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The Speaker Specialists ®

LS Series Loudspeakers

Advanced Tecnhical Information
From Matthew Polk and the Design/Engineering Team

DESCRIPTION

The Polk Audio 'LS' Series is comprised of a number of sophisticated loudspeaker systems designed to provide you with the greatest possible listening pleasure. We have spent years researching every aspect of loudspeaker design using the most advanced techniques. Our use of laser interferometry, computer simulation, and high precision measurements have significantly advanced our design capabilities and our understanding of loudspeakers.

The Polk 'LS' Series loudspeakers have been completely engineered from the ground up and embody an attention to detail that involves the optimization of every single component and aspect of the design. We use the term 'Dynamic Balance ™' to signify the integration of materials and technologies embodied in the 'LS' Series Loudspeakers.

This results in smoother frequency response, dramatically improved phase coherence, and lowered levels of distortion for purer sound and greater enjoyment from your compact discs, records, or tapes.

Specifications

LS50

Driver Complement
1 x 1" (25mm) dome tweeter
2 x 6-1/2" (165mm) driver
Size
32-1/2"H x 10-9/16"W x 11-9/16"D
(82.5cm x 26.8cm x 29.4cm)
Overall Frequency Response
30Hz - 26kHz
-3dB Limits
45Hz - 25kHz
Recommended Amplification
20 - 250 watts / channel
Impedance
Compatible with 8 ohm outputs
Efficiency
89.5dB
Shipping Weight
48 lbs (21.8 kg / pair)

LS70

Driver Complement
1 x 1" (25mm) dome tweeter
2 x 7-1/2" (165mm) driver
Size
37"H x 12-1/4"W x 14-9/16"D
(94cm x 31cm x 37cm)
Overall Frequency Response
25Hz - 26kHz
-3dB Limits
37Hz - 25kHz
Recommended Amplification
30 - 250 watts / channel
Impedance
Compatible with 8 ohm outputs
Efficiency
90dB
Shipping Weight
62 lbs (28.1 kg)

LS 90

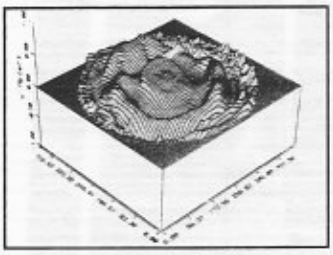
Driver Complement
1 x 1" (25mm) dome tweeter
4 x 6-1/2" (165mm) driver
Size
40"H x 12-1/4"W x 14-9/16"D
(94cm x 31cm x 37cm)
Overall Frequency Response
20Hz - 26kHz
-3dB Limits
35Hz - 25kHz
Recommended Amplification
30 - 250 watts / channel
Impedance
Compatible with 8 ohm outputs
Efficiency
90dB
Shipping Weight
73 lbs ea. (33.1kg ea.)

Features and Benefits

The Polk LS Series speakers are the result of years of research into the resonant behavior of materials and speaker cones. Working in conjunction with the Johns Hopkins University Center for Non-Destructive Evaluation, Polk Audio engineers developed an advanced analysis technique called "Full Field Laser Interferometry." This allowed us, for the first time, to view and analyze the microscopic vibrations on the surface of the entire speaker cone while it is in motion (illustration 1) . This breakthrough in speaker analysis technology enabled Polk engineers to devise ways to control and minimize the cone resonances which cause coloration and distortion in loudspeakers.We call these techniques "Dynamic Balance ", the successful integration of materials and mechanics in motion. Through the use of Dynamic Balance, the Polk LS Series achieve a level of sonic performance usually associated with larger, more costly designs.

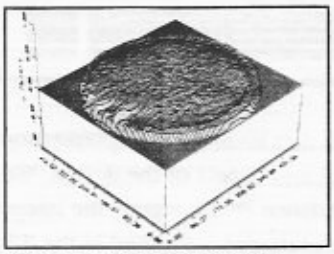
P-A-M Composite Cones - Through our laser interferometry research, we concluded that all single materials had drawbacks of one sort or another. Rather than settling for the compromises of a single material, Polk driver cones use a composite material, with stiff and soft components, to get the advantages of both. Polyolefin, used as the base material, is stiffened by the introduction of "Aramid Fibers" like those used in bulletproof vests plus mineral fillers. Free of resonant breakup modes, the LS drivers provide flat, low distortion performance for clear, un-colored sound reproduction.

Trilaminate Tweeter Domes - The SL6000 is the pinnacle of dome tweeter technology. It uses a trilaminate (three layer) dome of polyamide, aluminum and stainless steel to provide the listener with all the benefits of soft and hard dome designs. The highs are clean and extended without metallic harshness.



Laser Interferometry testing illustrates severe resonance break-up of single material cones

Resonance Damping Rubber Surround and Dustcap - Polk drivers use costly rubber surrounds and dustcaps which are tuned (like shock absorbers) to absorb cone resonances rather than allow them to reflect back into the cone again. This feature contributes to the flat frequency and phase response of the LS Series models. The rubber surrounds also resist Ultra Violet light and airborne pollutants which deteriorate cheap foam surrounds. A Polk driver will last far longer than competitive products and is therefore a better long-term value.



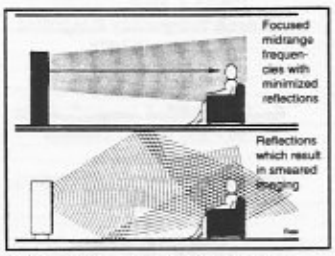
Polk Dynamic Balance Technology defeats cone resonance

Non-Resonant Cabinet Construction - The baffle to which the drivers are attached is the cabinet surface which is most prone to unwanted resonances and vibrations. Most speakers use 5/8 or 3/4 inch particle board baffles. To avoid unwanted vibration, the LS baffles are constructed of 1 inch thick MDF (a costly non-resonant wood product). The sides and back of the LS cabinets are braced with stiffening ribs to prevent the cabinet from resonating and coloring the sound.

Diffraction Control Baffle - The extended surround of the driver and the contoured tweeter faceplate provide a smooth transition for the waveforms leaving the side of the moving cones. This minimizes the early reflections known as diffraction. The beveled baffle frame also provides a smooth transition from the baffle and guides the waveforms to the listening space, thereby minimizing the effects of room reflections. The Polk LS Series loudspeakers are less room sensitive than other speakers and provide the kind of three-dimensional imaging which was previously found only in costlier designs.

Non-Parallel Sides - For the same reasons that recording studios are built with no parallel walls, the sloping sides of the LS models prevent internal standing waves from developing within the cabinet. If allowed to persist, such standing waves cause deep bass loss, boominess or both. The LS line suffers from no such affliction. The bass is deep, tight and detailed. It sounds like live music, not canned.

Air Particle Decelerator - Tall, thin tower type speakers, while attractive, can suffer from "organ pipe" resonances. Air particles moving through the cabinet can cause an audible resonance much like the fog horn-like sound made when air is blown across the mouth of a bottle. This resonance can badly color the sound of human voices and other midrange instruments. A complex matrix of fiberglass filaments in the center of the cabinet slows the velocity of the air particles, breaking up the organ pipe resonance while still allowing the air to pass through. The reproduction of voices by the LS speakers is utterly lifelike, without a trace of heaviness.



Polk 's line source array technology

Vertical Line Source Technology - By arranging the drivers in a line source array, midrange frequencies are focused in the vertical plane, thereby minimizing floor and ceiling reflections which smear the image and color the sound (see illustration at left).

Two - Way, Phase Coherent Crossovers -The human ear is ultra sensitive to the phase and frequency response errors in the range of 200 - 1,000 Hz (the midrange). Crossovers cause such errors and are therefore best placed outside that frequency range. Because of the wide response range of the Dynamic Balance drivers, Polk engineers were able to cross over to the tweeter well above the midrange. Free of the midrange phase response errors of typical loudspeakers, the Polk LS Series models provide vocal purity, clarity, and imaging not before available at their low prices.