

# FreeSpace® DS 16F 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 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 features a wide, even 140° conical pattern and frequency range down to 80 Hz.

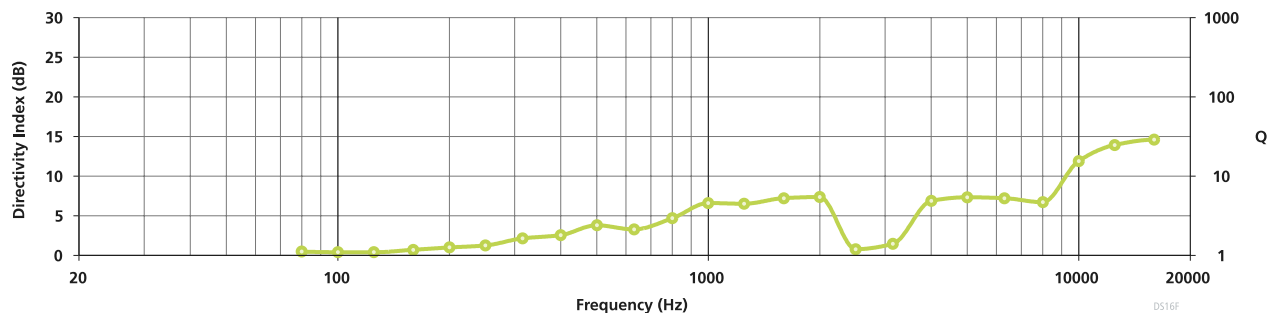
## Technical Specifications

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 Complement	2.25" (57 mm) full-range driver
Physical	
Enclosure	PC/ABS
Grille	Powder-coated steel grille
Environmental	Indoor use only
Connectors	Three-terminal barrier strip. Optional accessory available for use when ceramic connector and thermal fuse are required. Wire gauge: 18 AWG (0.8 mm) to 14 AWG (2.0 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	043053
White	043054

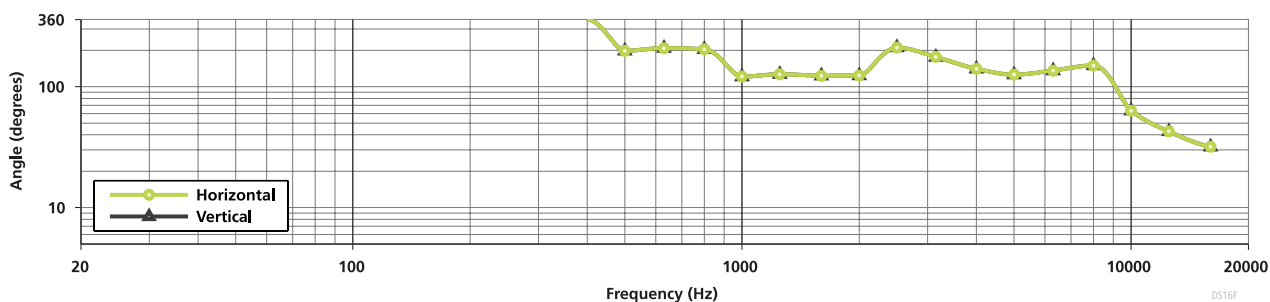
### Footnotes:

- <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.

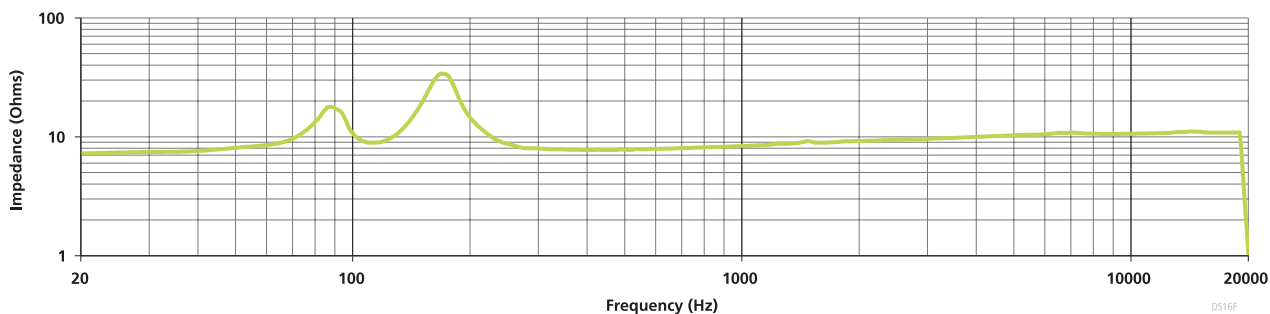
## Directivity Index and Q



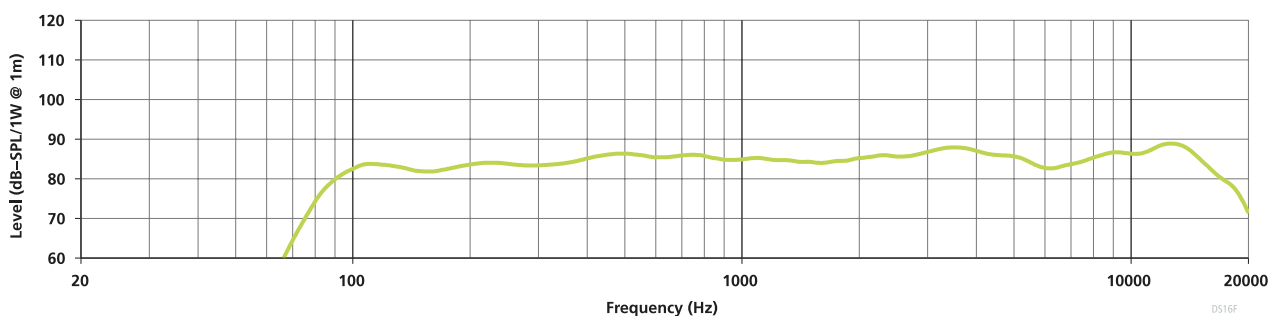
## Beamwidth



## Impedance



## On-Axis Response



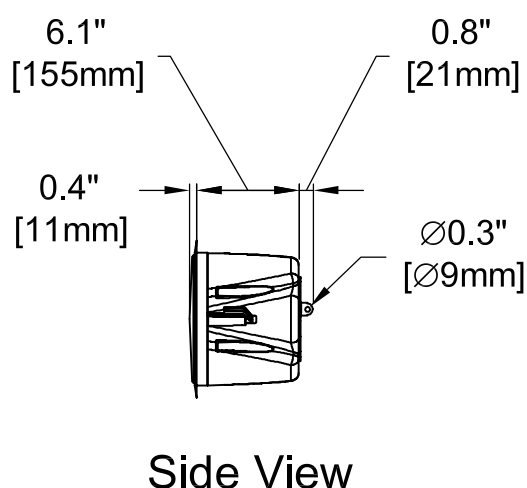
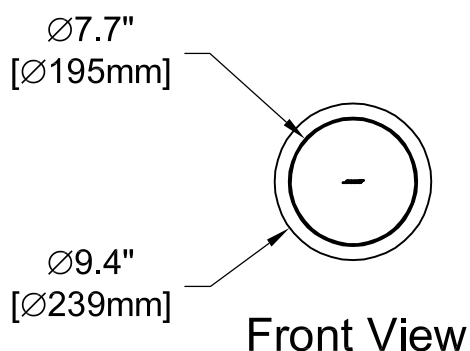
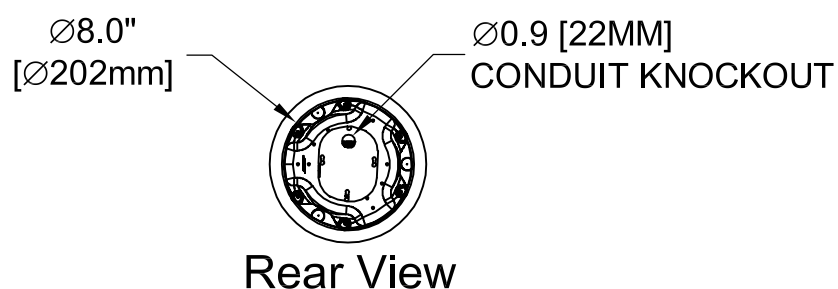
## Tap Chart

FreeSpace DS 16F 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.

## Mechanical Diagrams



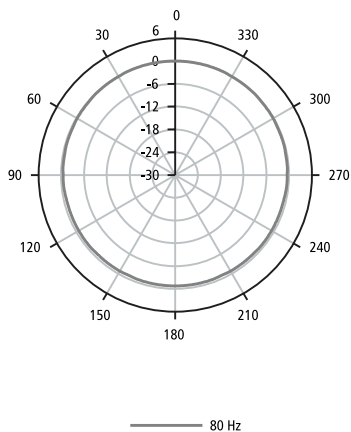
# FreeSpace® DS 16F loudspeaker



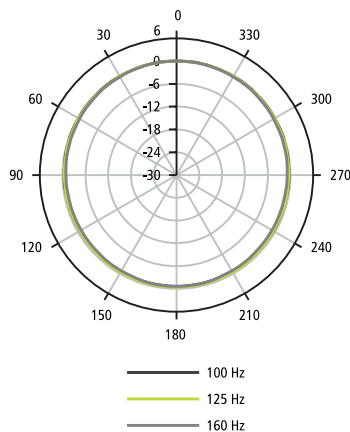
## Horizontal Plots

## TECHNICAL DATA SHEET

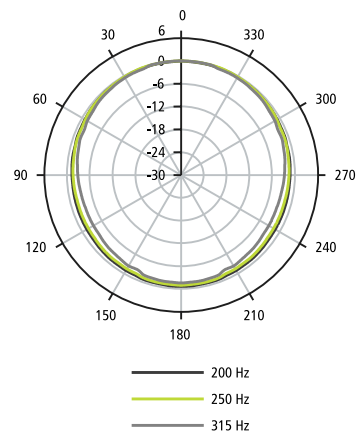
63 Hz Octave Band



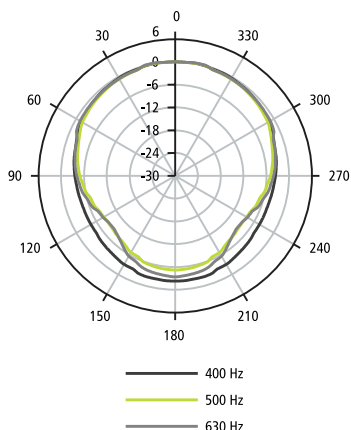
125 Hz Octave Band



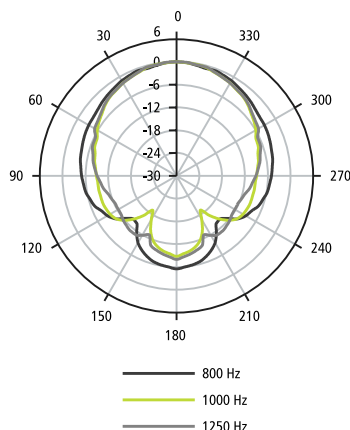
250 Hz Octave Band



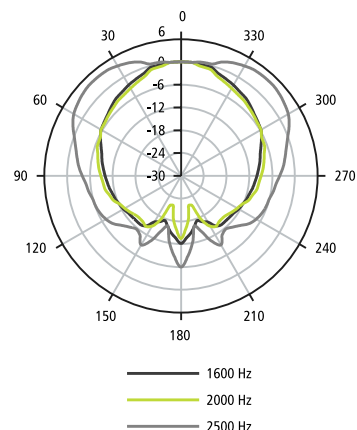
500 Hz Octave Band



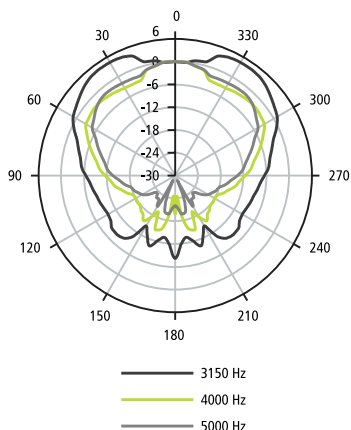
1000 Hz Octave Band



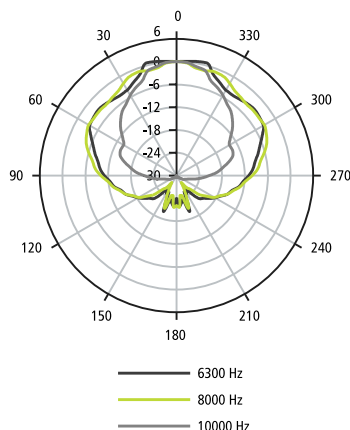
2000 Hz Octave Band



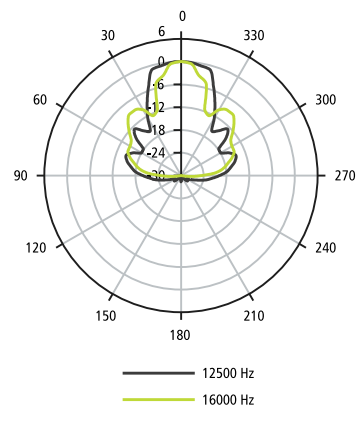
4000 Hz Octave Band



8000 Hz Octave Band



16000 Hz Octave Band



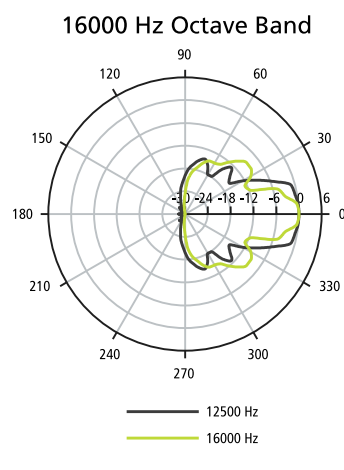
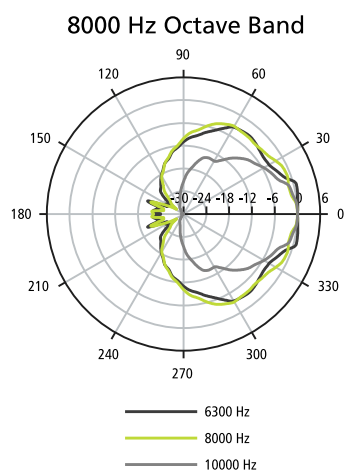
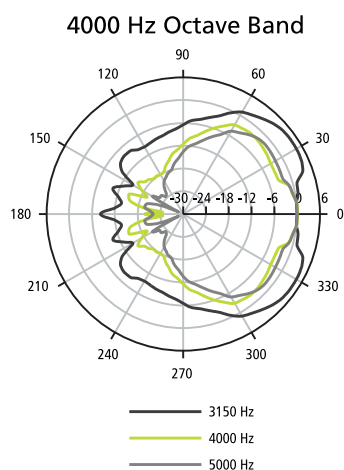
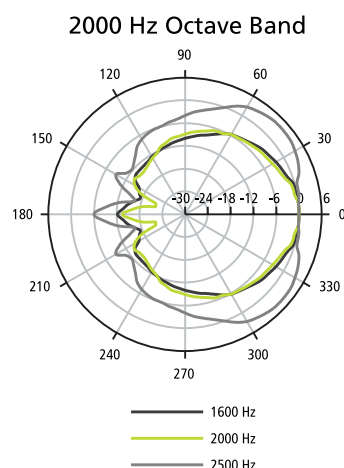
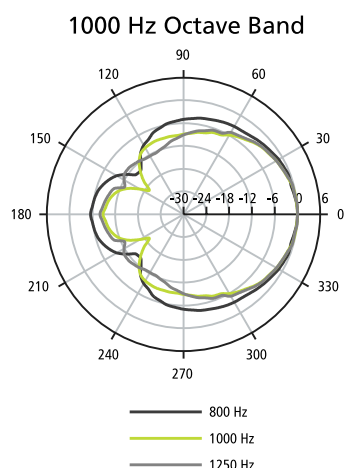
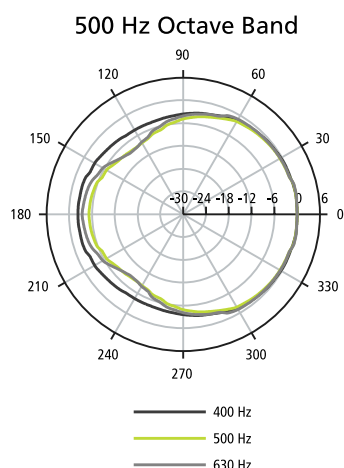
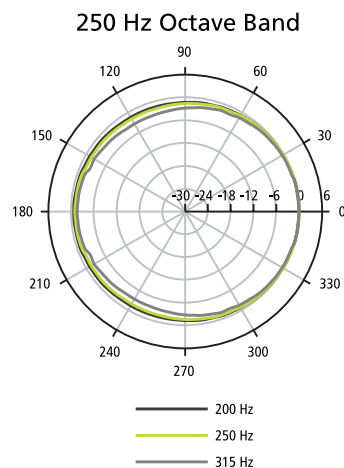
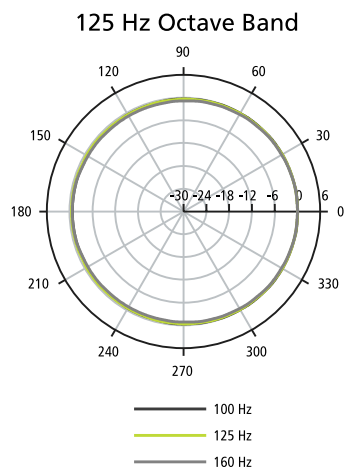
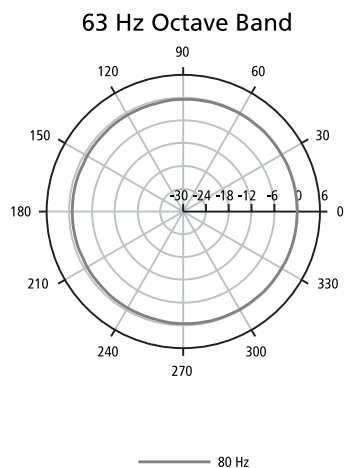
DS16F

# FreeSpace® DS 16F loudspeaker



## Vertical Plots

TECHNICAL DATA SHEET



DS16F

# FreeSpace® DS 16F 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. 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 loudspeaker.

## Safety and Regulatory Compliance

The FreeSpace® DS 16F 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
- 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 with a model PC-16 Plenum Cover installed
- 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 DS 16F 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