

# FreeSpace® DS 40F loudspeaker



## Key Features

- **Full-range** loudspeaker with a single 4.5" (114 mm) driver in a ported enclosure to deliver a 125° 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
- **Shortcan design** allows installation in shallower ceilings with minimum depth of 6.4" (163 mm)
- **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
- **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 40F is the most versatile member of the DS loudspeaker family. It is a high-performance, full-range, flush-mount loudspeaker designed for foreground and background music and speech reproduction in a wide range of installed applications. The DS 40F features high output and 125° conical pattern with a frequency range down to 70 Hz.

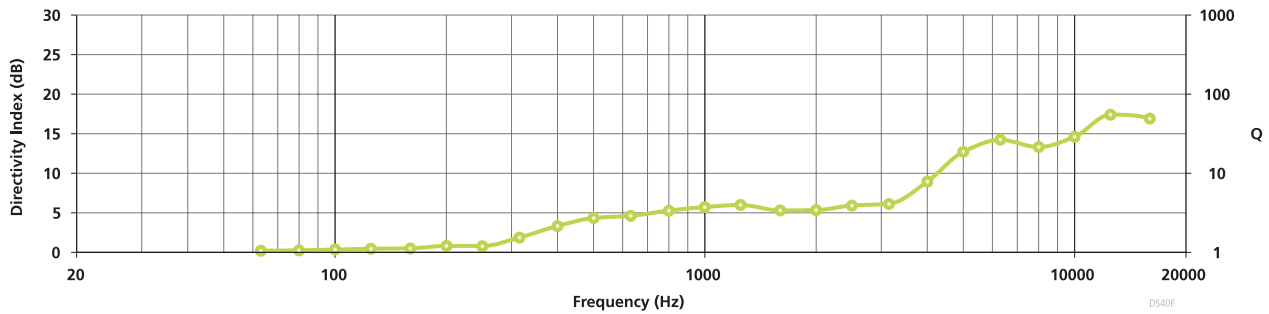
## Technical Specifications

System Performance	
Frequency Response (+/-3 dB) <sup>1</sup>	80 Hz - 17 kHz
Frequency Range (-10 dB) <sup>1</sup>	70 Hz - 19 kHz
Nominal Dispersion	125° conical
Recommended High-Pass Filter	70 Hz high-pass filter
Loudspeaker EQ	Recommended
Overload Protection	PTC/Resistor
Long Term Power Handling <sup>2</sup>	40 W (160 W peak)
Sensitivity (SPL / 1 W @ 1 m) <sup>3</sup>	87 dB SPL
Maximum SPL @ 1 m <sup>4</sup>	103 dB SPL (109 dB SPL peak)
Nominal Impedance	8 Ω (transformer bypassed)
Transformer Taps (70/100 V)	70 V: 2.5 W, 5 W, 10 W, 20 W, 40 W 100 V: 5 W, 10 W, 20 W, 40 W
Transducers	
Driver Compliment	4.5" (114 mm) full-range driver
Physical	
Enclosure	Polypropylene (front baffle), powder-coated steel (rear enclosure)
Grille	Powder-coated steel grille
Environmental	Indoor use only
Connectors	Three-terminal barrier strip; two-terminal barrier strip (8 ohm variant). 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: 11.8" (300 mm) Depth: 6.0" (153 mm) Ceiling hole diameter: 10.5" (267 mm)
Ceiling Thickness (Maximum)	2.5" (64 mm)
Net Weight	8.3 lb (3.7 kg) - with transformer 6.3 lb (2.8 kg) - 8 Ω variant
Shipping Weight	11.0 lb (5.0 kg) - with transformer 9.0 lb (4.1 kg) - 8 Ω variant
Product Code	
Black	321278-0130 - with transformer 321278-0140 - 8 Ω variant
White	321278-0230 - with transformer 321278-0240 - 8 Ω variant

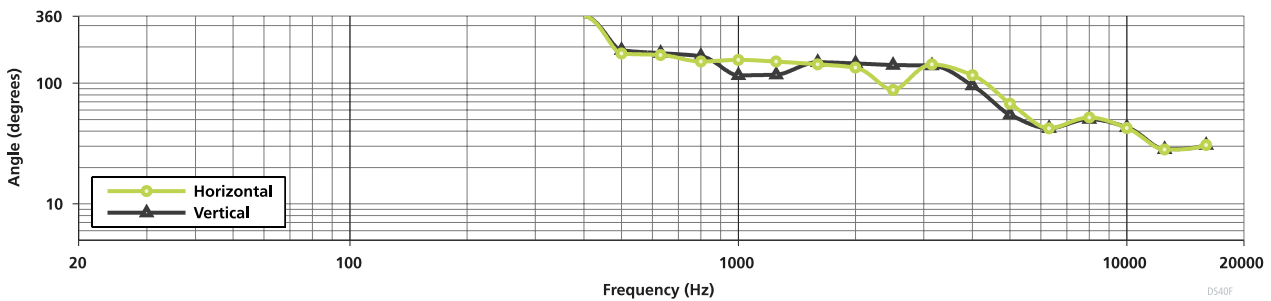
### Footnotes:

- <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.

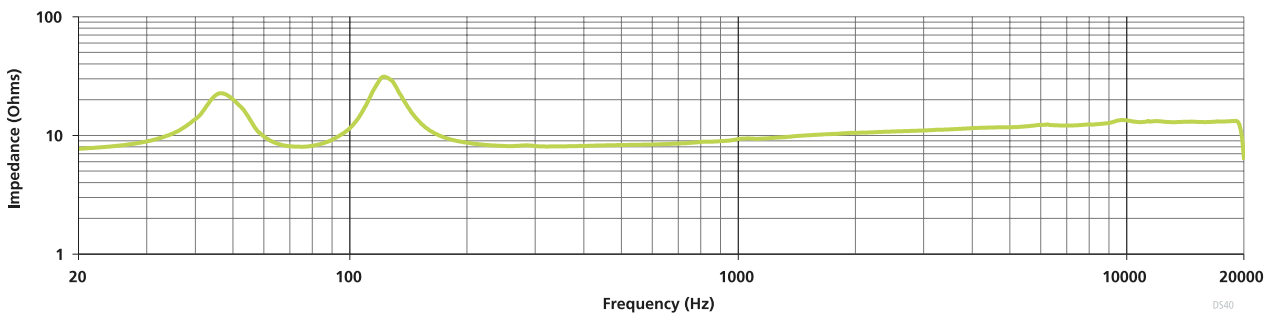
## Directivity Index and Q



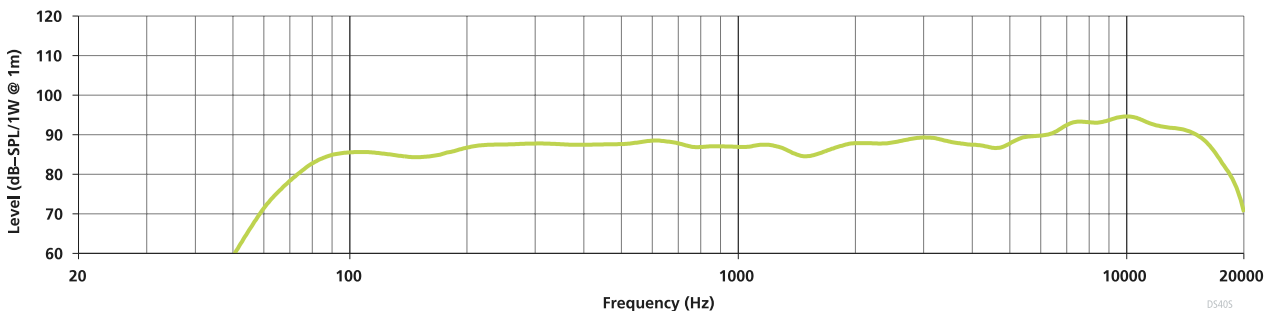
## Beamwidth



## Impedance



## On-Axis Response



# FreeSpace® DS 40F loudspeaker

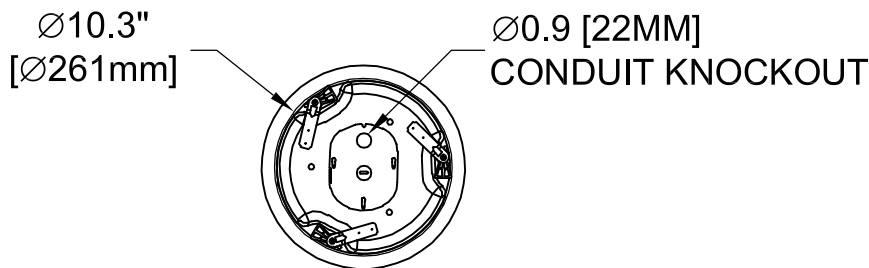


## Tap Chart

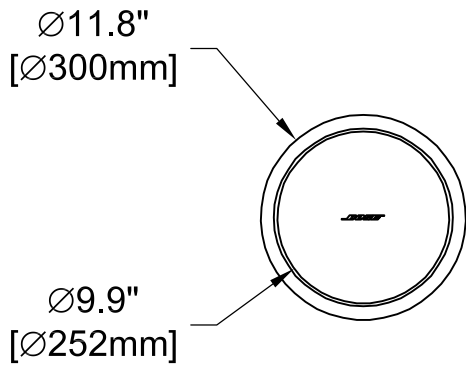
DS 40F												
Mount	m	2.4	3.0	3.6	4.2	4.8	5.5	6.1	6.7	7.3	8.0	
Height	ft	8	10	12	14	16	18	20	22	24	26	
T	2.5	94	91	89	86	85	83	82	81	80	79	dB <sub>SPL</sub>
	5	97	94	92	89	88	86	85	84	83	82	
A	10	100	97	95	92	91	89	88	87	86	85	
P	20	103	100	98	95	94	92	91	90	89	88	
	40	106	103	101	98	97	95	94	93	92	91	

**Note:** 2.5 Watt tap is not available for 100V operation.

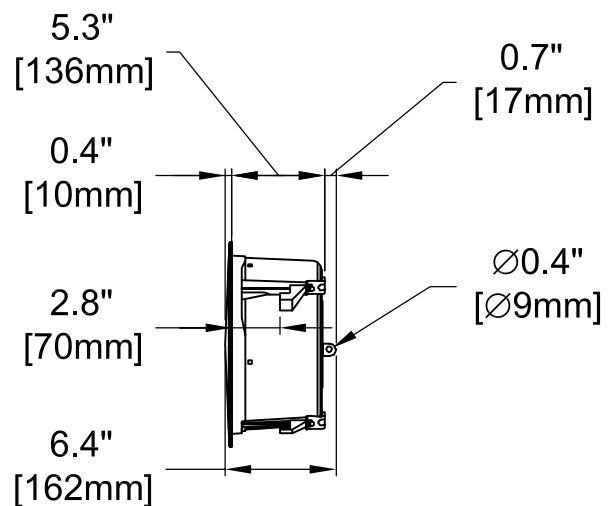
## Mechanical Diagrams



Back View



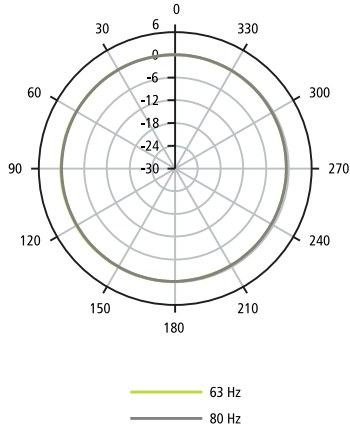
Front View



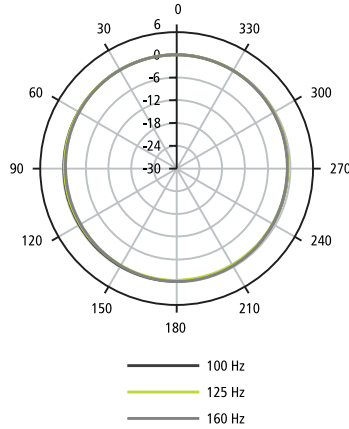
Side View

## Horizontal Plots

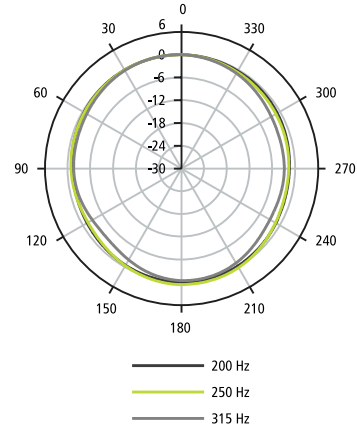
63 Hz Octave Band



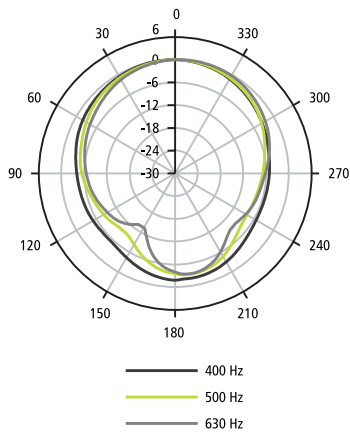
125 Hz Octave Band



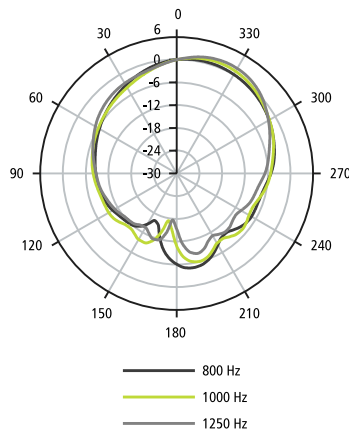
250 Hz Octave Band



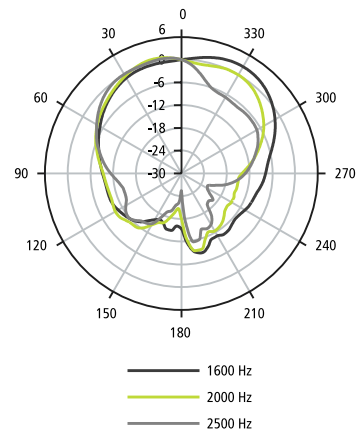
500 Hz Octave Band



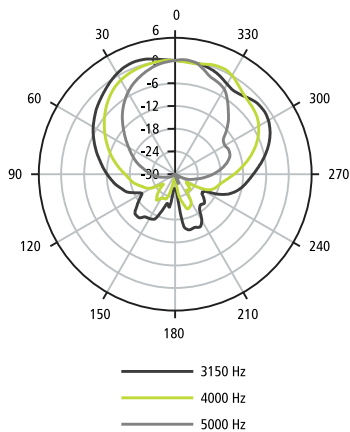
1000 Hz Octave Band



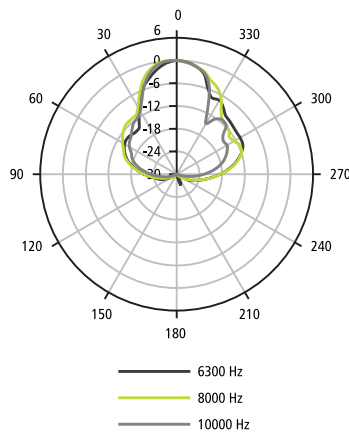
2000 Hz Octave Band



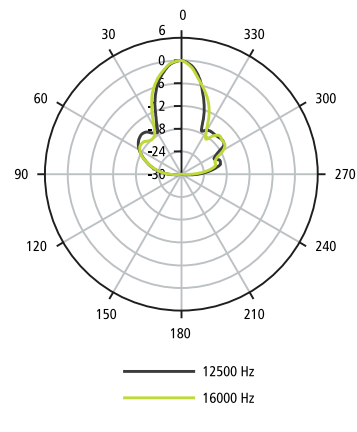
4000 Hz Octave Band



8000 Hz Octave Band

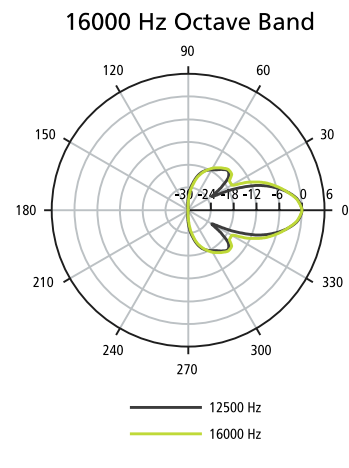
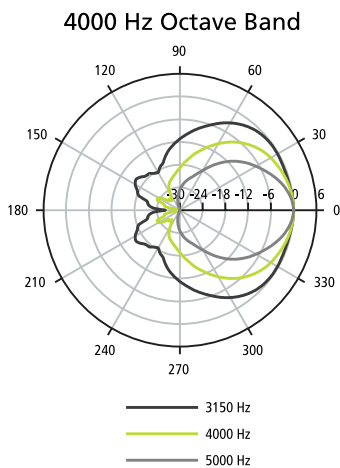
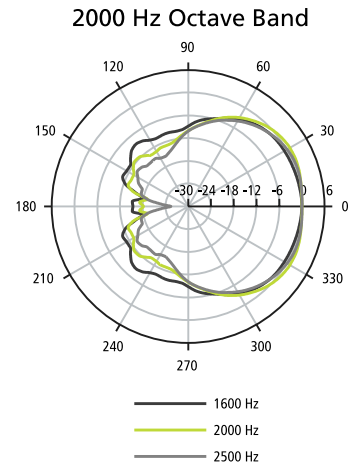
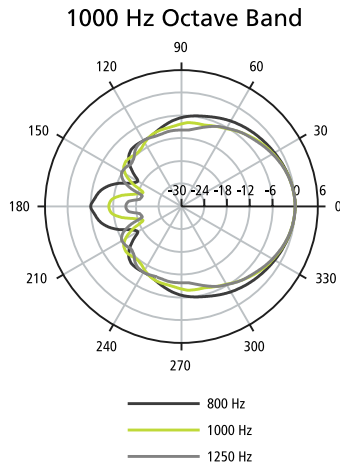
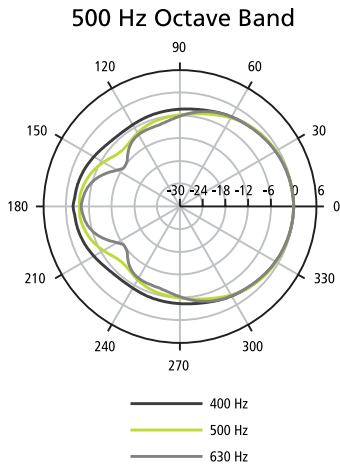
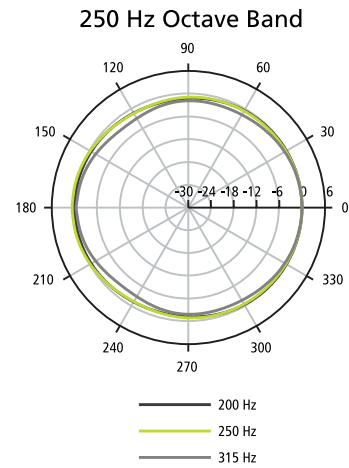
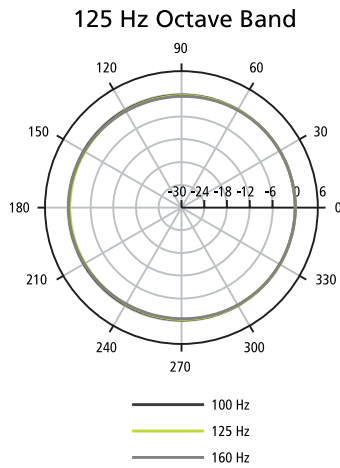
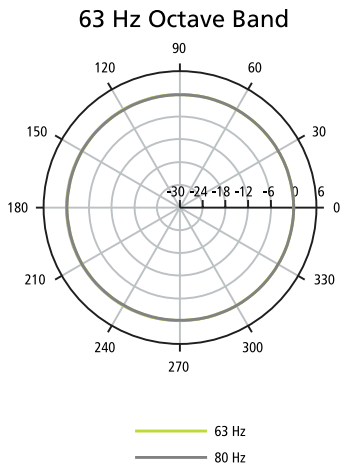


16000 Hz Octave Band



DS40F

## Vertical Plots



DS40F

# FreeSpace® DS 40F loudspeaker



## Architects' and Engineers' Specifications

The loudspeaker shall be a 40 watt, ported loudspeaker system utilizing one 4.5" (114 mm) full-range HVC (Helical Voice Coil) driver. The loudspeaker shall be designed for installation in ceilings up to 26 ft (8 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 level selector appropriate for various output taps. The loudspeaker input connections will allow for direct connection to 70 volt, 100 volt or low-impedance amplifiers. An 8 ohm variant of the loudspeaker shall be available without a transformer for low-impedance applications only.

The loudspeaker shall have a protection circuit to protect the product from occasionally being overdriven. Each loudspeaker shall have a bandwidth of 80 Hz – 17 kHz and a maximum continuous acoustic output of 103 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 input connection of the 8 ohm variant of the loudspeaker shall consist of a two-terminal barrier strip.

Power settings available shall be: 2.5, 5, 10, 20, and 40 watts at 70 volts; 5, 10, 20, and 40 watts at 100 volts; and 40 watts at 8 ohms (when referenced to IEC noise for 100 hours). The nominal dispersion shall be 125° conical coverage pattern at -6 dB (average 1 – 4 kHz).

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

The loudspeaker shall be the Bose® FreeSpace® DS 40F loudspeaker.

## Safety and Regulatory Compliance

The FreeSpace® DS 40F loudspeaker and FreeSpace DS 40F loudspeaker – 8 Ohm have passed extensive testing and comply 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*, 2008, Article 640.
- Suitable for use with fire alarm circuit wiring methods in accordance with NFPA 70, *National Electric Code*, 2008, 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*, 2008, Article 300-22 (c).
- NFPA 90-A, 2008, *Installation of Air Conditioning and Ventilation Systems*, Paragraph 4.3.11.2.6.5.

The DS 40F loudspeaker and DS 40F loudspeaker – 8 Ohm have been designed to the requirements defined in the following European regulatory specification for combination systems when installed with an accessory ceramic terminal and thermal fuse:

- British Standard Code of Practice BS 5839, Part 8.
- Tested to IEC 60268-5.