dV-DOSC

THE INCREDIBLE INNOVATION OF
WAVEFRONT SCULPTURE TECHNOLOGY®

APPLICATIONS

L-ACOUSTICS® dV-DOSC provides the same performance benefits as V-DOSC® and ARCS® in an extremely compact format suitable for both fixed installation and touring applications. The 120° horizontal coverage of dV-DOSC combined with the power of Wavefront Sculpture Technology® in adapting vertical system directivity to match the audience area results in well-defined, predictable coverage combined with exceptionally even frequency response and SPL.

As a full-range, two-way system, dV-DOSC can be used for speech reinforcement in corporate applications or as a voice-only system for television and theatrical productions. The compact profile of dV-DOSC is ideal for installations where visually unobtrusive sound design is an important issue.

dV-DOSC is also well-suited to large-scale fixed installations such as single or multiple distributed arrays for stadium and arena sound reinforcement. For these applications, the generous 120° horizontal pattern combined with the seamless transition between short- to long-throw zones obtained using Wavefront Sculpture principles allows the sound designer to achieve excellent intelligibility and cost-effective coverage even under difficult, highly reverberant acoustic conditions.

When combined with subwoofers for extended bandwidth applications, dV-DOSC can be used as a front-of-house system for small, medium and large venues. For these applications, the 120° horizontal coverage pattern provides excellent stereo imaging in the standard left-right format while the flexibility provided by Wavefront Sculpture allows the sound designer to cover virtually any room geometry.

For touring applications, dV-DOSC can be used as a downfill enclosure for flying underneath V-DOSC arrays or as a long-throw extension of the system when stacked on top of the V-DOSC flying bumper. Other applications include flown dV-DOSC arrays for center cluster or offstage fill and stacked configurations for front fill or stereo infill. When operated in conjunction with subwoofers, dV-DOSC can also be used for stage monitoring applications. Given all these possibilities, that's why the "dV" in dV-DOSC stands for "Definitely Versatile".

L-ACOUSTICS PROFESSIONAL SOUND SYSTEM

- **Active 2-way enclosure (2 x 8" LF, 1.4" HF)**
- **WST-based line source design**
- **Perfect coupling, predictable coverage**
- **Excellent for medium and long throw applications**
- **Coplanar symmetry (120° horizontal directivity)**
- **Adjustable vertical directivity (up to 7.5°)**
- **Designed for high performance touring and fixed installation**
- **Ergonomic, fast, secure rigging system**
- **OEM factory presets for approved digital processors**

SPECIFICATIONS

L-ACOUSTICS specifications are based on measurement procedures which produce unbiased results and allow for realistic performance prediction and simulations. Some of these specifications will appear very conservative when compared with other manufacturer's specifications. All measurements are conducted under free field conditions and scaled to a 1 m reference distance unless otherwise indicated.

Frequency Response

Frequency response	160 - 18k Hz (±3 dB)	(2W 75HI preset)
Usable bandwidth	100 - 20k Hz (-10 dB)	

Sensitivity[1]

LF (2.83 Vrms @ 1m)	99 dB SPL	100 - 800 Hz
HF (2.83 Vrms @ 1m)	109 dB SPL	800 - 18k Hz

Power Rating[2] (Long Term)

			Amplification (Recommended)	Impedance (Nominal)
LF 55 Vrms	380 Wrms	1520 Wpeak	760 W	8 ohms
HF 23 Vrms	66 Wrms	260 Wpeak	260 W	8 ohms

Nominal Directivity (-6dB)[3]

Horizontal	symmetrical, 120°
Vertical	defined by the array

System Output[4]

	Continuous SPL (flat array)	Continuous SPL (maximum curvature array)	
One enclosure	127 dB	127 dB	
Two enclosures	133 dB	131 dB	15° vertical coverage
Four enclosures	139 dB	135 dB	30° vertical coverage

Components

LF 2 x 8" weather-resistant loudspeaker (2" voice coil)

HF 1 x 1.4" neodymium compression driver mounted on custom DOSC waveguide and acoustic lens

[1] Sensitivity is the average SPL measured over the component's rated bandwidth

[2] Power rating displays the long term RMS power handling capacity using pink noise with a 6 dB crest factor over the component's rated bandwidth

[3] Directivity is averaged over the 1-10 kHz range

[4] System Output gives the unweighted SPL output of the system referenced to 1 m, including preset equalization and band leveling adjustment as measured under freefield conditions using the 2W 75LO preset

Enclosure

• Width	695 mm	27.4 in
• Front height	257 mm	10.1 in
• Rear height	171 mm	6.7 in
• Depth	476 mm	18.7 in
• Trap angle	2 x 3.75°	
• Shipping dims	800 x 360 x 560 mm	
	31.5 x 14.2 x 22 in	
• Weight (net)	31.8 kg	70.1 lbs
• Shipping weight	35 kg	77.2 lbs

- Connectors : 2x 4-pin Neutrik speakon
- Material : 15 mm, 24 mm Baltic birch plywood, aluminum top and bottom plates
- Finish : Maroon-gray™
- Grill : Black epoxy perforated steel with acoustically-transparent foam
- Rigging : Integrated flying hardware and handles

Additional Equipment

- OEM factory presets for approved digital processors
- L-ACOUSTICS dV-SUB or SB218 subwoofers
- L-ACOUSTICS LA24a or LA48a power amplifier

ARCHITECT SPECIFICATIONS

The enclosure shall be an active, 2-way loudspeaker containing two direct radiating, bass reflex-loaded 8-inch low frequency transducers mounted in a V-shaped configuration and one 1.4" exit, titanium diaphragm, neodymium compression driver that is coupled to a waveguide. As a full range system, the frequency response shall be 160 Hz to 18 kHz with less than ± 3 dB variation and the usable bandwidth shall be 100 Hz to 20 kHz (-10 dB).

The waveguide employed in the loudspeaker shall generate a flat, isophasic wavefront for the high frequency section. When vertically arrayed, multiple loudspeakers shall function according to the principles of Wavefront Sculpture Technology whereby the separation between acoustic centers of individual sound sources shall be less than the size of half the wavelength at the highest frequency of their operating bandwidth or the sum of the individual areas of the isophasic radiating elements shall be greater than 80 percent of the target radiating area. Components shall be configured in a coplanar symmetric arrangement and provide 120-degree horizontal coverage (-6 dB points) independent of the number of vertically arrayed elements.

Crossover points shall be 800 Hz between low and high frequency sections with 24 dB per octave Linkwitz-Riley characteristics. Long term power handling shall be 380 Wrms and 66 Wrms for low and high sections, respectively. Low frequency transducers shall be connected in parallel with a nominal 8-ohm impedance and the high frequency transducers shall have a nominal 8-ohm impedance. Connection to the loudspeaker shall be made via two parallel 4-pin Neutrik Speakon connectors.

The enclosure shall have a trapezoidal shape. Dimensions shall be 69.5 cm (27.4-in) wide, 25.7 cm (10.1-in) high at the front, 17.1 cm (6.7-in) high at the rear, 47.6 cm (18.7-in) deep. Enclosure weight shall be 31.8 kg (70.1 lbs). Cabinet construction shall consist of 15 mm (0.59-in) and 24 mm (0.94-in) Baltic birch plywood with 4 mm (0.16-in) thick top and bottom aluminum plates. The finish shall be maroon-gray, high-resilient paint. The front of the enclosure shall be protected by a black epoxy-coated, 2 mm (0.08-in) thick steel grille that is covered with 10 mm (0.4-in) thick acoustically-transparent open cell foam.

Loudspeaker enclosures shall be installed using a dedicated rigging bumper and accessories. The enclosure shall have an integral rigging system that allows arrays to be assembled with variable angles between enclosures up to a maximum of 7.5 degrees.

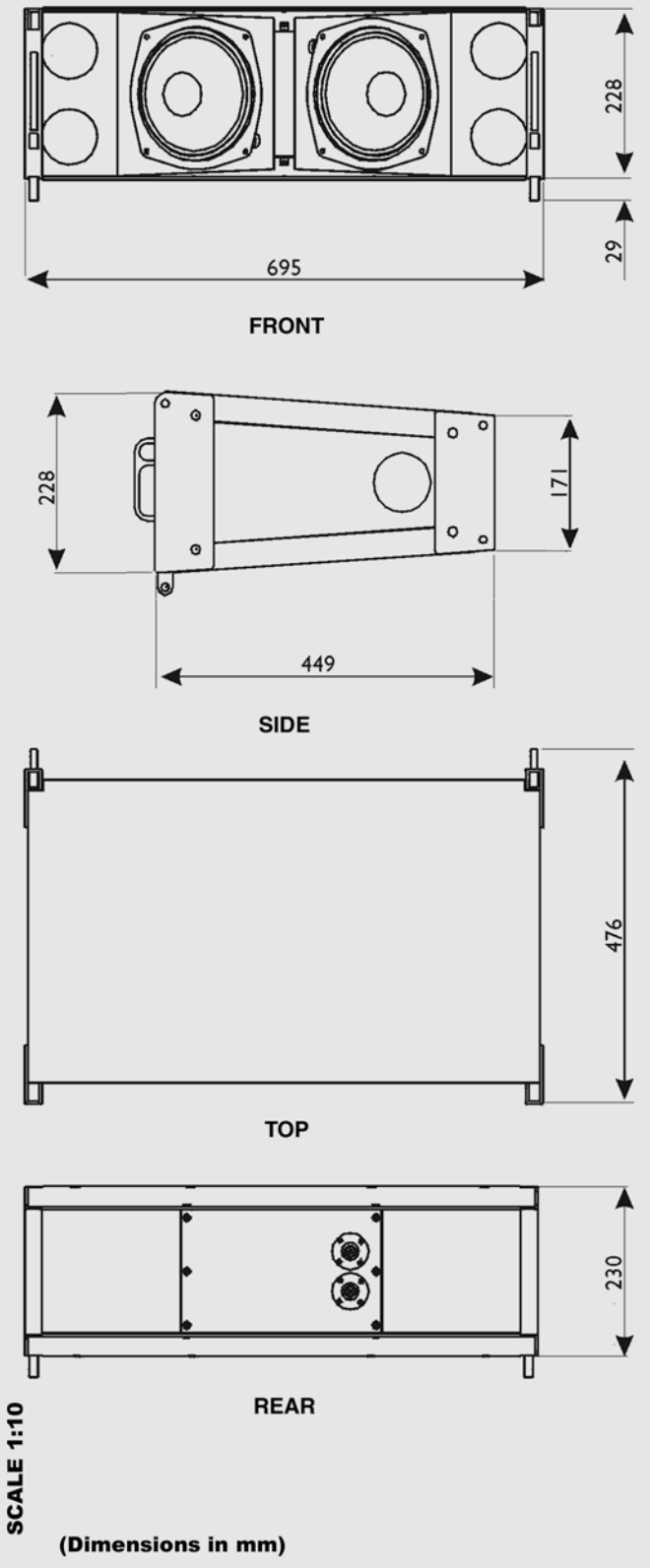
The loudspeaker shall be used with an approved digital processor with OEM factory presets for active 2-way or 3-way operation in conjunction with additional subwoofer enclosures.

The loudspeaker system shall be the L-ACOUSTICS dV-DOSC.

The subwoofer system shall be the L-ACOUSTICS dV-SUB or SB218.

ACCESSORIES

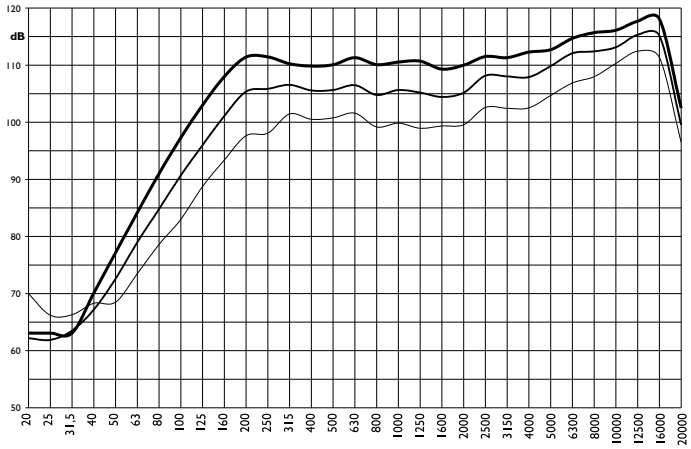
dV-PIN25:	Locking quick release pin (25 mm grip length) for dV-DOSC enclosure interconnection and connection to dV-BUMP
dV-PIN81:	Locking quick release pin (81 mm grip length) for attaching dV-DOSC to dV-DOWN
dV-ANGLEP:	Rear angle bar for varying vertical angle between dV-DOSC enclosures dV-ANGLEP1 values: 0, 2, 3.75, 5.5, 7.5 degrees dV-ANGLEP2 values: 1, 3, 4.5, 6.5 degrees
dV-ANGLEN:	Rear angle bar allowing for downwards tilt of stacked configurations
dV-BUMP:	Flying bumper for standalone rigging or flying on top of V-DOSC
dV-DOWN:	Flying bars (two) for rigging dV-DOSC under V-DOSC for down-fill applications
dV-FLIGHT:	Flight case for three dV-DOSC



dV-DOSC

PERFORMANCE DATA

FREQUENCY RESPONSE

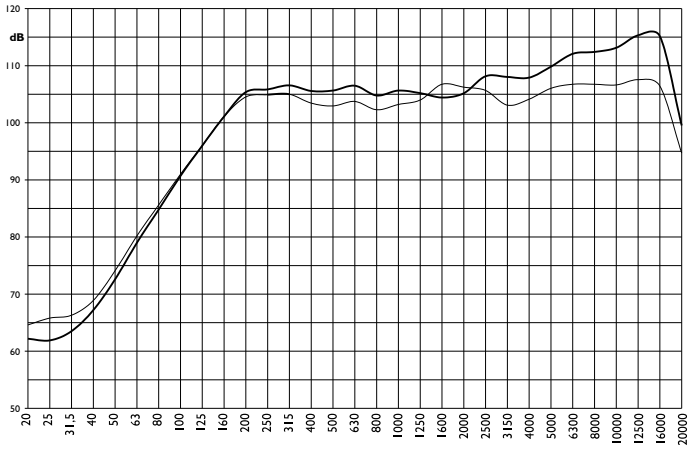


On axis response : 1 dV-DOSC

On axis response : 2 dV-DOSC 0°

On axis response : 4 dV-DOSC 0°

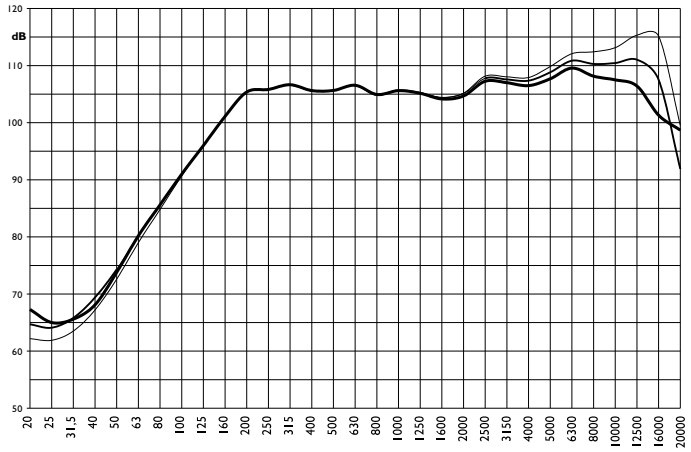
FREQUENCY RESPONSE



On axis response : 2 dV-DOSC 0°

Response averaged over beamwidth : 2 dV-DOSC 0°

FREQUENCY RESPONSE

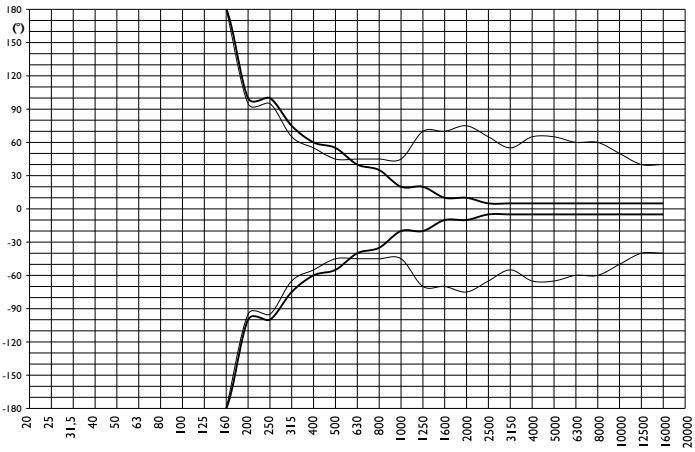


On axis response : 2 dV-DOSC 0°

On axis response : 2 dV-DOSC 3.75°

On axis response : 2 dV-DOSC 7.5°

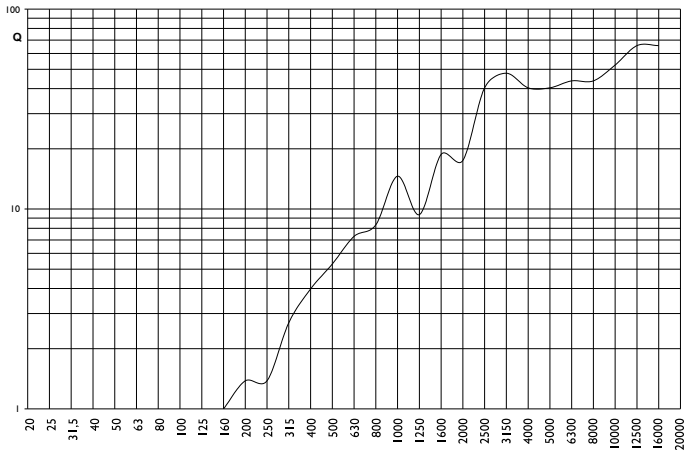
BEAMWIDTH (-6dB)



Horizontal beamwidth : 2 dV-DOSC 3.75°

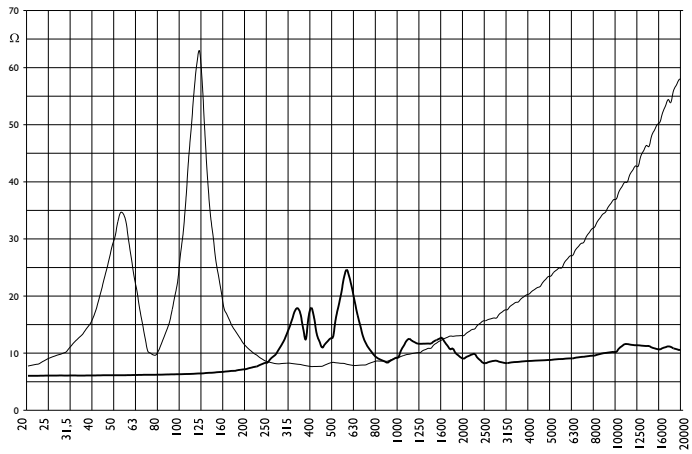
Vertical beamwidth : 2 dV-DOSC 3.75°

DIRECTIVITY FACTOR Q



Directivity factor : 2 dV-DOSC 3.75°

IMPEDANCE



LF

HF

WAVEFRONT SCULPTURE TECHNOLOGY®

The first task of sound engineers and audio consultants is to design sound reinforcement systems for a predefined audience area. Performance expectations in terms of clarity, coherence, sound pressure level (SPL) and coverage consistency have progressively increased over the years while at the same time the size of the audience has grown, inevitably leading to an increase in the number of loudspeakers.

In the past, conventional horn-loaded trapezoidal loudspeakers were typically assembled in fan-shaped arrays according to the nominal horizontal coverage angle of each enclosure in an attempt to reduce coverage overlap that causes destructive interference. With this type of arrangement, the optimum clarity available in one direction could only be provided by the individual enclosure facing in this direction. Attempts at "flattening the array" to achieve greater throw and higher SPLs resulted in severe interference in an uncontrolled way, affecting coverage, pattern control, intelligibility and overall sound quality. Even when arrayed according to specification (always an "optimum" compromise since the polar response of individual horns varies with frequency), the sound waves radiated by individual horn-loaded loudspeakers do not couple coherently thus the conventional system approach is fundamentally flawed. Furthermore, the chaotic sound fields created by interfering sound sources waste acoustic energy, thus requiring more power than a single, coherent source would in order to achieve the same SPL.

As an illustration of this principle, imagine throwing some pebbles into a pool of water. If one pebble is thrown into the water, circular waves will expand concentrically from the point where it entered. If a handful of pebbles are thrown into the water, we observe the equivalent of a chaotic wavefield. If we throw in a single larger stone, having total size and weight equal to the handful of pebbles, then we again see circular waves as for the case of the single pebble - only now with a much larger amplitude.

A Single Sound Source From Many Speakers

The initial specification for the Wavefront Sculpture Technology® (WST) research and development program was the design of a single acoustic source that is completely modular and adjustable while providing a totally coherent, predictable wavefield. In 1988, an early L-ACOUSTICS system called "Incremental" proved the project's feasibility. Based on this experimental concept, Professor Marcel Urban and Dr. Christian Heil began theoretical research and presented their findings at the 92nd AES Convention in Vienna in 1992 (Preprint #3269). The theory that was developed defines the acoustic coupling conditions for successfully arraying individual sound sources - including wavelength, the shape of each source, their surface areas and their relative separation.

Briefly, the coupling conditions can be summarized as follows:

An assembly of individual sound sources arrayed following a regular step distance on a planar or curved continuous surface is equivalent to a single sound source having the same dimensions as the total assembly if one or both of the following two conditions are fulfilled :

1) Frequency: The step distance (distance between the acoustic centers of individual sources) is smaller than half the wavelength over the operating bandwidth.

2) Shape: The wavefronts generated by individual sources are planar and together fill at least 80 percent of the total radiating surface area.

Additional conditions were published in the Audio Engineering Society journal paper "Wavefront Sculpture Technology", JAES Vol. 51, No. 10, October 2003. The first two WST conditions were re-derived (based on an intuitive approach using Fresnel analysis) and in addition it was shown that:

3) Deviation from the ideal, target wavefront (flat or curved) must be less than a quarter wavelength at the highest operating frequency (this corresponds to less than 5 mm curvature at 16 kHz)

4) For curved arrays, enclosure tilt angles should vary in inverse proportion to the listener distance (geometrically this is equivalent to shaping variable curvature arrays to provide equal spacing of individual enclosure impacts on the audience listening plane)

5) Limits exist concerning the size of each enclosure, the minimum allowed listener distance and the relative angles that are allowed between enclosures.

L-ACOUSTICS defines the practical implications of these conditions as Wavefront Sculpture Technology. The first WST condition dictates the design constraints for achieving single sound source performance at lower frequencies. By loading high-frequency compression drivers with the L-ACOUSTICS "DOSC" waveguide it is possible to meet the second WST condition at higher frequencies. Since WST conditions are satisfied over the entire audio bandwidth, the sound engineer or designer is provided with a "single" loudspeaker with well-defined coverage and wavefront shape, thus allowing the geometrical distribution of energy to be precisely installed to match the geometry of the audience seating area.

L-ACOUSTICS KUDO™, ARCS®, dV-DOSC and V-DOSC® are true line source arrays. KUDO, dV-DOSC and V-DOSC are designed for large audiences and long-throw applications while ARCS is suitable for medium-throw needs. All use the heart of Wavefront Sculpture Technology - the patented DOSC Waveguide - to achieve remarkable results.

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