

1/4-inch Prepolarized Free-field Microphone Type 40BE

Product Data and Specifications

Typical applications

- **High frequency measurements**
- **High level measurements**
- **Acoustic transient measurements**
- **Use with G.R.A.S. CCP* preamplifiers**

The G.R.A.S. Microphone Type 40BE is a 1/4-inch precision condenser microphone for general purpose measurements in open acoustic fields. It is a prepolarized free-field microphone with a large dynamic range and a wide frequency response.

As a free-field microphone, the Type 40BE is for measuring the sound pressure which existed before it was placed in the sound field pointing towards the sound source.

The disturbing effects of its presence in the sound field are minimal for most of its frequency range because of its small dimensions (see Fig. 1 inset). At higher frequencies, the effects of reflections and diffractions generally lead to an increase in the measured sound pressure levels. Fig. 3 shows what these are in a free-field for various angles of incidence. The Type 40BE compensates for this to provide a flat frequency response at an angle of 0° incidence in a free field (see Fig. 2).



Fig. 1 1/4-inch Prepolarized Free-field Microphone Type 40BE

G.R.A.S. CCP* preamplifiers are also available for use with the Type 40BE, these are:

- 1/4-inch Preamplifier Type 26CB
 - 1/2-inch Preamplifier Type 26CA with adaptor RA0019
- (see separate data sheets)

All G.R.A.S. microphones comply with the specifications of IEC 1094: *Measurement Microphones, Part 4: Specifications for working standard microphones.*

Non-corrosive, stainless materials are used in manufacturing these microphones to enable them to withstand rough handling and corrosive environments.

All G.R.A.S. microphones are guaranteed for 5 years and are individually checked and calibrated before leaving the factory. An individual calibration chart is supplied with each microphone.

* Constant Current Power.

Specifications

Frequency response:		Upper limit (3% distortion):	
10 Hz - 40 kHz:.....	± 1 dB		166 dB re. 20 µ Pa
4 Hz - 80 kHz:.....	± 2 dB	Microphone thermal noise:	30 dBA re. 20 µ Pa
4 Hz - 100 kHz:.....	± 3 dB	Nominal cartridge capacitance:	
Nominal open circuit sensitivity:		Polarized:	5.2 pF
at 250 Hz:	4 mV/Pa		
Polarization voltage:			
	0 V		

...continued overleaf

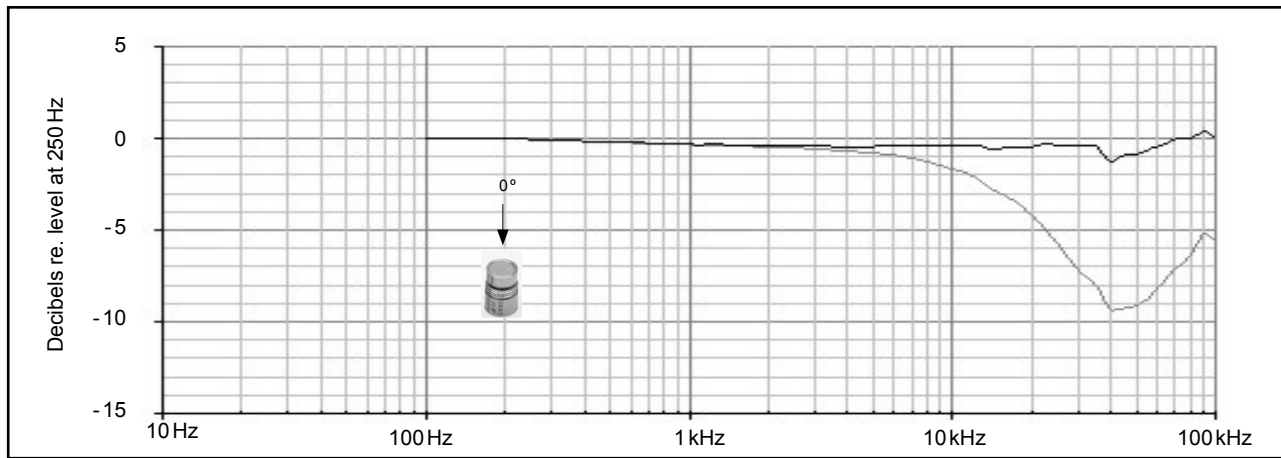


Fig. 2 Typical frequency response of Type 40BE (without protection grid). Upper curve shows free-field response for 0°, lower curve shows pressure response

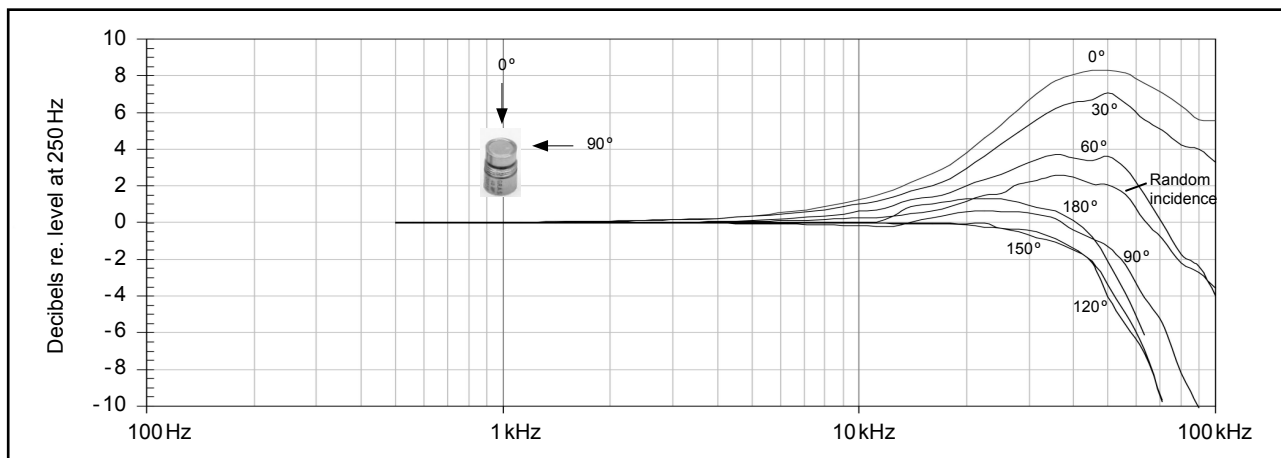


Fig. 3 Free-field corrections for various angles of incidence (without protection grid)

Specifications (continued)

<p>Resonant frequency: 90° Phase shift: 100 kHz</p> <p>Effective front volume: Nominal at 250 Hz: 0.6 mm³</p> <p>Static-pressure coefficient: 250 Hz at 25 °C -0.014 dB/kPa</p> <p>Influence of axial vibration, 1 m/s²: 60 dB re. 20 µ Pa</p> <p>Temperature: Range: -40 °C to +150 °C Mean coeff. (-10 °C to +50 °C): -0.01 dB/°C</p> <p>Venting: Rear vented</p> <p>Note: for most applications, rear venting is more advantageous particularly where phase response is critical. If front</p>	<p>venting is preferred, please add “front venting” to the Type number of the microphone when ordering.</p> <p>IEC 1094-4 Type Designation: WS3F</p> <p>Dimensions (with protection grid): Length/Diameter: 10.5 mm/6.9 mm</p> <p>(without protection grid): Length/Diameter: 9.1 mm/6.3 mm</p> <p>Diameter (diaphragm ring): 6.0 mm</p> <p>Threads: Protection Grid: 6.35 mm - 60 UNS Preamplifier Mounting: 5.7 mm - 60 UNS</p> <p>Weight: 1.75 g</p>
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G.R.A.S. Sound & Vibration reserves the right to change specifications and accessories without notice

1/4-inch Free-field Microphone Type 40BF

Product Data and Specifications

Typical applications

- **Sound pressure measurements**
- **High frequency measurements**
- **High level measurements**
- **Acoustic transient measurements**

The G.R.A.S. Microphone Type 40BF is a 1/4-inch precision condenser microphone for general purpose measurements in open acoustic fields. It is an externally polarized free-field microphone with a large dynamic range and a wide frequency response.

As a free-field microphone, the Type 40BF is for measuring the sound pressure which existed before it was placed in the sound field pointing towards the sound source.

The disturbing effects of its presence in the sound field are minimal for most of its frequency range because of its small dimensions (see Fig. 1 inset). At higher frequencies, the effects of reflections and diffractions generally lead to an increase in the measured sound pressure levels. Fig. 3 shows what these are in a free-field for various angles of incidence. The Type 40BF compensates for this to provide a flat frequency response at an angle of 0° incidence in a free-field (see Fig. 2).



Fig. 1 1/4-inch Free-field Microphone Type 40BF (inset shows true size)

G.R.A.S. 1/4-inch preamplifiers (see data sheet for Types 26AA, 26AB, 26AC and 26AL) are also available for use with the Type 40BF. The mounting thread (5.7 mm - 60 UNS-2) is compatible with other available makes of similar microphone preamplifiers.

All G.R.A.S. microphones comply with the specifications of IEC 1094: *Measurement Microphones, Part 4: Specifications for working standard microphones*.

Non-corrosive, stainless materials are used in manufacturing these microphones to enable them to withstand rough handling and corrosive environments.

All G.R.A.S. microphones are guaranteed for 5 years and are individually checked and calibrated before leaving the factory. An individual calibration chart is supplied with each microphone.

Specifications

Frequency response:		Microphone thermal noise:	
4 Hz - 100 kHz	±2.0 dB		30 dBA re. 20 µ Pa
10 Hz - 40 kHz	±1.0 dB	Capacitance:	7 pF
Nominal sensitivity:	4 mV/Pa	Effective front volume:	Nominal at 250 Hz:..... 0.6 mm ³
Polarization voltage:	200 V	Temperature:	Range:..... -40 °C to +150 °C
Upper limit (3 % distortion):	166 dB re. 20 µ Pa		...continued overleaf

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¼-inch Free-field Microphone Type 40BF

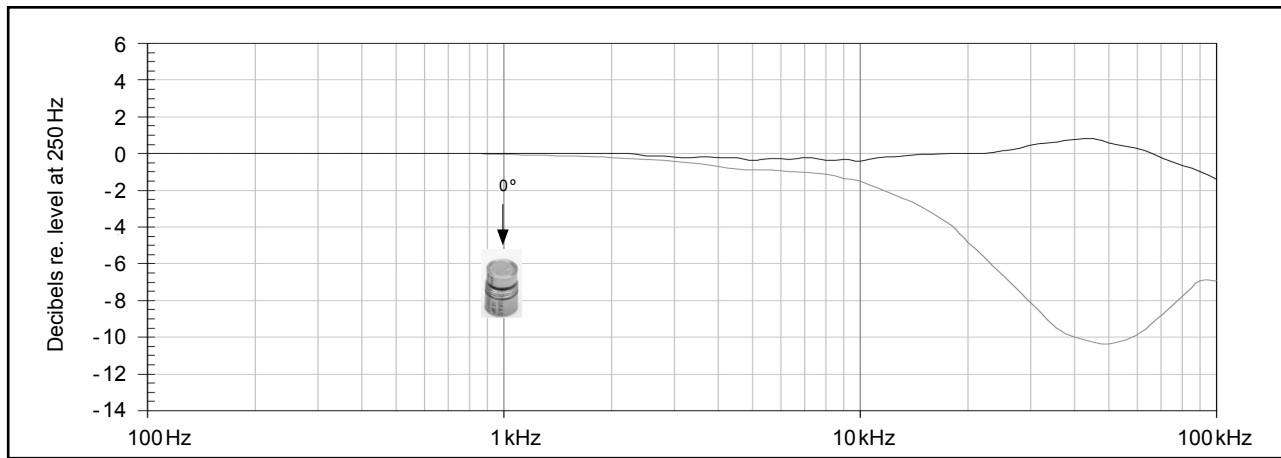


Fig. 2 Typical frequency response of Type 40BF (without protection grid). Upper curve shows free-field response for 0°, lower curve shows pressure response

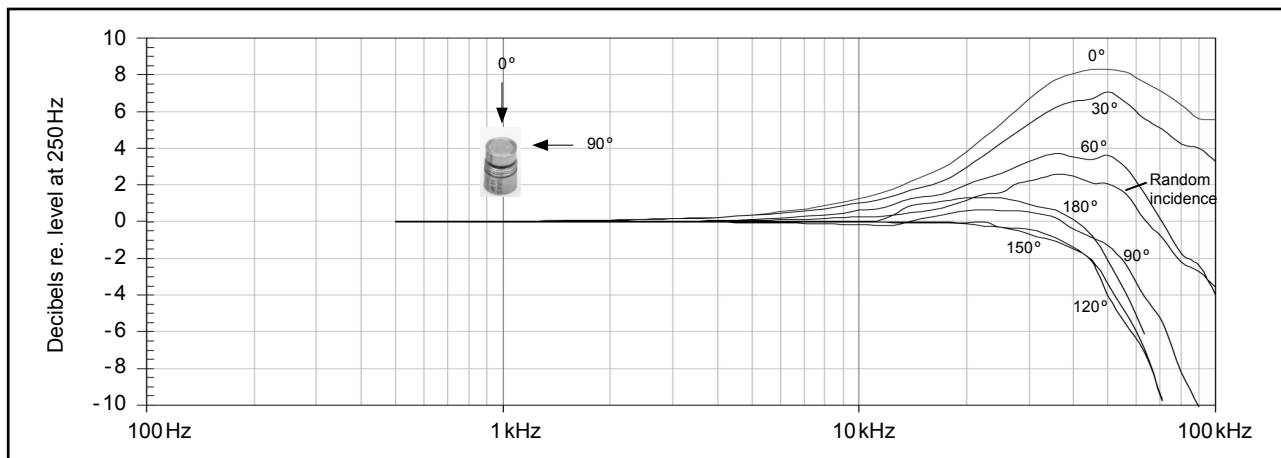


Fig. 3 Free-field corrections for various angles of incidence (without protection grid)

Specifications (continued)

Coeff. (250 Hz): -0.01dB/°C	IEC 1094-4 designation:	WS3F
Static-pressure coefficient:	-0.020 dB/k Pa	Dimensions (with protection grid):	Length/Diameter: 10.5 mm/6.9 mm
Humidity range:	0 - 100% (non-condensing)	(without protection grid):	Length/Diameter: 9.1 mm/6.3 mm
Influence of humidity (250 Hz):	<0.1 dB (0 - 100% RH)	Diameter (diaphragm ring):	6.0 mm
Influence of axial vibration, 1 m/s²:	60 dB re. 20 μ Pa	Threads:	Protection Grid: 6.35 mm - 60 UNS
Venting:	Rear vented	Pre-amplifier Mounting: 5.7 mm - 60 UNS	Weight:
<p>Note: for most applications, rear venting is more advantageous particularly where phase response is critical. If front venting is preferred, please add "front venting" to the Type number of the microphone when ordering.</p>			1.75 g

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1/4-inch Prepolarized, Pressure Microphone Type 40BD

Product Data and Specifications

Typical applications

- Sound pressure measurements
- High frequency measurements
- High level pressure measurements
- Use with G.R.A.S. CCP¹ preamplifiers

The G.R.A.S. Microphone Type 40BD is a 1/4-inch precision condenser microphone for general purpose acoustic measurements, e.g. in couplers and at boundaries. It is a prepolarized pressure microphone with a large dynamic range and a wide frequency response.

As a pressure microphone, the Type 40BD measures the sound pressure at the location of its diaphragm. It has a flat pressure-frequency response over its entire working frequency range (see Fig. 2).

In an open sound field, a pressure microphone will also include the disturbing effects of its presence in the sound field. These are minimal for most of its frequency range because of its small dimensions (see Fig. 1 inset). At higher frequencies, the effects of reflections and diffractions must be accounted for. Generally, they lead to an increase in the measured sound pressure and corrections have to be made. Fig. 3 shows what these corrections are in a free field for various angles of incidence.



Fig. 1 1/4-inch Prepolarized, Pressure Microphone Type 40BD

G.R.A.S. CCP¹ preamplifiers are also available for use with the Type 40BD, these are:

- 1/4-inch Preamplifier Type 26CB
- 1/2-inch Preamplifier Type 26CA with adaptor RA0019
- (see separate data sheets)

All G.R.A.S. microphones comply with the specifications of IEC 1094: *Measurement Microphones, Part 4: Specifications for working standard microphones.*

Non-corrosive, stainless materials are used in manufacturing these microphones to enable them to withstand rough handling and corrosive environments.

All G.R.A.S. microphones are guaranteed for 5 years and are individually checked and calibrated before leaving the factory. An individual calibration chart is supplied with each microphone.

Specifications

Frequency response:		Dynamic range:	
4 Hz - 70 kHz:	±2.0 dB	Upper limit (3 % distortion):	174 dB re. 20 μ Pa
10 Hz - 25 kHz:	±1.0 dB	Microphone thermal noise:	40 dBA re. 20 μ Pa
Nominal sensitivity:	1.6 mV/Pa	Capacitance:	7 pF
Polarization voltage:	0 V	Temperature range:	-40 °C to +120 °C
			...continued overleaf

¹ Constant Current Power

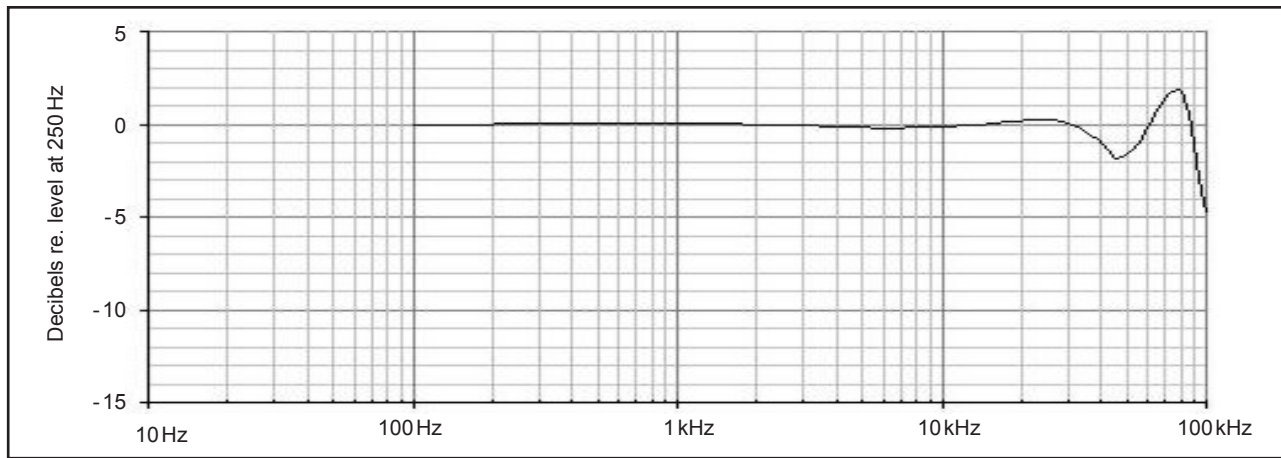


Fig. 2 Typical frequency response for Type 40BD (without protection grid)

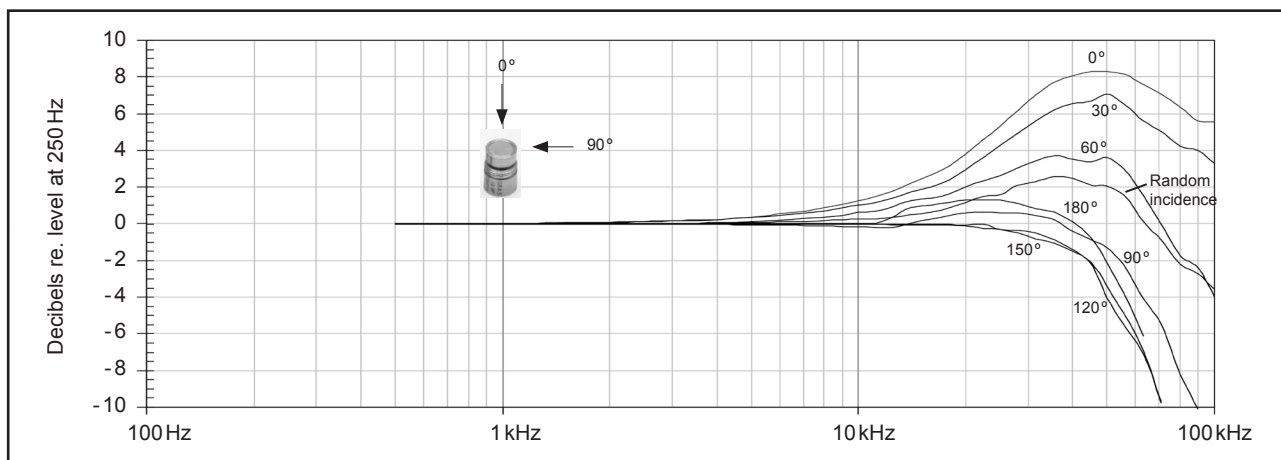


Fig. 3 Free-field corrections for various angles of incidence (without protection grid)

Specifications (continued)

<p>Temperature coefficient (250 Hz): -10 °C - +50 °C: -0.01 dB/°C</p> <p>Static-pressure coefficient: at 250 Hz: -0.008 dB/k Pa</p> <p>Humidity range: 0 - 100% (non-condensing)</p> <p>Influence of humidity (250 Hz): <0.1 dB (0 - 100% RH)</p> <p>Influence of axial vibration, 1 m/s²: 55 dB re. 20 µ Pa</p> <p>Venting: Rear vented Note: for most applications, rear venting is more advantageous particularly where phase response is critical. If</p>	<p>front venting is preferred, please add “front venting” to the Type number of the microphone when ordering.</p> <p>Dimensions (with protection grid): Length: 10.5 mm Diameter: 6.9 mm</p> <p>(without protection grid): Length: 9.1 mm Diameter: 6.35 mm</p> <p>Diameter (diaphragm ring): 5.9 mm</p> <p>Threads: Protection Grid: 6.35 mm - 60 UNS Preamplifier Mounting: 5.7 mm - 60 UNS</p> <p>Weight: 2 g</p>
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1/4-inch High-pressure Microphone Type 40BH

Product Data and Specifications

Typical applications

- Sound pressure measurements
- Impulse-sound measurements
- Very high level measurements

The G.R.A.S. Microphone Type 40BH is a 1/4-inch high-pressure microphone with a flat pressure-frequency response from 10 Hz to 20 kHz (see Fig. 2). Apart from its frequency response and lower sensitivity, it is similar to the Type 40BP (see separate product-data sheet).

Its low sensitivity and wide frequency response make it ideal for measuring acoustic impulses and very high sound-pressure levels (up to 194 dB re. 20 µPa).

As a pressure microphone, the Type 40BH measures the sound pressure at the location of its diaphragm. In an open sound field, a pressure microphone will also include the disturbing effects of its presence in the sound field. These are minimal for most of its frequency range because of its small dimensions (see Fig. 1 inset). At higher frequencies, the effects of reflections and diffractions must be accounted for. Generally, they lead to an increase in the measured sound pressure and corrections have to be made. Fig. 3 shows what these corrections are in a free field for various angles of incidence.



Fig. 1 1/4-inch High-pressure Microphone Type 40BH (inset shows true size)

G.R.A.S. 1/4-inch preamplifiers (see data sheet for Types 26AA, 26AB, 26AC and 26AL) are also available for use with the Type 40BH. The mounting thread (5.7 mm - 60 UNS-2) is compatible with other available makes of similar microphone preamplifiers.

All G.R.A.S. microphones comply with the specifications of IEC 1094: *Measurement Microphones, Part 4: Specifications for working standard microphones*.

Non-corrosive, stainless materials are used in manufacturing these microphones to enable them to withstand rugged handling and corrosive environments.

All G.R.A.S. microphones are guaranteed for 5 years and are individually checked and calibrated before leaving the factory. An individual calibration chart is supplied with each microphone.

Specifications

Frequency Response: 10 Hz - 20 kHz	±2.0 dB	Dynamic range: Upper limit (3% distortion):	194 dB re. 20 µPa
Nominal Sensitivity:	0.4 mV/Pa	Microphone thermal noise:	60 dB re. 20 µPa
Polarization Voltage:	200 V	Capacitance:	6 pF
		Temperature: Range:	-40 °C to +150 °C ...continued overleaf

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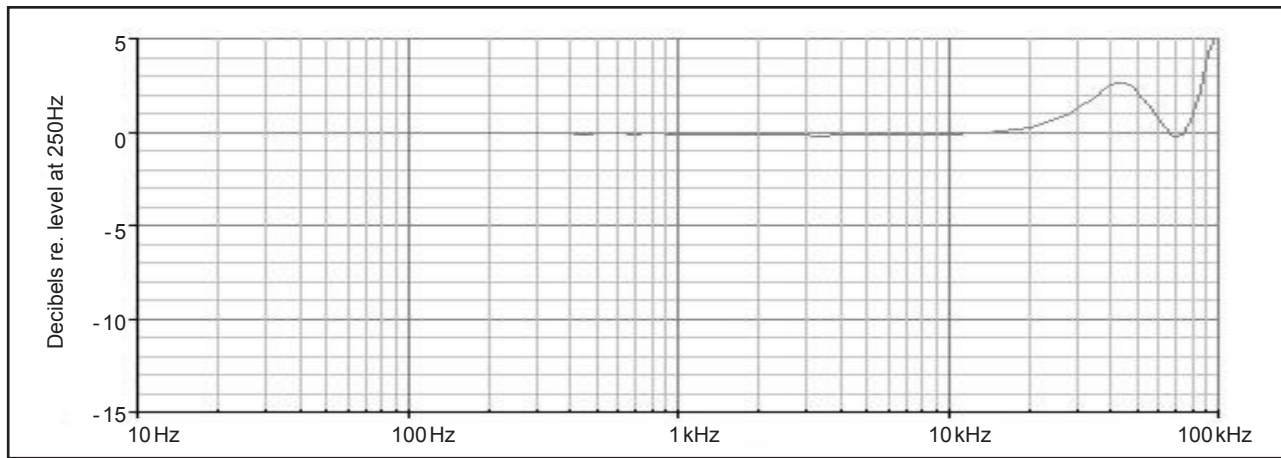


Fig. 2 Typical frequency response for Type 40BH (without protection grid)

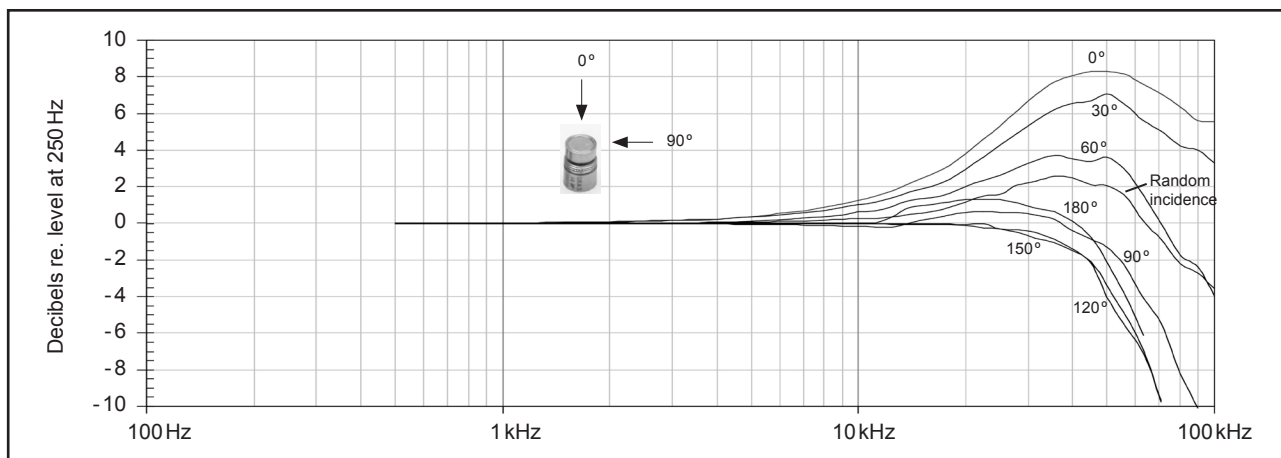


Fig. 3 Free-field corrections for various angles of incidence (without protection grid). Note: for free-field measurements, use 90° incidence (also known as grazing incidence)

Specifications (continued)

<p>Coeff. (250 Hz): -0.01 dB/°C</p> <p>Static-pressure coefficient: -0.004 dB/k Pa</p> <p>Humidity range: 0 - 100% (non-condensing)</p> <p>Influence of humidity (250 Hz): <0.1 dB (0 - 100% RH)</p> <p>Influence of axial vibration, 1 m/s²: 69 dB re. 20 μ Pa</p> <p>Venting: Rear vented</p> <p>Note: for most applications, rear venting is more advantageous particularly where phase response is critical. If front venting is preferred, please add "front venting" to the Type number of the microphone when ordering.</p>	<p>Dimensions (with protection grid): Length/Diameter: 10.5 mm/6.9 mm</p> <p>(without protection grid): Length/Diameter: 9.1 mm /6.3 mm</p> <p>Diameter (diaphragm ring): 6.0 mm</p> <p>Threads: Protection Grid: 6.35 mm - 60 UNS Preamplifier Mounting: 5.7 mm - 60 UNS</p> <p>Weight: 2g</p>
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1/4-inch Pressure Microphone Type 40BP

Product Data and Specifications

Typical applications

- **Sound pressure measurements**
- **High frequency measurements**
- **High level pressure measurements**

The G.R.A.S. Microphone Type 40BP is a 1/4-inch precision condenser microphone for general purpose acoustic measurements, e.g. in couplers and at boundaries. It is an externally polarized pressure microphone with a large dynamic range and a wide frequency response.

As a pressure microphone, the Type 40BP measures the sound pressure at the location of its diaphragm. It has a flat pressure-frequency response over its entire working frequency range (see Fig. 2).

In an open sound field, a pressure microphone will also include the disturbing effects of its presence in the sound field. These are minimal for most of its frequency range because of its small dimensions (see Fig. 1 inset). At higher frequencies, the effects of reflections and diffractions must be accounted for. Generally, they lead to an increase in the measured sound pressure and corrections have to be made. Fig. 3 shows what these corrections are in a free field for various angles of incidence.

G.R.A.S. 1/4-inch preamplifiers (see data sheet for Types 26AA, 26AB, 26AC and 26AL) are also



Fig. 1 1/4-inch Pressure Microphone Type 40BP (inset shows true size)

available for use with the Type 40BP. The mounting thread (5.7 mm - 60 UNS-2) is compatible with other available makes of similar microphone preamplifiers.

All G.R.A.S. microphones comply with the specifications of IEC 1094: *Measurement Microphones, Part 4: Specifications for working standard microphones*.

Non-corrosive, stainless materials are used in manufacturing these microphones to enable them to withstand rough handling and corrosive environments.

All G.R.A.S. microphones are guaranteed for 5 years and are individually checked and calibrated before leaving the factory. An individual calibration chart is supplied with each microphone.

Specifications

Frequency response:		Upper limit (3 % distortion):	
4 Hz - 70 kHz	±2.0 dB		174 dB re. 20 µ Pa
10 Hz - 25 kHz	±1.0 dB	Microphone thermal noise:	31 dBA re. 20 µ Pa
Nominal sensitivity:	1.6 mV/Pa	Capacitance:	7 pF
Polarization voltage:	200 V		...continued overleaf

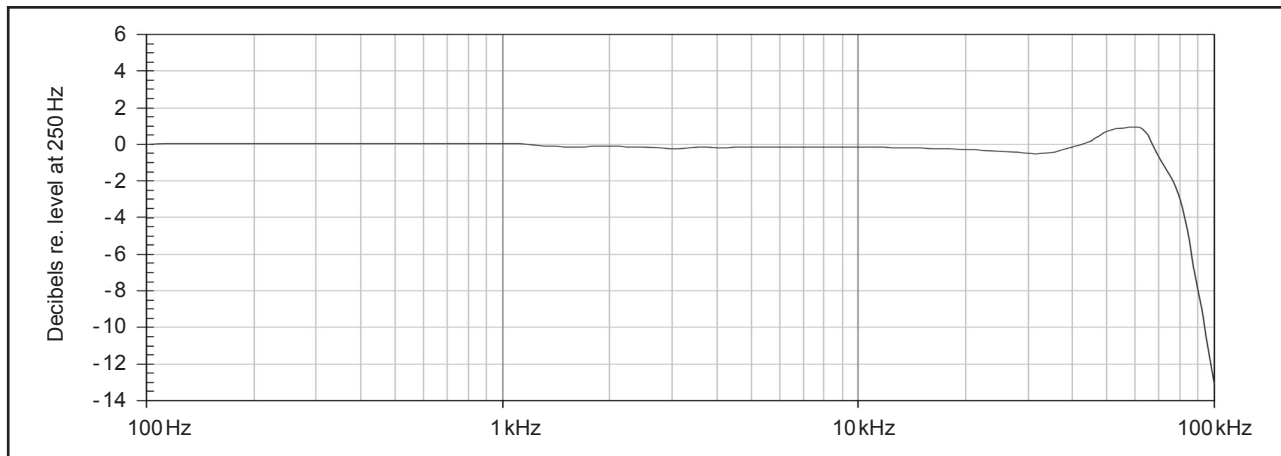


Fig. 2 Typical frequency response for Type 40BP (without protection grid)

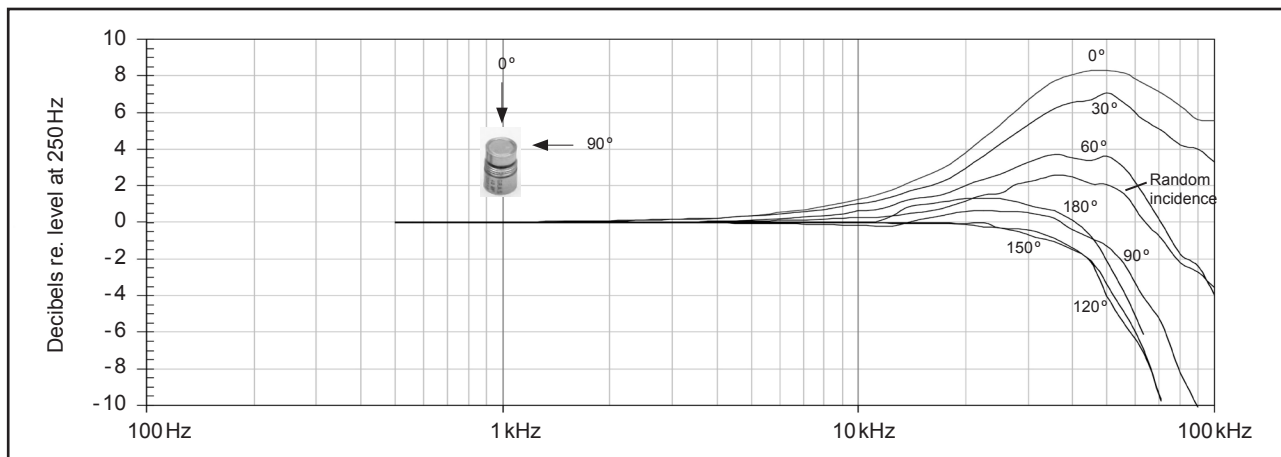


Fig. 3 Free-field corrections for various angles of incidence (without protection grid)

Specifications (continued)

Temperature: Range: -40 °C to +150 °C Coeff. (250 Hz): -0.01 dB/°C	venting is preferred, please add “front venting” to the Type number of the microphone when ordering.
Static-pressure coefficient: -0.003 dB/k Pa	Dimensions (with protection grid): Length/Diameter: 10.5 mm/6.9 mm
Humidity range: 0 - 100% (non-condensing)	(without protection grid): Length/Diameter: 9.1 mm/6.3 mm
Influence of humidity (250 Hz): <0.1 dB (0 - 100% RH)	Diameter (diaphragm ring): 5.9 mm
Influence of axial vibration, 1 m/s²: 69 dB re. 20 μ Pa	Threads: Protection Grid: 6.35 mm - 60 UNS Preamplifier Mounting: 5.7 mm - 60 UNS
Venting: Rear vented Note: for most applications, rear venting is more advantageous particularly where phase response is critical. If front	Weight: 2 g

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