

# FreeSpace® DS 16F VA loudspeaker



## Key Features

- **Full-range** loudspeaker with a single 2.25" (57 mm) driver in a ported enclosure to deliver a 140° conical coverage pattern and clear, intelligible music and speech reproduction for flush-ceiling or pendant-mount applications
- **Integrated multi-tap transformer** with innovative thumb wheel adjustment for easy-to-change tap setting from underneath the loudspeaker grille
- **Shared voicing** across entire FreeSpace DS product family enables DS 16, DS 40 and DS 100 loudspeakers to be integrated on the same system and maintain consistent tonal quality
- **Can be combined** with either surface- or flush-mount FreeSpace 3 Acoustimass® module for extended bass response
- **Supported** by a suite of accessories, including ceiling-mount bracket, adjustable tile bridge, pendant-mount kit and square grille



TECHNICAL DATA SHEET

## Product Overview

The Bose® FreeSpace DS 16F VA is the entry-level member of the DS loudspeaker family. It is a high-performance, full-range, flush-mount loudspeaker designed for background music and speech reproduction in a wide range of installed applications. The DS 16F VA features a wide, even 140° conical pattern and frequency range down to 80 Hz.

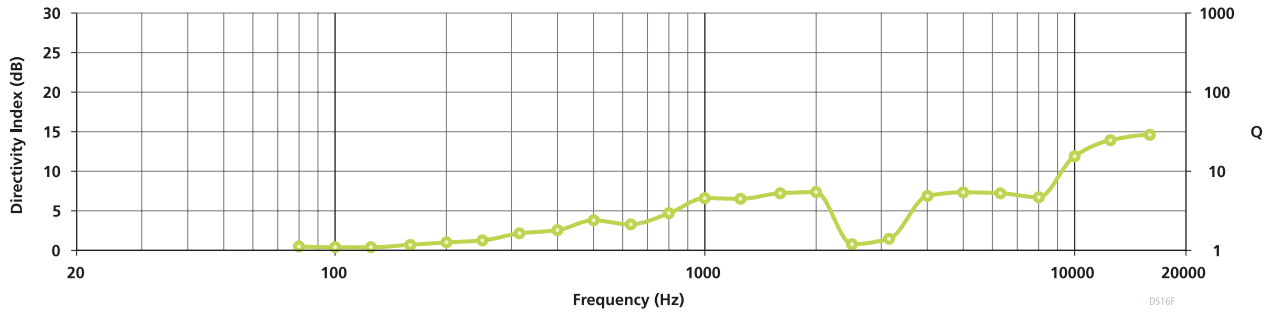
## Technical Specifications

System Performance	
Frequency Response (+/-3 dB) <sup>1</sup>	95 Hz - 17 kHz
Frequency Range (-10 dB) <sup>1</sup>	80 Hz - 19 kHz
Nominal Dispersion	140° conical
Recommended High-Pass Filter	80 Hz high-pass filter
Loudspeaker EQ	Recommended
Long-Term Power Handling <sup>2</sup>	16 W (64 W peak)
Sensitivity (SPL / 1 W @ 1 m) <sup>3</sup>	84 dB SPL
Maximum SPL @ 1 m <sup>4</sup>	96 dB SPL (102 dB SPL peak)
Nominal Impedance	8 Ω (transformer bypassed)
Transformer Taps (70/100 V)	70 V: 1 W, 2 W, 4 W, 8 W, 16 W 100 V: 2 W, 4 W, 8 W, 16 W
Transducers	
Driver Compliment	2.25" (57 mm) full-range driver
Physical	
Enclosure	PC/ABS
Grille	Powder-coated steel grille
Environmental	Indoor use only (EN 54-24 type A)
Connectors	Three-terminal barrier strip with a pre-wired ceramic connector Wire gauge: 18 AWG (0.8 mm) to 14 AWG (2.5 mm)
Suspension / Mounting	Three integrated quick-install mounting arms. Three mounting points at the rear of the enclosure for use with optional accessory pendant mount kit. Safety cable attachment: .35" (8.9 mm) diameter hole on junction box
Dimensions	Outer flange diameter: 9.4" (239 mm) Depth: 6.9" (176 mm) Ceiling hole diameter: 8.0" (203 mm)
Ceiling Thickness (Maximum)	1.5" (38 mm)
Net Weight	4.4 lb (1.9 kg)
Shipping Weight	6.0 lb (2.7 kg)
Product Code	
Black	352419-0110
White	352419-0210

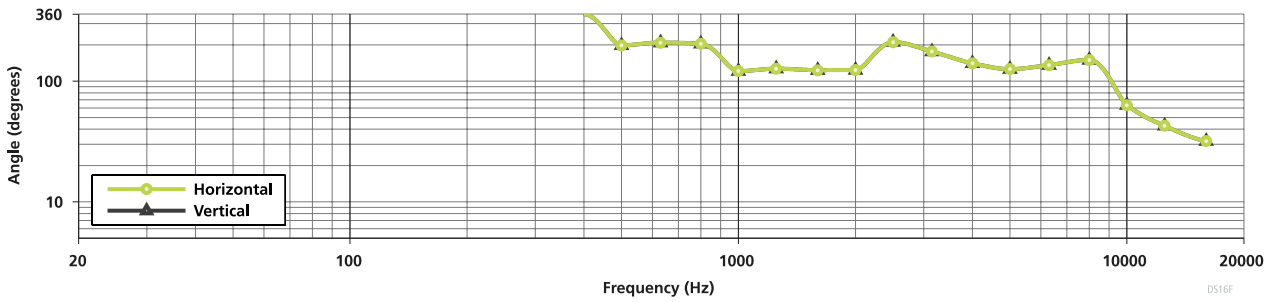
### Footnotes:

- <sup>1</sup> Frequency response and range measured on-axis with recommended active EQ in an anechoic environment.
- <sup>2</sup> Power handling tested using pink noise filtered to meet IEC 268-5, 6 dB crest factor, 100 hours, with recommended EQ.
- <sup>3</sup> Sensitivity measured in free field (no boundary-loading gain) with recommended active EQ, referenced to 1W/1m.
- <sup>4</sup> Maximum SPL calculated from sensitivity and power handling specifications, exclusive of power compression.

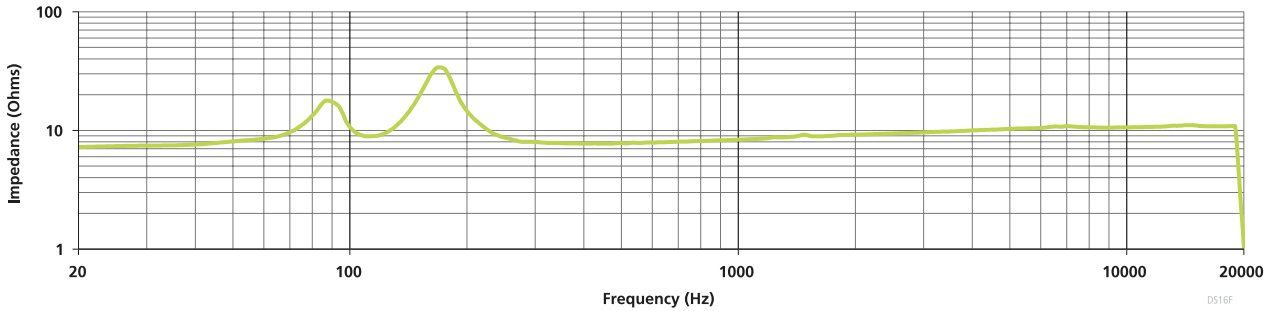
## Directivity Index and Q



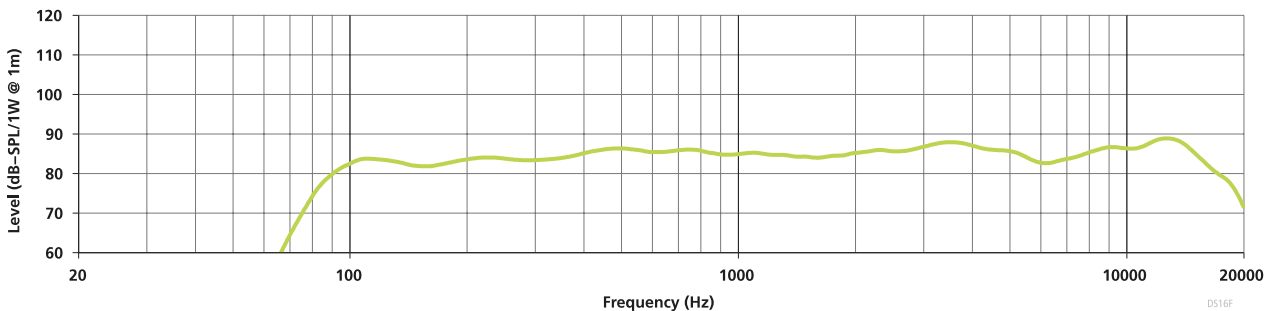
## Beamwidth



## Impedance



## On-Axis Response



## Tap Chart

FreeSpace DS 16F VA Tap Chart								
Mount	m	2.4	3.0	3.6	4.2	4.8	5.5	6.1
Height	ft	8	10	12	14	16	18	20
T A P	1	87	84	82	79	78	76	75
	2	90	87	85	82	81	79	78
	4	93	90	88	85	84	82	81
	8	96	94	91	88	87	85	84
	16	99	97	94	91	90	88	87

dB<sub>SPL</sub>

Note: 1 Watt tap is not available for 100V operation

Additional Product Specifications per EN54.24 (2008)

Environmental Type: A (Indoor Applications)

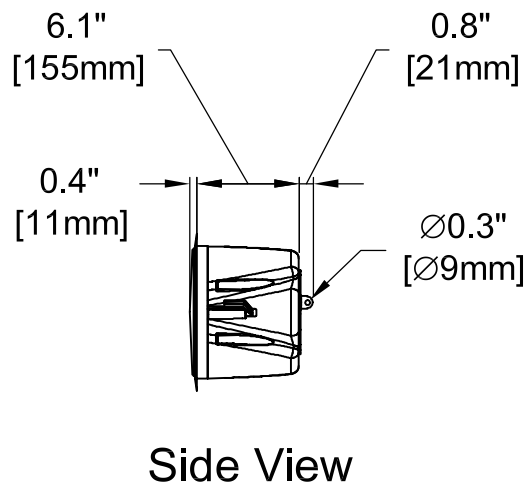
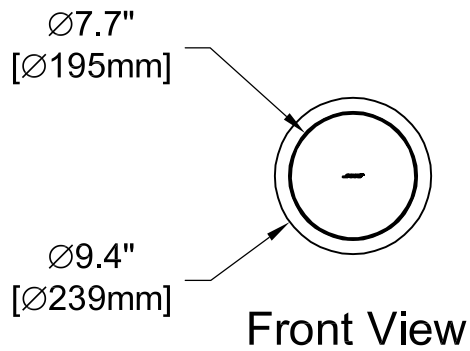
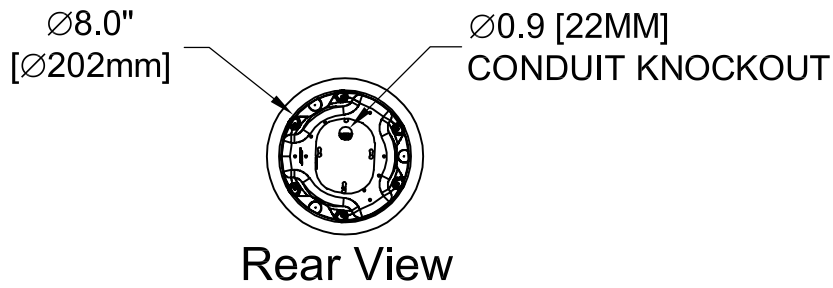
EN 54-24 testing done without EQ applied

<b>Rated impedance for each tapping</b>	70V:	2662.0 Ω (1 W)	1897.7 Ω (2 W)	1097.7 Ω (4 W)	647.6 Ω (8 W)	355.8 Ω (16 W)
	100V:	-	2662.0 Ω (1 W)	1897.7 Ω (4 W)	1097.7 Ω (8 W)	647.6 Ω (16 W)
<b>Sensitivity</b>	72.6 dB SPL @ 1 W, 4 m					
<b>Maximum Sound Pressure (at highest power setting)</b>	83.2 dB SPL @ 16 W, 4 m					
<b>Coverage Angle (-6 dB)</b>	H:	500 Hz = 181°	1 kHz = 172°	2 kHz = 174°	4 kHz = 161°	
	V:	500 Hz = 184°	1 kHz = 187°	2 kHz = 173°	4 kHz = 166°	
<b>Reference Axis, Reference Plane, &amp; Horizontal Plane</b>	The specifications data was measured in an anechoic chamber, free-field on standard EN S4-24 baffle: Reference axis: Axis is on the center of grille surface and perpendicular to the grille surface Reference plane: Plane is on the grille surface and perpendicular to the reference axis Horizontal plane: Plane is containing the reference axis and perpendicular to the reference plane					
<b>Rated Noise Power</b>	16 W					

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## Mechanical Diagrams



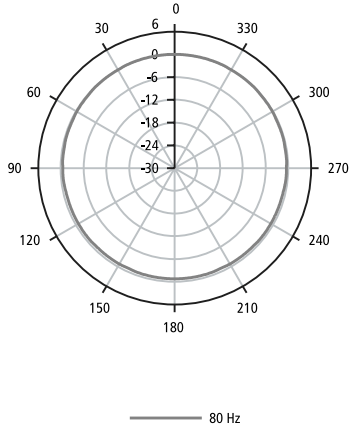
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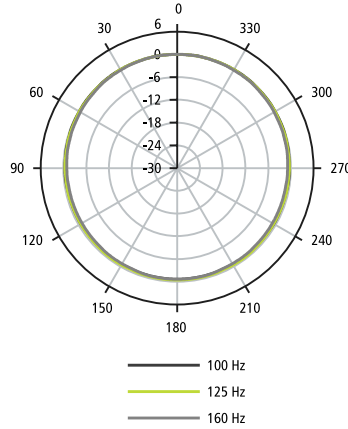
## Horizontal Plots

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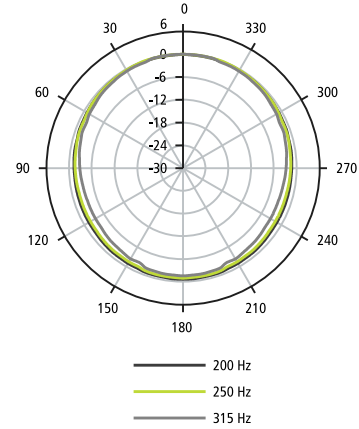
63 Hz Octave Band



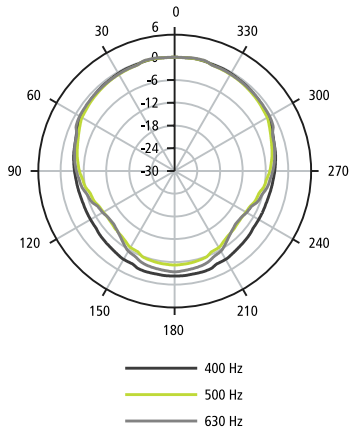
125 Hz Octave Band



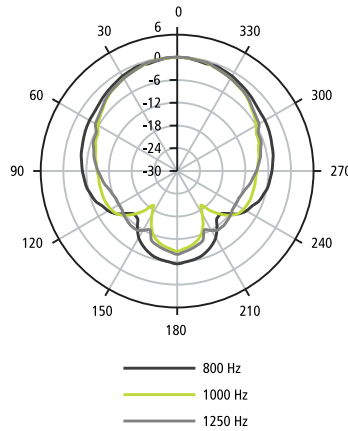
250 Hz Octave Band



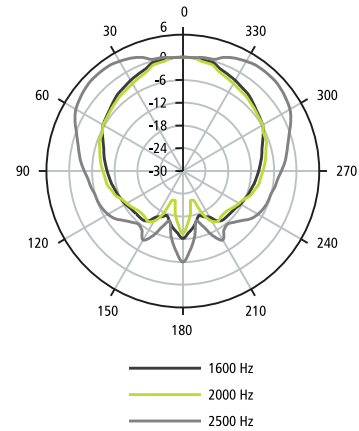
500 Hz Octave Band



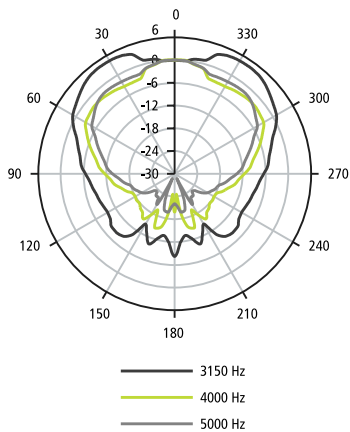
1000 Hz Octave Band



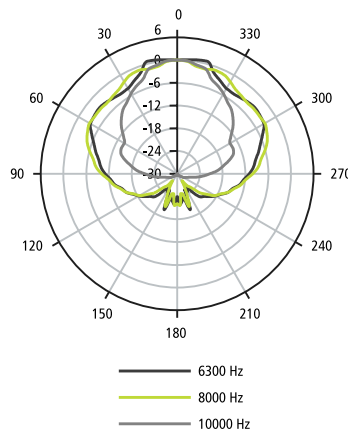
2000 Hz Octave Band



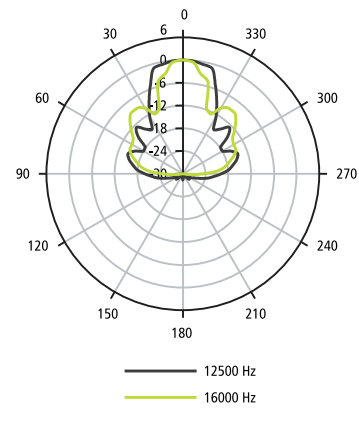
4000 Hz Octave Band



8000 Hz Octave Band



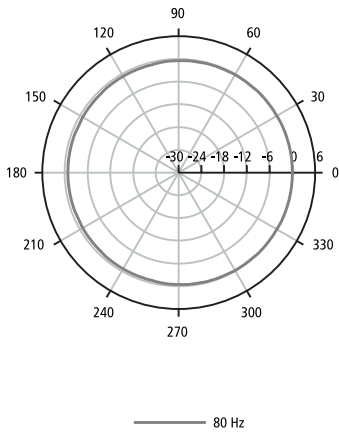
16000 Hz Octave Band



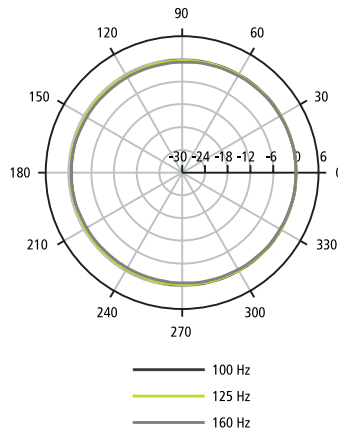
DS16F

## Vertical Plots

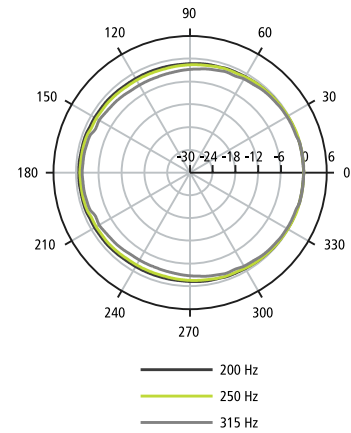
63 Hz Octave Band



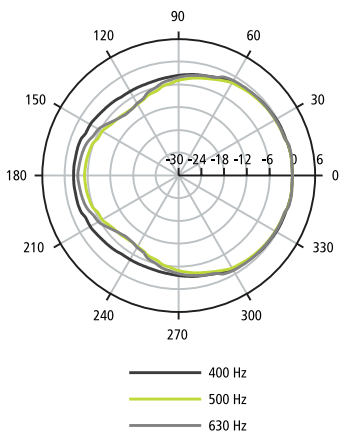
125 Hz Octave Band



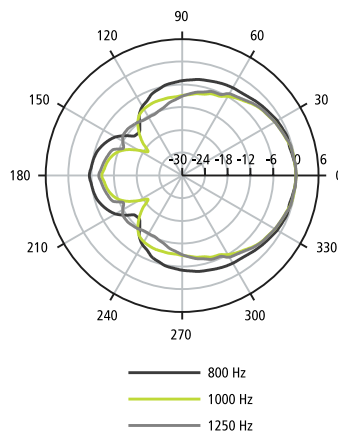
250 Hz Octave Band



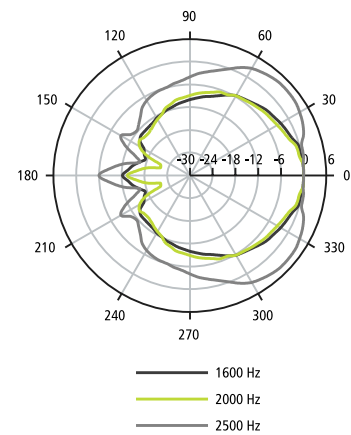
500 Hz Octave Band



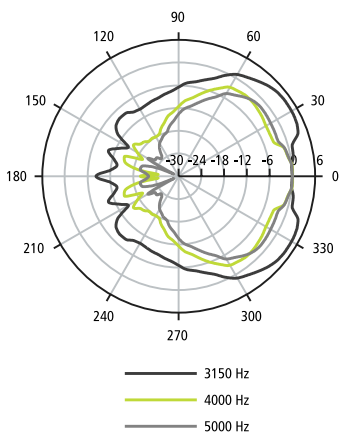
1000 Hz Octave Band



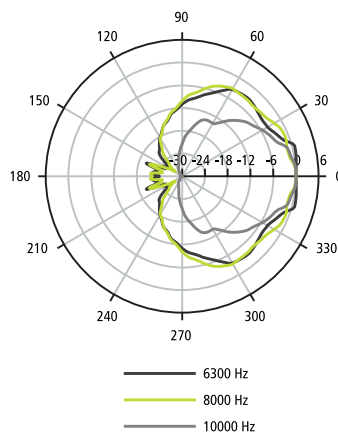
2000 Hz Octave Band



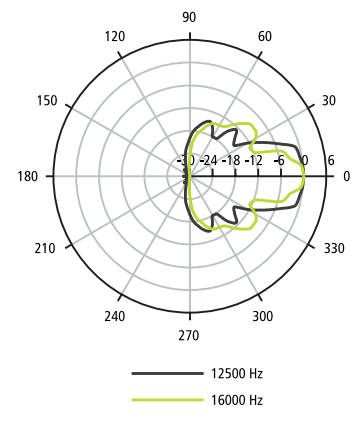
4000 Hz Octave Band



8000 Hz Octave Band



16000 Hz Octave Band



DS16F

# FreeSpace® DS 16F VA loudspeaker



## Architects' and Engineers' Specifications

The loudspeaker will be a 16 watt, ported loudspeaker system utilizing one 2.25" (57 mm) full-range driver. The loudspeaker shall be designed for installation in ceilings up to 20 ft (6.1 m) 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 selector switch appropriate for various output taps. The loudspeaker input connections will allow for direct connection to 70 volt, 100 volt 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 95 Hz – 17 kHz and a maximum continuous acoustic output of 96 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-terminal barrier strip with a pre-wired ceramic connector. The loudspeaker shall meet numerous standards for combination music and evacuation systems around the world.

Power settings available shall be: 1, 2, 4, 8, and 16 watts at 70 volts; 2, 4, 8, and 16 watts at 100 volts; and 16 watts at 8 ohms (when referenced to IEC noise for 100 hours). The nominal dispersion shall be 140° conical coverage pattern at -6 dB (average 1 – 4 kHz).

The loudspeaker shall be the Bose® FreeSpace® DS 16F VA loudspeaker.

## Safety and Regulatory Compliance

The FreeSpace® DS 16F VA loudspeaker has passed extensive testing and complies with the following specifications and uses:

Certified to European Standard EN 54-24: 2008  
*Components of Voice Alarm Systems-Loudspeakers*

Environmental Rating: Type A (indoor applications)

The DS 16F VA also has been designed to the requirements defined in the following European regulatory specifications for combination systems:

British Standard Code of Practice BS 5839, Part 8 (with PC-16)

Tested to IEC60268-5

## Wire Gauge

The FreeSpace® DS16F VA loudspeaker is designed to work with 18 AWG (0.8 mm<sup>2</sup>) to 14 AWG (2.5 mm<sup>2</sup>) size wire only.

This product conforms to all applicable EU directive requirements. The complete declaration of conformity can be found at [www.bose.com/compliance](http://www.bose.com/compliance)



ID # of the Certified Body: 0560

Year of the CE Mark: 2012

EC Certificate of Conformity #: **0560-CPD-12219003/AA/00**