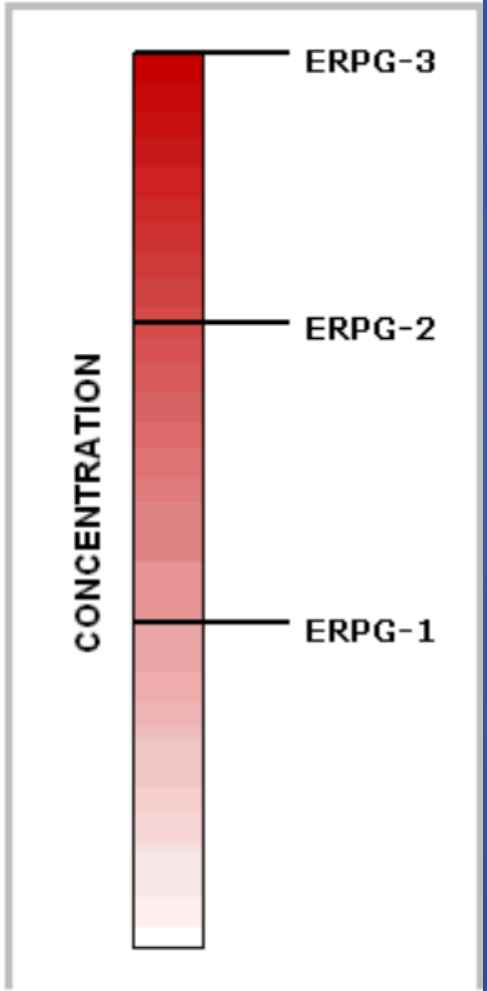
What are ERPGs?

ERPGs estimate the concentrations at which most people will begin to experience health effects if they are exposed to a hazardous airborne chemical for 1 hour. (Sensitive members of the public—such as old, sick, or very young people—aren't covered by these guidelines and they may experience adverse effects at concentrations below the ERPG values.) A chemical may have up to three ERPG values, each of which corresponds to a specific tier of health effects.

The three ERPG tiers are defined as follows:

- **ERPG-3** is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.
- **ERPG-2** is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.
- **ERPG-1** is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

For More Information



Senses

NFPA 470 (2022 Ed.) Chapter 4.2.1(13)


FOX2
NEWS

Summary

Minimum Response Criteria – RINSED mnemonic Awareness Level Responders - Review

Recognize

Identify

Notify

Scene security

Evacuate

Decontaminate

Incident Action Plan

Hazardous Materials Incident

First-in Responder Incident Action Plan Worksheet (RINSED Mnemonic)

Agency/Crew	
Location	
Date	Time

	Recognize
Location/Name of Business	

RINSED Exercise

- Based on the incident photo complete the First-in Responder Incident Action Plan Worksheet.
  - Recognize
  - Identify
  - Notify
  - Scene security
  - Evacuate
  - Decontaminate

Questions?

Thomas O. Murdock, Ph.D. "Tommy"
St. Cloud Chemical Assessment Team
Hazardous Materials Response and Chemical Assessment Training
763-208-5581 (home)
612-715-2361 (cell)
tomdimurdock@gmail.com

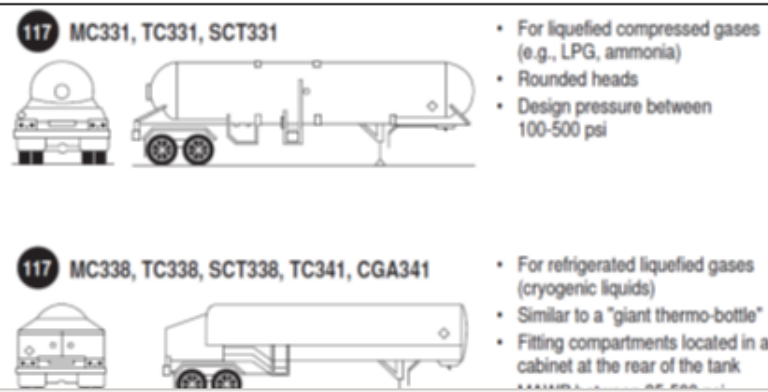
RINSED Exercise

- Based on the incident photo, complete the First-in Responder Incident Action Plan Worksheet.
  - Recognize
  - Identify
  - Notify
  - Scene security
  - Evacuate
  - Decontaminate

Hazardous Materials Incident

First-in Responder Incident Action Plan Worksheet (RINSED Mnemonic)

Agency/Crew	
Location	
Date	Time

Recognize	
Location/Name of Business	
	


12:02 80°
11
abc


12:02 80°
11
abc


1824
8

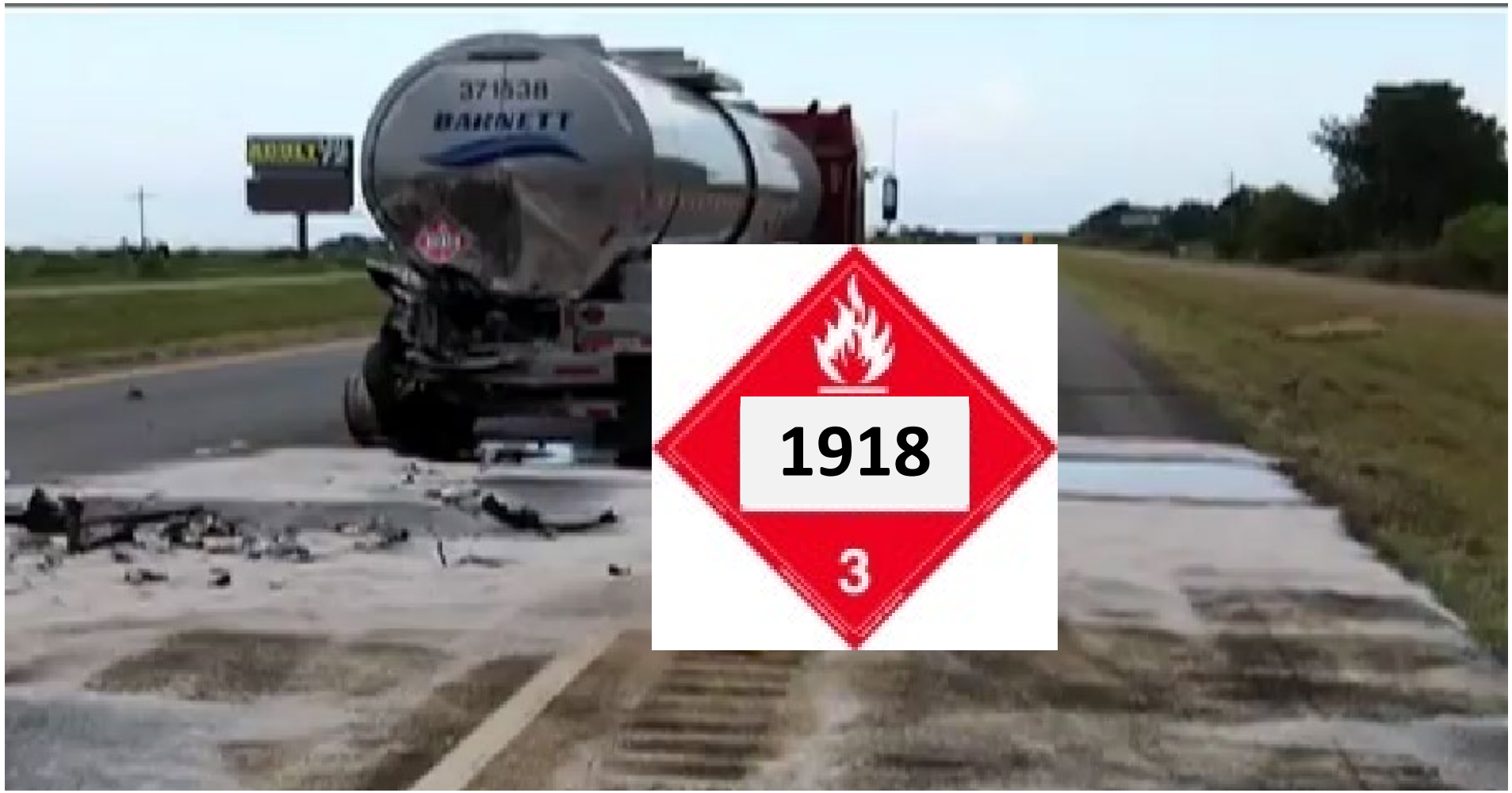

FOX2
NEWS


1017
2


1206
3

Potassium Dichromate
UN 3087

Tank Truck Leaking UN 1918




1789
8

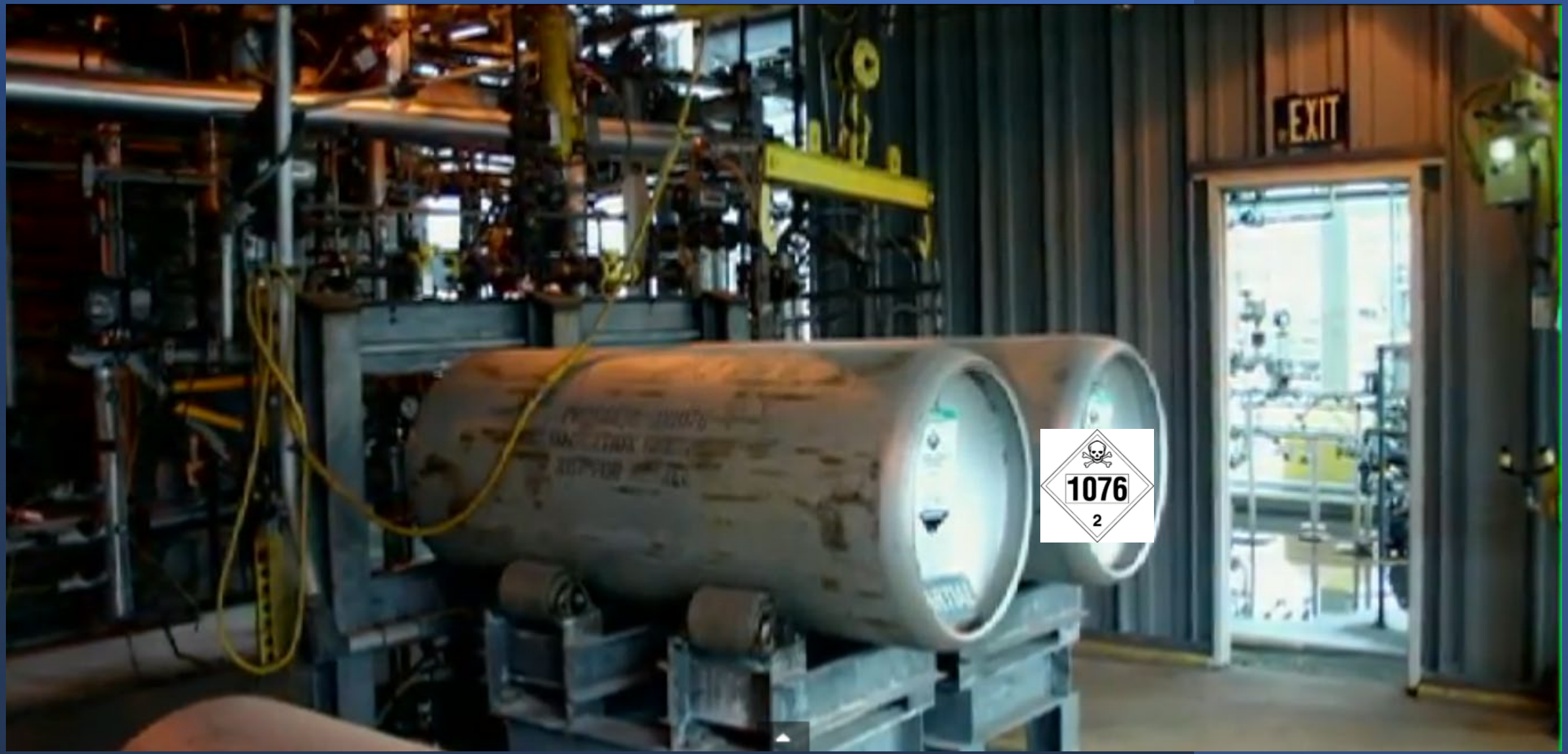
9 08
1791

10549
LIQUEFIED PETROLEUM GAS
1075


PROCOR
UNPX 127502
1495


1789
8


CTL
1830
8


EXIT
1076
2


1778
8
NO ILLEGAL
DUMPING
FACILITY
MONITORED
BY CAMERA


IPBX 17560
1805
8

Tar


1230
7:31
BREAKING NEWS
TANKER FIRE I-95 NORTH
IN FAIRFIELD
wtnh.com


2949
8


1824
8


12:02 80°
11
abc


12:02 80°
11
abc


I-5
LAKEWAY DR
1977
2


2582

UN NA 1086


1005
2


1805
8

50% Hydrogen Peroxide


1013
2


PAM
PAM
1604
8
53
53