

1-inch Pressure Microphone Type 40EN

Product Data and Specifications

Typical applications

- **Coupler measurements and precision acoustic measurements**
- **Flush (boundary) measurements**

The G.R.A.S. Microphone Type 40EN (Fig. 1) is a 1-inch pressure microphone ideal for measurements in couplers, e.g. the G.R.A.S. RA0075 NBS 9A 6 cm³ Coupler used for testing earphones according to ANSI S 3.7 – 1995. It can also be flush-mounted to measure sound pressures at walls and boundaries as well as be used as a laboratory-standard microphone.

The Type 40EN is normally front vented (as on delivery) but can be changed to rear vented or, for very low-frequency measurements, non vented. A special tool, GR0603, is provided for use when changing O-rings in order to change the venting.

As a pressure microphone, the Type 40EN has a flat pressure-frequency response over its entire working frequency range (see Fig. 2).

In an open sound field, measurements will also include the disturbing effects of the microphone's presence in the sound field. These are minimal at low frequencies (large wavelengths compared with microphone size). At higher frequencies, corrections for the effects of reflections and diffractions must be



Fig. 1 Pressure Microphone Type 40EN.
Left: with protection grid Right: 64-AA configuration for NBS 9-A couplers

made. Fig. 3 shows what these corrections are in a free field for various angles of incidence.

1-inch to ½-inch Adapters (RA0017, RA0073) are available for using Type 40EN with G.R.A.S. ½-inch preamplifiers (see separate data sheets for Types 26AG, 26AH, 26AJ, 26AK and 26AM).

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: 2.6 Hz - 8 kHz	±2.0 dB	Upper limit (3 % distortion):	146 dB re. 20 µ Pa
Nominal sensitivity:	50 mV/Pa	Microphone thermal noise:	9.6 dBA re. 20 µ Pa
Polarization voltage:	200 V	Nominal capacitance:	56 pF
		Temperature range:	-40 °C to +150 °C ...continued overleaf

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1-inch Pressure Microphone Type 40EN

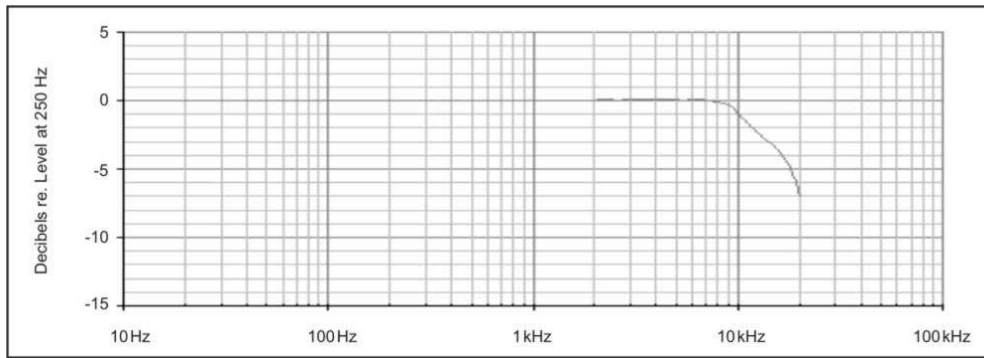
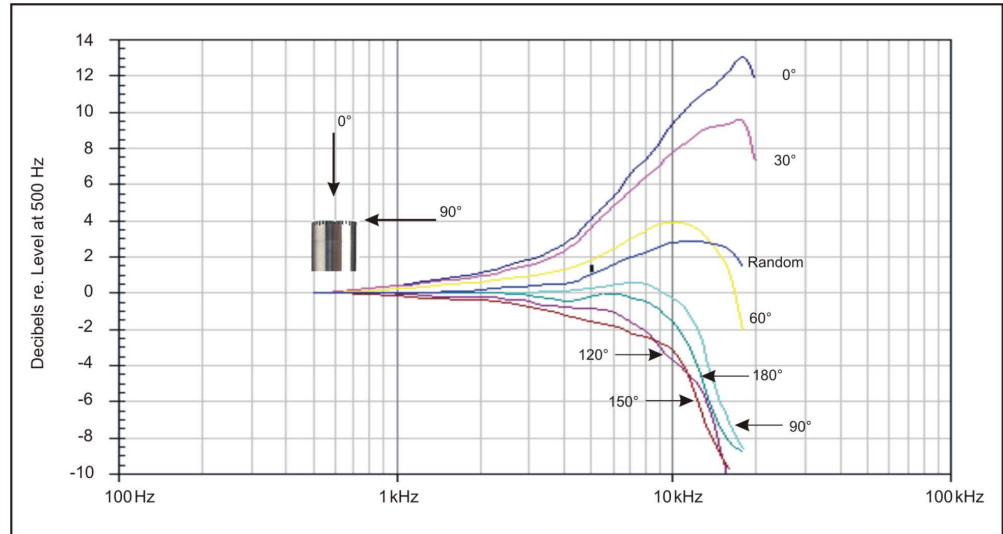


Fig. 2 Typical frequency response for Type 40EN

Fig. 3 Free-field corrections for various angles of incidence



Specifications (continued)

Temperature coefficient (250 Hz): -10 °C to +50 °C	0.003 dB/°C	Dimensions (with protection grid):	Length: 19.0 mm
Static-pressure coefficient (250 Hz, 25 °C):	-0.016 dB/k Pa	Diameter: 23.77 mm	
Humidity range:	0 - 100% (non-condensing)	(without protection grid):	Length: 17.1 mm
Influence of humidity (250 Hz):	<0.1 dB (0 - 100% RH)	Diameter: 23.77 mm	
Influence of axial vibration, 1 m/s²:	67 dB re. 20 μ Pa	Diameter (diaphragm ring):	22.05 mm
Venting (for O-rings fitted):		Threads:	Protection Grid: 23.11 mm - 60 UNS
OR0774 Front vented		Preamplifier Mounting: 23.11 mm - 60 UNS	
OR5003 Rear vented		Weight:	32 g
OR0774 + OR5003 Non vented		Accessories included:	
IEC 1094-4 type designation:	W1SP	O-ring OR5003	
		Key (for changing O-rings) GR0603	

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1-inch Laboratory STD., Pressure Microphone Type 40EU

Product Data and Specifications

Typical applications

- *LS1P Reference microphone*
- *Precision reciprocity calibrations*
- *Laboratory reference for secondary calibration of working-standard microphones*

The G.R.A.S. Microphone Type 40EU (Fig. 1) is a 1-inch laboratory-standard pressure microphone for use in couplers. It fulfills the requirements as a replacement for WE 640 microphones.

As a pressure microphone, the Type 40EU has a flat pressure-frequency response over its entire working frequency range (see Fig. 2).

1-inch to ½-inch Adapters (RA0017, RA0073) are available for using Type 40EU with G.R.A.S. ½-inch preamplifiers (see separate data sheets for Types 26AG, 26AH, 26AJ, 26AK and 26AM).

All G.R.A.S. microphones comply with the specifications of IEC 61094: *Measurement Microphones, Part 2: Specifications for laboratory standard microphones.*

Specifications

Frequency response:		Polarization voltage:	200 V
2.6 Hz - 8 kHz	±2.0 dB	Dynamic range:	
4 Hz - 5 kHz	±1.0 dB	Upper limit (3% distortion):	146 dB re. 20 µ Pa
Nominal sensitivity (20°C):		Microphone thermal noise:	9.6 dBA re. 20 µ Pa
	50 mV/Pa	Nominal capacitance:	56 pF
	-26 dB re. 1 V/Pa	Temperature range:	-40 °C to +150 °C
Venting:	Rear vented		...continued overleaf



Fig. 1 1-inch Pressure Microphone Type 40EU

Non-corrosive, stainless materials are used in manufacturing these microphones to make them both robust and to withstand corrosive environments.

The Type 40EU is a linear reversible transducer as required for precision reciprocity calibrations. When carefully handled, it will retain its calibrated properties for centuries to come.

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. The Type 40EU is also supplied with a protective dust cap when not in use.

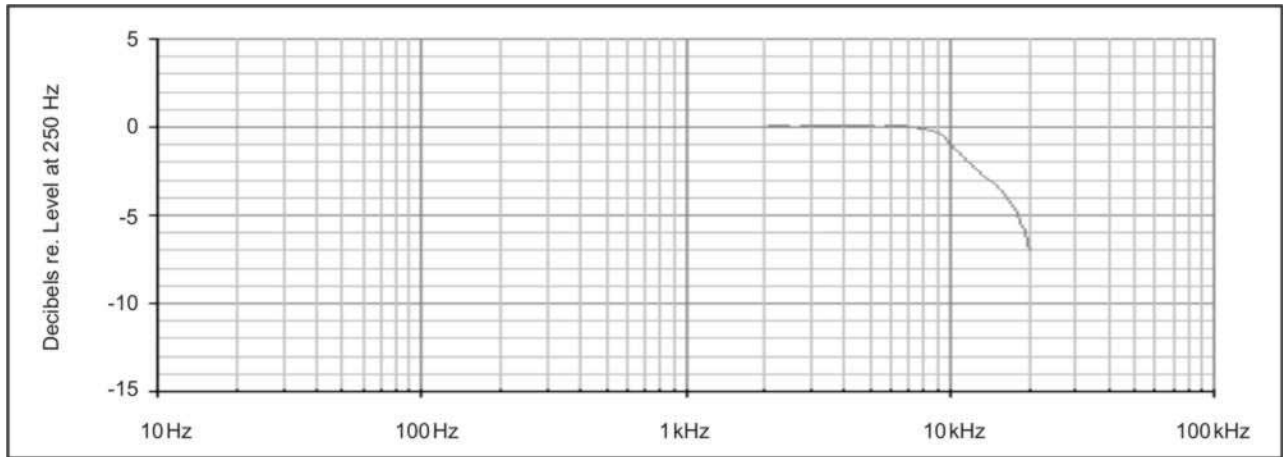


Fig. 2 Typical pressure frequency response for Type 40EU

Specifications (continued)

Temperature coefficient (250 Hz): -10°C to +50°C	0.003 dB/°C	Dimensions (with protection grid):	Length: 19.0 mm
Static-pressure coefficient (250 Hz, 25°C):	-0.016 dB/k Pa	Diameter: 23.77 mm	
Humidity range:	0 - 100% (non-condensing)	(without protection grid):	Length: 17.1 mm
Influence of humidity (250 Hz):	<0.1 dB (0 - 100% RH)	Diameter: 23.77 mm	
Influence of axial vibration, 1 m/s²:	67 dB re. 20 μ Pa	Diameter (diaphragm ring):	22.05 mm
IEC 61094-2 type designation:	LS1P	Threads:	Protection Grid: 23.11 mm - 60 UNS
		Preamplifier Mounting: 23.11 mm - 60 UNS	
		Weight:	32 g

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1/8-inch Prepol., Pressure Microphone Type 40DD

Product Data and Specifications

Typical applications

- *Sound-pressure measurements*
- *High-frequency measurements*
- *Very high level pressure measurements*
- *Impulse-noise measurements*

The G.R.A.S. Microphone Type 40DD (Fig. 1) is a 1/8-inch pressure microphone with a wide frequency response (see Fig. 2) and a large dynamic range.

Its tiny physical size (see Fig. 1) reduces to a minimum the effects of diffractions and reflections created by its presence in the sound field. This allows it to be used for measuring very-high frequency sounds without disturbing the sound field.

Its low sensitivity makes it ideal for high-level measurements. This, combined with its wide frequency response, make it also well suited for impulse-noise measurements.

The Type 40DD must be used with an adapter (RA0063 or RA0082 - both available from G.R.A.S.) for mounting 1/8-inch microphones onto 1/4-inch preamplifiers.



Fig. 1 1/8-inch Pressure Microphone Type 40DD (inset shows true size)

G.R.A.S. 1/4-inch CCP Preamplifiers Types 26CC, 26CB, (see separate data sheets) are available for use with the Type 40DD when fitted with an adapter RA0063 or RA0082. The mounting thread (5.7 mm - 60 UNS-2) is compatible with other available makes of similar microphone preamplifiers.

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

Nominal open-circuit sensitivity: at 250Hz. 0.7 mV/Pa	Upper limit of dynamic range: 3% distortion 174 dB re. 20 µ Pa
Frequency response: ±1.0 dB. 10 Hz - 30 kHz ±2.0 dB 6.5 Hz - 80 kHz ±3.0 dB 6.5 Hz - 140 kHz	Lower limit of dynamic range: Thermal noise. 40 dBA re. 20 µ Pa
Polarization voltage: 0V	Nominal cartridge capacitance: 3 pF
	Resonant frequency: 90° phase shift 160 kHz ...continued overleaf

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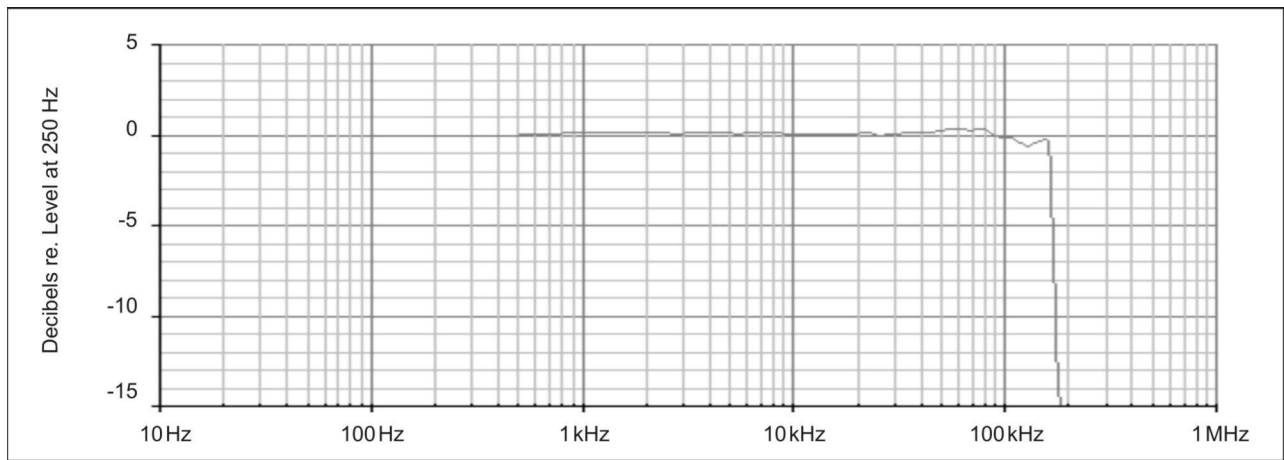


Fig. 2 Typical frequency response for Type 40DD (without protection grid)

Specifications (continued)

Effective front volume: Nominal at 250 Hz 0.1 mm ³	Dimensions (with protection grid): Length: 6.7 mm Diameter: 3.5 mm
Static-pressure coefficient: 250 Hz at 25 °C -0.01 dB/kPa	(without protection grid): Length: 6.1 mm Diameter: 3.2 mm
Influence of axial vibration: for 1 m/s ² 59 dB re. 20 μ Pa	Diameter (diaphragm ring): 3.0 mm
Temperature range: -40 °C to +120 °C	Threads: Protection Grid: M 3.175 x 0.2 Preamplifier Mounting: M 3 x 0.25
Mean temperature coefficient: -10 °C to +50 °C 0.01 dB/°C	Weight: 1.5 g
Venting: Rear vented	

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1/8-inch Pressure Microphone Type 40DP

Product Data and Specifications

Typical applications

- *Sound-pressure measurements*
- *High-frequency measurements*
- *Very high level pressure measurements*
- *Impulse-noise measurements*



Fig. 1 1/8-inch Pressure Microphone Type 40DP (inset shows true size)

The G.R.A.S. Microphone Type 40DP (Fig. 1) is a 1/8-inch pressure microphone with a wide frequency response (see Fig. 2) and a large dynamic range.

Its tiny physical size (see Fig. 1) reduces to a minimum the effects of diffractions and reflections created by its presence in the sound field. This allows it to be used for measuring very-high frequency sounds without disturbing the sound field.

Its low sensitivity makes it ideal for high-level measurements. This, combined with its wide frequency response, make it also well suited for impulse-noise measurements.

The Type 40DP must be used with an adapter (RA0063 or RA0082 - both available from G.R.A.S.) for mounting 1/8-inch microphones onto 1/4-inch

preamplifiers.

G.R.A.S. 1/4-inch preamplifiers Types 26AA, 26AB, 26AC and 26AL (see separate data sheet) are available for use with the Type 40DP when fitted with an adapter RA0063 or RA0082. The mounting thread (5.7 mm - 60 UNS-2) is compatible with other available makes of similar microphone preamplifiers.

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

Specifications

Nominal open-circuit sensitivity: at 250Hz.	1 mV/Pa	Upper limit of dynamic range: 3% distortion	174 dB re. 20 µ Pa
Frequency response: ±1.0 dB.	10 Hz - 30 kHz	Lower limit of dynamic range: Thermal noise.	40 dBA re. 20 µ Pa
±2.0 dB	6.5 Hz - 140 kHz	Nominal cartridge capacitance: Polarized.	3.5 pF
Polarization voltage:	200 V	Resonant frequency: 90° phase shift	160 kHz ...continued overleaf

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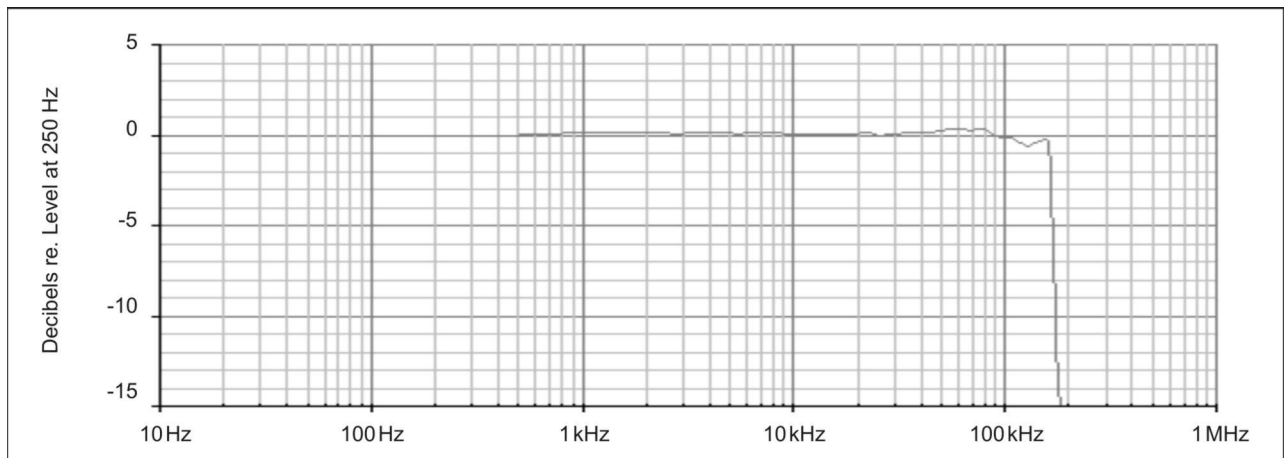


Fig. 2 Typical frequency response for Type 40DP (without protection grid)

Specifications (continued)

Effective front volume:		Dimensions (with protection grid):	
Nominal at 250 Hz	0.1 mm ³	Length:	6.7 mm
Static-pressure coefficient:		Diameter:	3.5 mm
250 Hz at 25 °C	-0.01 dB/k Pa	(without protection grid):	
Influence of axial vibration:		Length:	6.1 mm
for 1 m/s ²	59 dB re. 20 μ Pa	Diameter:	3.2 mm
Temperature range:		Diameter (diaphragm ring):	
	-40 °C to +150 °C		3.0 mm
Mean temperature coefficient:		Threads:	
-10 °C to +50 °C	0.01 dB/°C	Protection Grid:	M 3.175 x 0.2
Venting:		Preamplifier Mounting:	M 3 x 0.25
	Rear vented	Weight:	
			1.5 g

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