



FreeSpace® DS 100F Loudspeaker

Product Overview

The Bose® FreeSpace® DS 100F loudspeaker is a high-performance, flush-mount loudspeaker designed for foreground music and speech reproduction in a wide range of commercial applications, including retail, restaurant and hospitality establishments. Clean, sleek styling visually blends into ceilings. The DS 100F loudspeaker meets numerous standards for combination music and evacuation systems around the world.

Product Information

The FreeSpace DS 100F flush-mount loudspeaker is engineered for installation in ceilings up to 30ft (10m) high, and is suitable for use in air handling (plenum) spaces. An optional pendant-mount kit allows the loudspeaker to be hung from open ceilings.

The FreeSpace DS 100F loudspeaker can be used as an 8-ohm, 100-watt loudspeaker or as a 70/100V loudspeaker. Transformer taps can be set by using an innovative thumb wheel, accessible from the front of the loudspeaker underneath the grille.

Performance of the FreeSpace DS 100F loudspeaker can be maximized through the use of the recommended Bose loudspeaker equalization resident in select Bose electronics or by using other equipment with parametric equalization. The loudspeaker can be used out of the box with a 55-Hz high-pass filter when recommended loudspeaker equalization is not used.

The DS 100F loudspeaker is acoustically compatible with the DS 100SE surface-mount loudspeaker and can be integrated on the same loudspeaker line.

The FreeSpace DS 100F loudspeaker meets numerous standards for combination music and evacuation systems around the world. A ceramic connector and thermal fuse are included and can be used when required.



Key Features

- Maximum SPL of 105 dB-SPL (peak 111 dB-SPL)
- High SPL output allows for installation in ceilings up to 30ft (10m) high
- Full-range performance from 65 Hz to 16 kHz
- 160° conical dispersion
- Quick and easy flush-mount installation
- Elegant, modern styling that blends with décor; available in black or white and can be painted
- One 2.25" (57mm) Twiddler® driver and a separate 5.25" (133mm) driver provide clarity and full bass response
- Integrated multi-tap transformer provides easy-to-change tap settings that are accessible underneath the loudspeaker grille:
70V – 12.5W, 25W, 50W, 100W
100V – 25W, 50W, 100W
- Can be used as an 8Ω, 100W loudspeaker
- Can be combined with the FreeSpace DS 100SE surface-mount loudspeaker on the same loudspeaker line
- Listed to ANSI/UL 1480-2005
- Suitable for use in air handling (plenum) spaces

Applications

The FreeSpace DS 100F loudspeaker is well-suited for permanent installations at:

- Retail stores
- Transportation facilities
- Hospitality venues
- Concourses
- Restaurants
- Houses of worship

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Detailed Product Specifications

Power handling ¹	100W
Nominal impedance (transformer bypass)	8Ω
Sensitivity ² (at 1W @ 1m)	85 dB-SPL
Maximum SPL ³ (pink noise @ 1m @ rated power)	105 dB-SPL 111 dB-SPL (Peak)
Frequency range ⁴ (-3 dB)	65 Hz – 16 kHz
Beamwidth (-6 dB point, average 1 – 4 kHz)	160° conical

¹⁻⁴ See "How our Loudspeakers are Measured" on page 8.

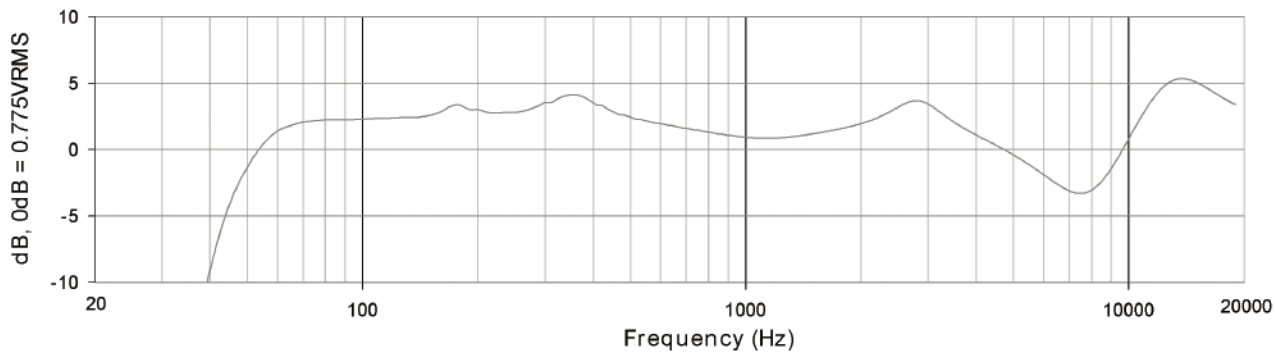
Additional Product Information

This product is equipped with a protection circuit that will reduce the high frequencies to an audibly lower level when the loudspeaker is overdriven. In the event the protection circuit is activated, reduce the input level.

Performance of the FreeSpace® DS 100F loudspeaker can be maximized through the use of the recommended Bose® loudspeaker equalization resident in select Bose electronics or by using other equipment with parametric equalization. The loudspeaker can be used out of the box with a 55-Hz high-pass filter when recommended loudspeaker equalization is not used.

TECHNICAL DATA SHEET

Recommended Loudspeaker Equalization Curve



FreeSpace® DS 100F Loudspeaker



Driver complement:

- One 2.25" (57mm) Twiddler® driver
- One 5.25" (133mm) woofer

Construction features:

- Enclosure: Injection-molded polypropylene
- Grille: Powder-coated steel

Dimensions:

- Outer flange diameter: 11.8" (299mm)
- Ceiling hole diameter: 10.5" (267mm)
- Height to top of housing: 7.6" (193mm)

Weight:

- Product: 13lb (5.9kg)
- Shipping: 16lb (7.3kg)

Package contents:

- Loudspeaker, installation guide

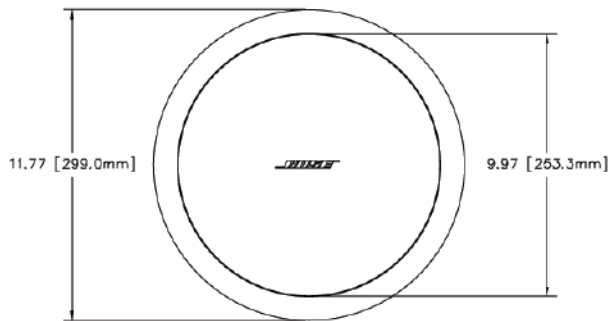
Finish:

- Textured black or white finish with a contoured, powder-coated steel grille. Both the enclosure and grille can be painted.

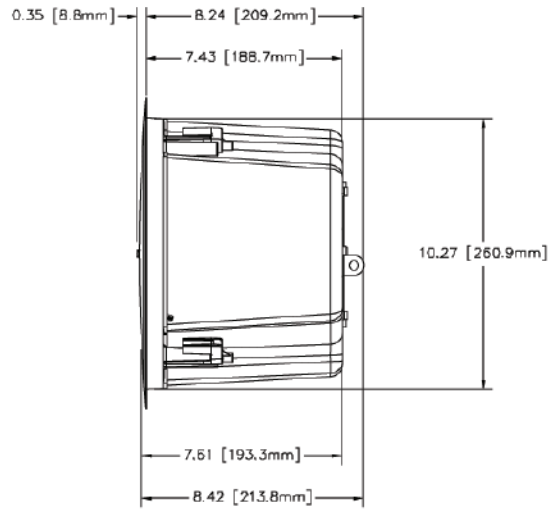
Connectors:

- Three-terminal barrier strip with a pre-wired ceramic connector

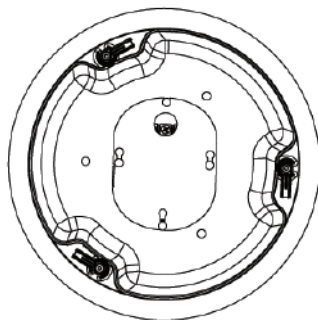
Mechanical diagrams:



Front View



Side View



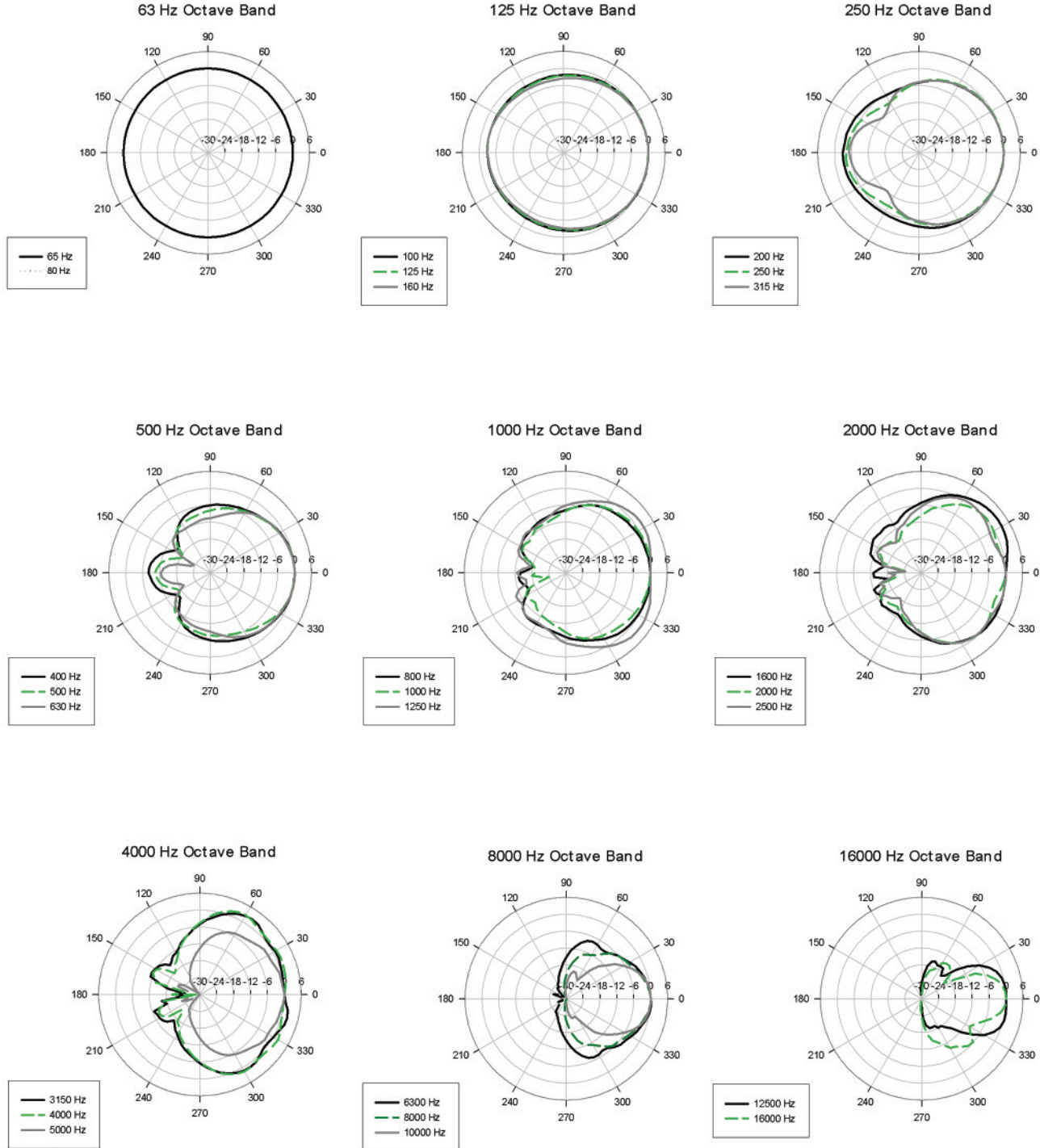
Rear View

FreeSpace® DS 100F Loudspeaker



Polar Plots 1/3 Octave Horizontal

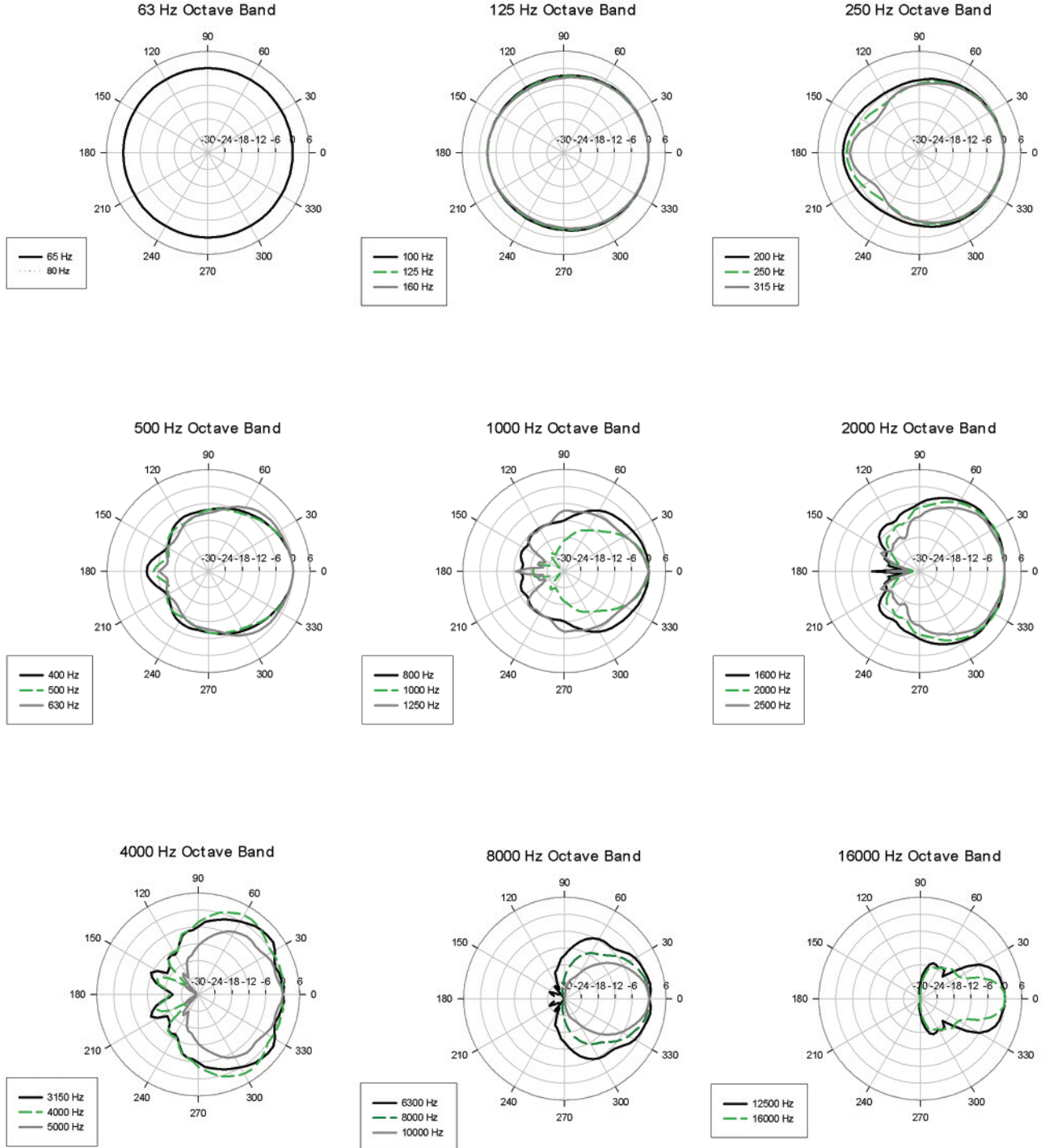
TECHNICAL DATA SHEET



FreeSpace® DS 100F Loudspeaker



Polar Plots 1/3 Octave Vertical



FreeSpace® DS 100F Loudspeaker



Design Recommendations

When creating a design that uses the FreeSpace® DS 100F loudspeaker, you should consider the following:

- Recommended mounting height for the FreeSpace DS 100F loudspeaker is between 12 and 32ft (3.6 and 10m).
- Maximum SPL for a typical application is between 89 and 103 dB-SPL.
- Always add 25% headroom to your amplifier to accommodate various types of program material.

Coverage requirements vary for each application, and the loudspeaker spacing will vary based on mounting height and listener height. Use the following two steps to calculate the required loudspeaker spacing distance for your application.

<p>1 Calculate the loudspeaker throw distance.</p>	<p>2 Calculate the loudspeaker spacing distance by multiplying the loudspeaker throw distance by the desired coverage multiplier.</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th>Coverage</th> <th>Multiplier</th> </tr> </thead> <tbody> <tr> <td>Premium</td> <td>2.0</td> </tr> <tr> <td>Standard</td> <td>2.5</td> </tr> <tr> <td>Minimum</td> <td>3.0</td> </tr> </tbody> </table> <p style="text-align: center;">Loudspeaker Throw Distance x Coverage Multiplier = Spacing</p> <div style="text-align: center; margin-top: 20px;"> $\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ <p>(Loudspeaker Throw Distance) (Coverage Multiplier) (Spacing)</p> </div>	Coverage	Multiplier	Premium	2.0	Standard	2.5	Minimum	3.0
Coverage	Multiplier								
Premium	2.0								
Standard	2.5								
Minimum	3.0								

Total system sound pressure level varies based on the mounting height, loudspeaker tap and room acoustics. For typical applications, use the chart below to determine the total sound pressure level that will be achieved using the DS 100F loudspeaker.

		DS 100F										
Mount Height	m	3.6	4.2	4.8	5.5	6.1	6.7	7.3	8.0	10.0		
	ft	12	14	16	18	20	22	24	26	32		
TAP (W)	12.5*	94	91	90	88	87	86	85	84	81	dB-SPL	
	25	97	94	93	91	90	89	88	87	84		
	50	100	97	96	94	93	92	91	90	87		
	100	103	100	99	97	96	95	94	93	90		

*12.5-watt tap available only in 70V mode.

For more detailed information, refer to the FreeSpace DS 100F loudspeaker Design Guide.

FreeSpace® DS 100F Loudspeaker



Engineers' and Architects' Specifications

The loudspeaker shall be a 100-watt, ported loudspeaker system utilizing one 2.25" (57mm) mid-high frequency driver and a separate 5.25" (133mm) woofer. The loudspeaker shall be designed for installation in ceilings up to 30ft (10m) high. An optional pendant-mount accessory allows the loudspeaker to be hung from open ceilings.

The loudspeaker shall have a nominal rated impedance of 8 ohms and shall be wired in parallel with a line voltage matching (step-down) transformer with a level selector appropriate for various output taps. The loudspeaker input connections will allow for direct connection to either 70V, 100V or low-impedance amplifiers.

Exposed cosmetic surfaces of the loudspeaker shall be paintable, and the acoustically transparent grille component shall be formed of powder-coated steel.

Each loudspeaker shall have a bandwidth of 65 Hz – 16 kHz and a maximum acoustic output of 105 dB-SPL referenced to a full bandwidth pink noise input at 1 meter at the loudspeaker's rated power. The input connection shall consist of a three-position barrier connector with a pre-wired ceramic connector. The loudspeaker shall be plenum-rated for use in air handling spaces. The loudspeaker shall meet numerous standards for combination music and evacuation systems around the world.

Power settings available shall be: 12.5W, 25W, 50W, 100W @ 70V; 25W, 50W, 100W @ 100V; and 100W @ 8Ω (when referenced to IEC noise for 100 hours). The nominal dispersion shall be 160° conical coverage pattern at -6 dB (average 1 – 4 kHz).

The loudspeaker shall be the Bose® FreeSpace® DS 100F loudspeaker.

Safety and Regulatory Compliance

The FreeSpace DS 100F loudspeaker has passed extensive testing and complies with the following specifications and uses:

Listed to ANSI/UL 1480-2005

- Fire Protective Signaling Use – UL Category UUMW, File Number S 3241. Control Number 42S9. Not for use with DC-supervised systems.
- General-purpose use – UL Category UEAY, File Number S 5591 Control Number 3N89.
- The DS 100F loudspeaker is suitable for use indoors in damp locations.
- Suitable for installation using Class 1, Class 2 or Class 3 wiring methods in accordance with NFPA 70, *National Electric Code*, 2002, Article 640.
- Suitable for use with fire alarm circuit wiring methods in accordance with NFPA 70, *National Electric Code*, 2002, Article 760.
- Suitable for use in air handling (plenum) spaces.
- UL-2043, Fire Test and Visible Smoke Release for Discrete Products and their Accessories Installed in Air Handling Spaces.
- NFPA 70, *National Electric Code*, 2002, Article 300-22 (c).
- NFPA 90-A, 2002, *Installation of Air Conditioning and Ventilation Systems*, Paragraph 4.3.10.2.6.5.
- EMC Directive 89/336/EEC and Article 10 (1) of the directive, EN50081-1 and EN50082-1 as signified by the CE mark.

The FreeSpace DS 100F loudspeaker also has been designed to the requirements defined in the following European regulatory specification for combination systems:

- British Standard Code of Practice BS 5839, Part 8.
- Tested to IEC60268-5.

Limited Warranty

The FreeSpace DS 100F loudspeaker is covered by a five-year transferable limited warranty.

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Product Codes

FreeSpace DS 100F loudspeaker-Blk	PC 040804
FreeSpace DS 100F loudspeaker-Wht	PC 040805

Accessories

DS 100F tile bridge (6 pack)	PC 041864
DS 100F rough-in pan (6 pack)	PC 041993
DS 100F pendant-mounting kit-Blk	PC 041862
DS 100F pendant-mounting kit-Wht	PC 041863

Replacement Parts

Grille-Blk	PN 299570
Grille-Wht	PN 299571
2.25" (57mm) driver w/gasket	PN 299562
5.25" (133mm) woofer w/gasket	PN 299563

How our Loudspeakers are Measured

1. Power handling

Full-bandwidth pink noise, meeting the IEC Standard #268-5, is applied to the loudspeaker and amplified to a level at the loudspeaker terminals corresponding to the power handling of the loudspeaker. The loudspeaker must show no visible damage or measurable loss of performance after 100 hours of continuous testing.

2. Sensitivity

Full-bandwidth pink noise is applied to the loudspeaker with its active equalization curve and amplified to a level at the loudspeaker terminals corresponding to 1 watt, as referenced to the nominal impedance. The average sound pressure level (dB-SPL) is measured at 1 meter from the speaker in an anechoic environment.

3. Maximum SPL

Full-bandwidth pink noise is applied to the loudspeaker with its active equalization curve and amplified to a level at the loudspeaker terminals corresponding to the long-term rated power handling of the speaker. The average sound pressure level (dB-SPL) is measured at 1 meter from the speaker in an anechoic environment.

4. Frequency range

Sine waves are injected into the loudspeaker, and the level is adjusted to 1 watt, as referenced to the nominal impedance, and the level measured at 1 meter. Resulting graph is smoothed by 0.05 octave-band.