



Product Parameters and Specifications
Model: Legatia L1 Pro Special Edition Tweeter

Legatia Pro™ L1 Special Edition

The Legatia Pro L1 SE is a limited-edition, super high-end mobile audio tweeter based upon the architecture of the original and highly-acclaimed Hybrid Audio Technologies Legatia L1 Pro transducer. At the onset of the Legatia Pro-Series program, we wanted to be sure that the Pro-Series tweeter could be listened to for long listening sessions with no noticeable listener fatigue, and the Pro L1 answered the call. The Pro L1 SE is an advancement of the original Legatia L1 Pro design, boasting a radiator ring diaphragm for exceptional polar response and an even broader frequency response, and lower resonance frequency than the original L1 Pro.

The Legatia Pro L1 SE is ring radiator tweeter that has superior damping and extended frequency response. The Pro L1 SE is a light and transiently fast tweeter in a 25mm body that doesn't suffer from typical "heaviness" in tonal quality, typically associated with damped, large-diameter dome tweeters; the L1 Pro SE can be used for the reproduction of upper midrange and treble frequencies in dedicated two-, three-, and four-way front stage systems. The Pro L1 SE has exceptional polar response, and remains small enough to install in typical locations within a vehicular environment. The Pro L1 SE is the new benchmark for radiator ring diaphragm tweeters.



Figure 1: Pro L1 SE tweeter, shown larger than actual size for detail.



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Legatia Pro L1 SE in more detail

The Legatia Pro L1 SE is a 25mm (1-inch) ring radiator-type tweeter which has an extended linear response and exceptional transient response. The design offers a wide dispersion pattern to make for flexible on- and off-axis installation and speaker location.

The L1 Pro SE has several unique features that ensure performance is superior to all other designs in this category. The ring radiator geometry is notorious for delivering a flat, extended response, but many radiator designs have suffered historically from poor off-axis response. The main L1 Pro SE criteria was to have a ring radiator that could work exceptionally well in a car environment, with an end-user's choice of either on- or off-axis operation with good polar response. The geometry of the wave guide was paramount to achieving this result and was the subject of a concerted effort by Hybrid Audio Technologies engineers. The wave guide also prevents phase cancellation for uniform frequency response and uniform polar radiation. The addition of the wave guide is an improvement over a conventional dome tweeter design simply for the fact that the diaphragm is terminated not only at its edges, but also at the center of the diaphragm as well. This feature improves the damping of modal distortion and resonance. In concert with the wave guide is a treated fine cloth diaphragm to ensure smooth frequency response.

The Pro L1 SE is efficient, exhibits low distortion, and has a wide dispersion; the L1 Pro SE has a slightly heavier moving mass than the L1 Pro, which in turn has afforded more damping character, while the resonance has been lowered by 120 Hz over the L1 Pro (580 Hz). Nominal and thermal power handling has also been improved over the original L1 Pro transducer; the Pro SE tweeter has a very high power handling with proper filtering, and the L1 Pro SE diaphragm is much less susceptible to mechanical deformation than other designs, and yet yields a smooth response over the extent of its range.

The motor assembly is conventional dynamic, with a $\phi 24.5 \times 3.5$ H NdFeB neodymium magnet structure to ensure a relatively small footprint size and shallow depth. A perforated grille protects the diaphragm and ring. The Pro L1 SE boasts a fully machined aluminum body; the body is machined aluminum, not process-cast aluminum. The dense metal structure of the tweeter housing helps to reduce resonances within the body of the tweeter to abate resonance, and ensure effective reproduction of extremely low music tones. Additionally, the Pro L1 SE has a polypropylene tuned and damped chamber at the rear of the motor assembly; the chamber helps to reduce backwave distortion and significantly lower the tweeter's resonance frequency to allow it to be used to play tones in the vocal spectrum, if desired. A machined aluminum 46mm knurled accoutrement (denoted as "aluminum adapter" in Figure 2) at the base of the tweeter provides optimized clamping strength to the mounting media. The Pro L1 SE tweeter is available in two colors to ensure cosmetic integration with the vehicle's surroundings: silver brushed aluminum, and anodized black (there is no cost difference between the two colors) with copper phase plug and radiator ring.

The 58mm wide mounting flange, only 3mm larger than the Legatia L1V2 tweeter, provides a solid-aluminum mounting surface for the tweeter without the necessity of mounting cups or external hardware.

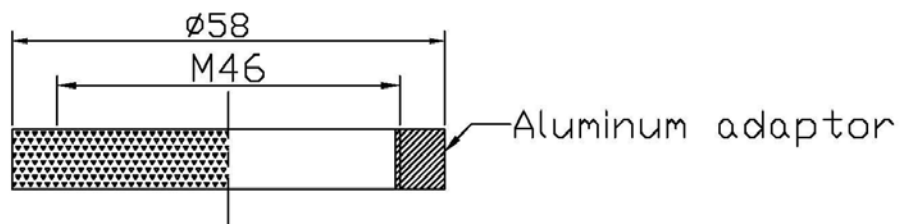


Figure 2: Pro L1 SE tweeter mounting accoutrement - detailed view of aluminum 46mm knurled aluminum adapter



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The overall dimensions of the driver are very amenable for use in the car audio environment, boasting an exceptional depth of just 28mm (nearly unheard of in a tuned-chamber tweeter). The terminations are an extraordinary feature of the Pro L1 SE: nickel-plated spring-loaded binding posts were used to give the end-user flexibility in direct connection with large-gauge tinned wiring, without the need for crimp terminations.

Limited Edition Statement

The Legatia L1 Pro Special Edition is a first-generation limited edition radiator ring transducer. Hybrid Audio Technologies guarantees a maximum number of Legatia L1 Pro Special Edition transducer sets that will be created within this edition. The maximum number is 150 sets.

Included with the Legatia L1 Pro SE set is a Statement of Authenticity, which includes an original signature by Hybrid Audio Technologies Founder and Chief Executive Officer Scott E. Buwalda. Included with the signature guarantee is a certification that the limited edition Legatia L1 Pro Special Edition transducer program, which included design, prototyping, testing, manufacturing, and packaging, was performed by the Hybrid Audio Technologies Founder, or in his direct supervision, and includes a statement of personal inspection of the transducers.

The final feature of the Pro SE tweeter is the Special Edition logo on the tuned chamber:



Figure 3: Pro L1 SE tweeter - "Special Edition" tuned chamber, for reference



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Reference Figure 4, below, for the mechanical drawing of the Pro L1 tweeter.

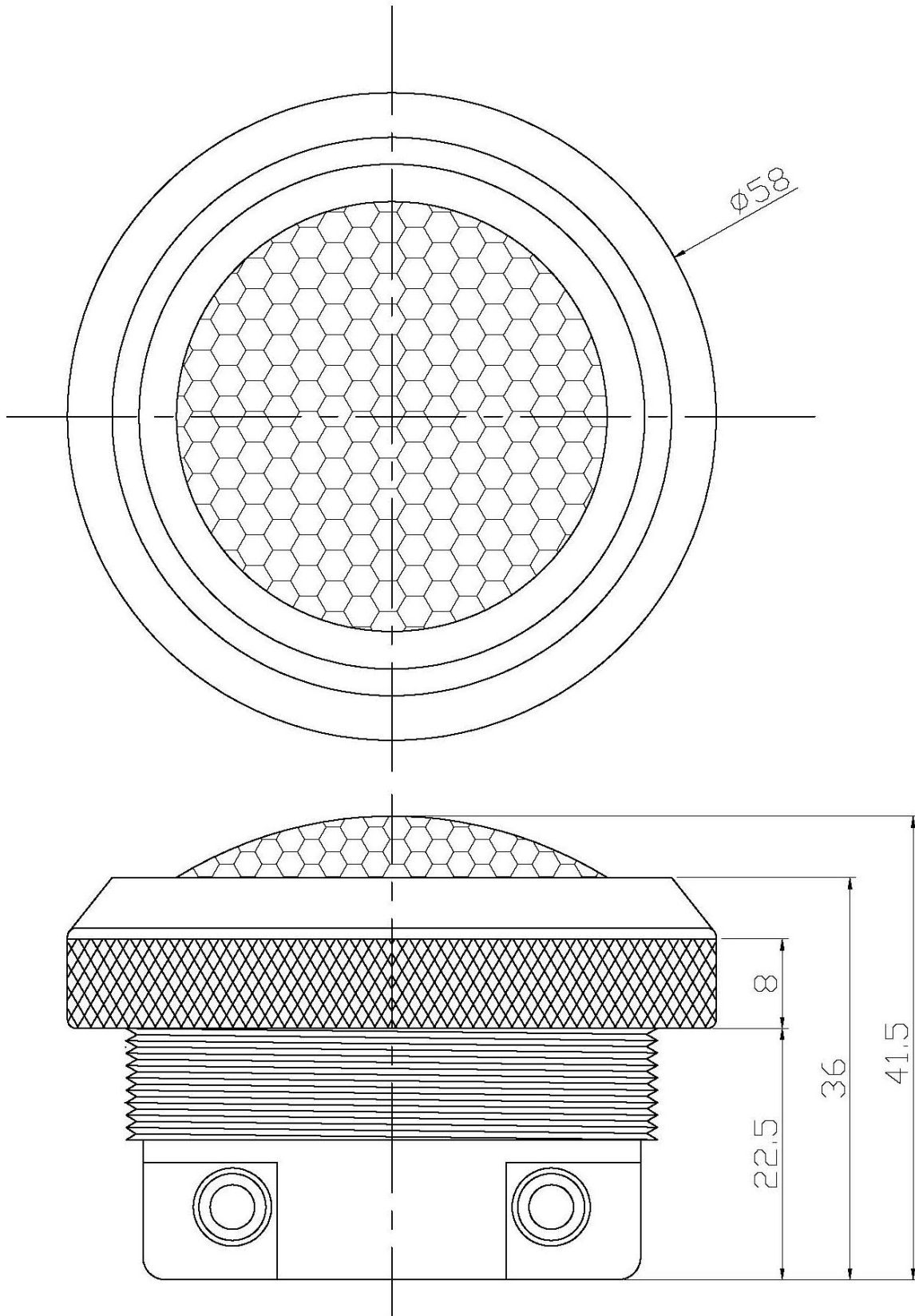


Figure 4: Pro L1 SE tweeter - dimensioned mechanical drawing



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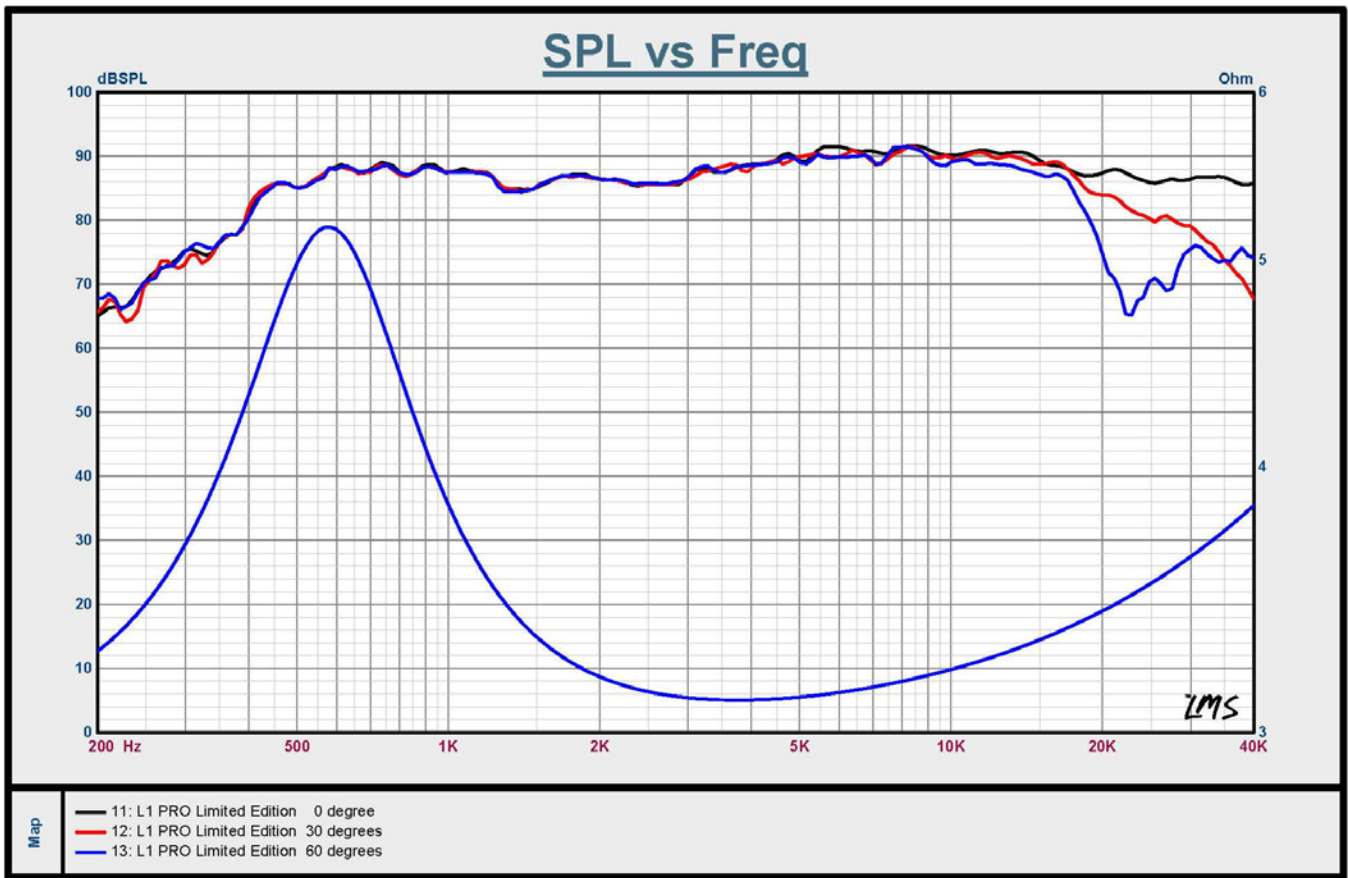
Legatia Pro™ L1 SE Thiele-Small Parameters

Overall Diameter	φ58mm
Mounting Depth	30.5 mm from bottom of surface-mount flange
Mounting Methodology	Surface-mount tweeter with standard-pitch M46 X 8mm thick knurled thread aluminum adapter to secure the tweeter body from the rear
Construction	Solid machined aluminum with polypropylene tuning chamber
Distortion	<5% max at rated power input, no crossover
Magnet Diameter and Construction	φ24.5 × 3.5 H NdFeB
Recommended Minimum Crossover Frequency	1,800 Hz at 24 dB/octave highpass (conservative)
P _{nom} : Rated Power Input (No Crossover)	25 watts (AES Standard)
P _{max} : Maximum Power Input (No Crossover)	50 watts (AES Standard)
P _{max} : (With Recommended Minimum Crossover)	125 watts
Resonance Frequency (Fs)	580 Hz
Frequency Range	Fs (580 Hz) - 40,000 Hz, +/- 3 dB
Sensitivity	91.5 dB at 1 watt/1 meter
Nominal Impedance	4Ω
DC Resistance	3.0Ω
Voice Coil Diameter	25mm (1-inch)
Q Mechanical System (Qms)	1.244
Q Electrical System (Qes)	1.717
Q Total System (Qts)	0.721
K _{rm}	3.048 μΩ
E _{rm}	1.001
K _{xm}	4.314 mH
E _{xm}	0.409



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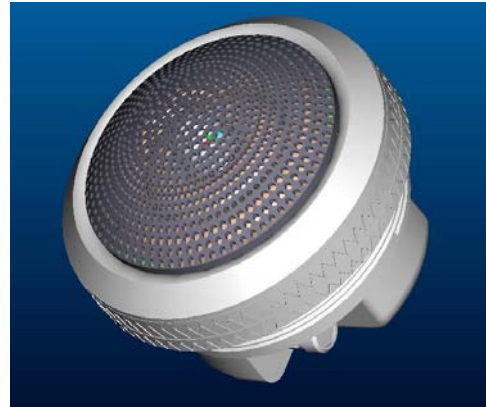
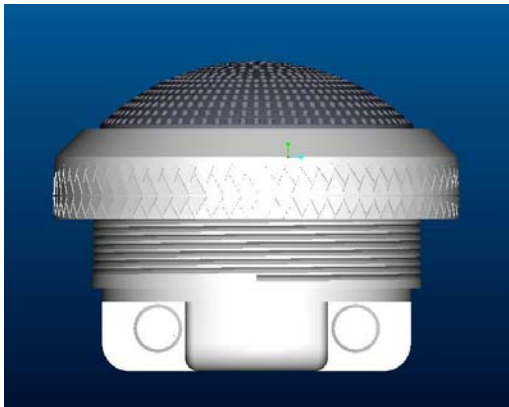
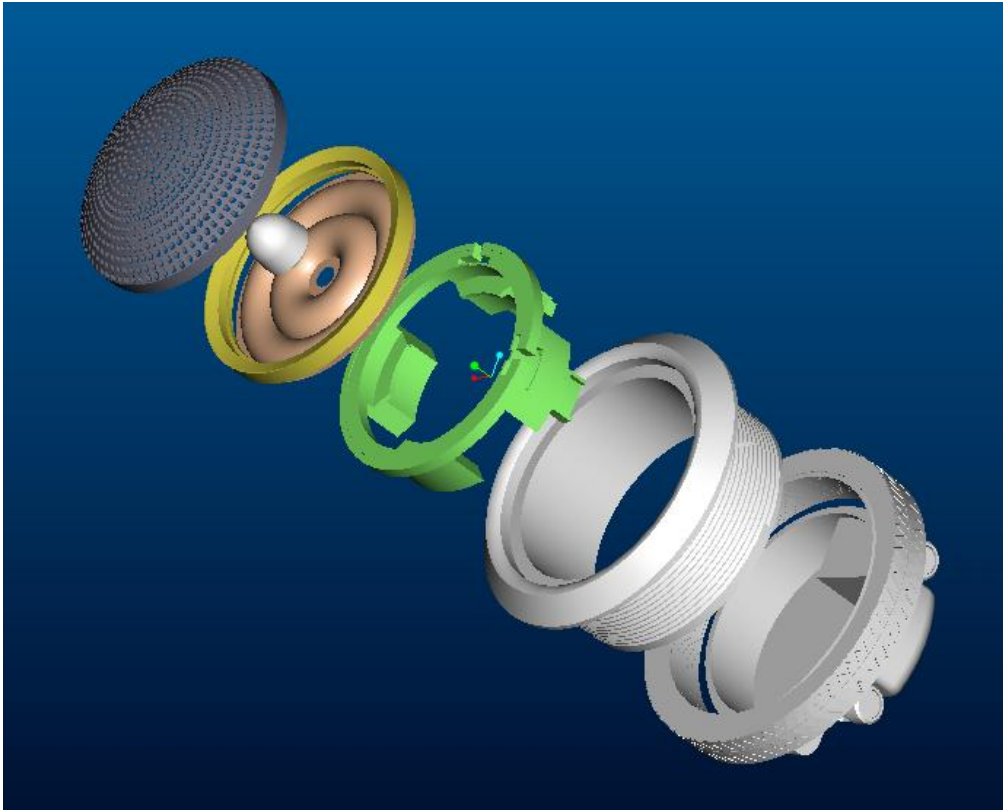
Legatia Pro™ L1 Impedance and SPL Verses Frequency Plots





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Annex 1: Legatia Pro™ L1 3-Dimension Design Drawings



Note: specifications are subject to change without notice
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