ACOUSTIC MEASUREMENT SENSORS & INSTRUMENTATION

PCB PIEZOTRONICS
AN AMPHENOL COMPANY

pcb.com/acoustics | 1 800 828 8840

PCB – TRUSTED BY COMPANIES AND LABORATORIES WORLDWIDE

PCB Piezotronics, Inc. provides a variety of acoustic measurement products, including prepolarized and externally polarized condenser, array, probe, low-profile surface, and special purpose microphones. Microphone products are complemented by an assortment of preamplifiers, signal conditioners, A-weighting filters, handheld calibrators, and accessories.

All PCB® acoustic products are manufactured from the highest quality materials. They are used by a variety of industries and customers including automotive, aerospace & defense, OEM's, universities, consultants, white goods (appliance), and consumer goods manufacturers.

Over 50 Years Experience

PCB designs, manufactures, and sells sensors worldwide. With over 1000 employees across the globe, there are several Ph.D.'s on our large engineering staff. These skilled resources enable PCB to offer a variety of products ranging from microphones to accelerometers, force, torque, pressure, load, MEMS sensors, dosimeters, and sound level meters. At PCB, we understand the complexities of your test environment and requirements, therefore we can recommend the best solution for your application.

Innovation

PCB is the inventor of ICP® technology. PCB heavily invests in employees, manufacturing, and R&D equipment. This keeps us a leader in sensor technology. Whether it is introducing the industry's first commercial prepolarized high temperature and first prepolarized low noise microphones, or enabling our business partners to measure the lowest noise level in the world with a custom 3" microphone, you can be assured that PCB is on the leading edge of acoustic design.

PERFORMANCE YOU DEMAND AT A PRICE YOU CAN AFFORD

Save up to 40% Compared to Competitor Brands

1/2" FREE-FIELD PREPOLARIZED MICROPHONE & PREAMPLIFIER

MODEL 378B02

- Our most popular model. Ideal for testing in open areas and anechoic chambers
- 3.15 Hz -20 kHz (+/- 2dB)
- TEDS compliant

1/4" ARRAY STYLE PREPOLARIZED MICROPHONES

MODELS 130F20, 130F21 & 130F22

- Value oriented for multichannel audible range testing
- BNC connector, also available with a 10-32, or SMB connector
- TEDS compliant

1/2" FREE-FIELD PREPOLARIZED MICROPHONE

MODEL 377B02

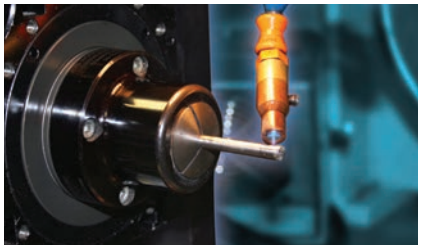
- 50 mV/Pa
- 3.15 Hz -20 kHz (+/- 2dB)
- 15 dBA – 147 dB

IN-HOUSE MANUFACTURING

PCB uses only the highest quality material and components for its microphones. While other sensor providers outsource their manufacturing, PCB has invested heavily in on-going employee training as well as in a state of the art, in-house CNC machining facility. This allows us to control all factors that affect quality and delivery. PCB has made significant investments in our people and operations, including:

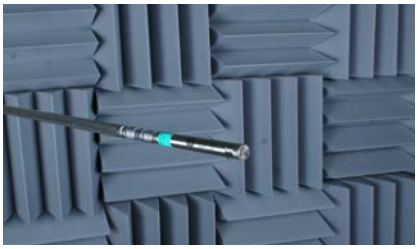
High Volume Robotic Machining Cells

PCB's in-house machining facilities control factors that affect quality, production quantities, and delivery. This reduces dependency on outside sources, enables PCB to meet urgent requests, and keeps cost down so savings can be passed through to our customers.



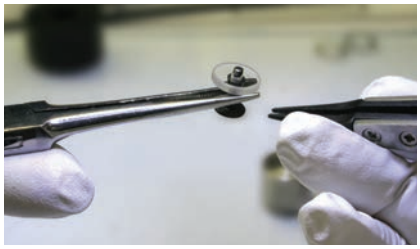
Laser Welding

Microphones are welded in clean areas to ensure stability and robustness.



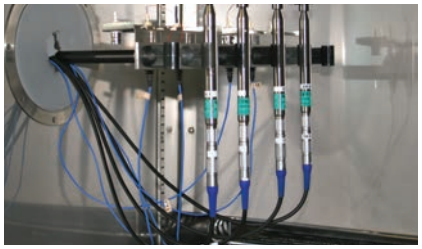
Anechoic Chamber

This special sound proof room enables our large team of engineers to design, test, and verify acoustic sensors.



Clean Rooms

Assembly is performed in clean rooms to ensure consistency and compliance with Working Class IEC standards. Certified professionals manufacture and assemble all microelectronics in controlled environments.

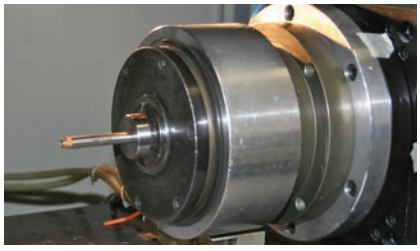


Environmental Chambers

Environmental stress relieving and testing ensures long term stability in the harshest environments.

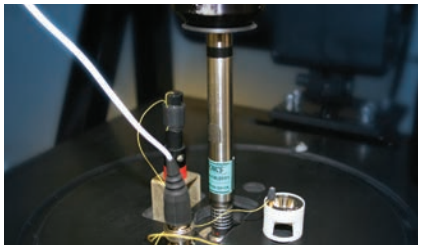
Nitrogen Storage Chambers

All critical components and assemblies are stored in nitrogen chambers to minimize contamination and maximize stability.



Laser Etching

Model and serial numbers are etched on the microphone assemblies. Large easy-to-read fonts are on the external housings. Disassembly is not required to read these designations.



Calibration

Every PCB microphone and preamplifier is calibrated with traceable certifications. Some competitors only offer sensitivity readings, typical responses, or certifications of compliance.

Inspection

Every PCB microphone and preamplifier is individually inspected to ensure a quality product gets shipped each and every time.

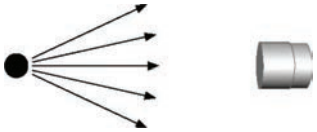
SELECTING THE RIGHT MICROPHONE

There are several product options to consider when choosing a microphone and preamplifier system to measure sound or unwanted sound, called noise. In some cases, multiple products can be used for the same application. The PCB Microphone Handbook provides detailed information about microphone selection, maintenance, calibration, associated standards, and more. To download this handbook, visit www.pcb.com/acoustics.

MICROPHONE FIELD TYPES

FREE-FIELD RESPONSE

Free-field microphones are designed for use in environments without reflections. They are ideal for outdoor applications, as well as laboratory applications in an anechoic chamber. Common free-field testing includes automotive pass-by, loudspeakers, appliances, and disk drive sound measurements.



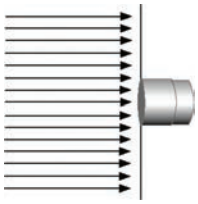
Free-field

Sound Source Location for Noise Reduction

PRESSURE RESPONSE

Pressure microphones are specifically designed to be flush-mounted to a surface at the boundary of the sound field. This allows accurate measurement of sound pressure in ducts, wind tunnels, and couplers. Pressure microphones are ideal for use as reference microphones, as they are designed to have very flat frequency response within a sound coupler or calibrator. Pressure microphones are also required for most ear simulator applications.

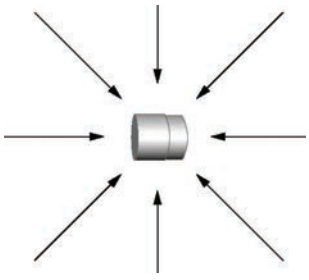
Flush Mounted Microphone Measurements in an Impedance Tube



Pressure Response

RANDOM INCIDENCE RESPONSE

Random incidence microphones are designed for use in areas where the sound field could come from any direction. The best uses for these microphones are to perform measurements in reverberant chambers and for many indoor noise applications. They are well suited for room acoustics, as well as for aerospace and automotive cabin noise measurements.

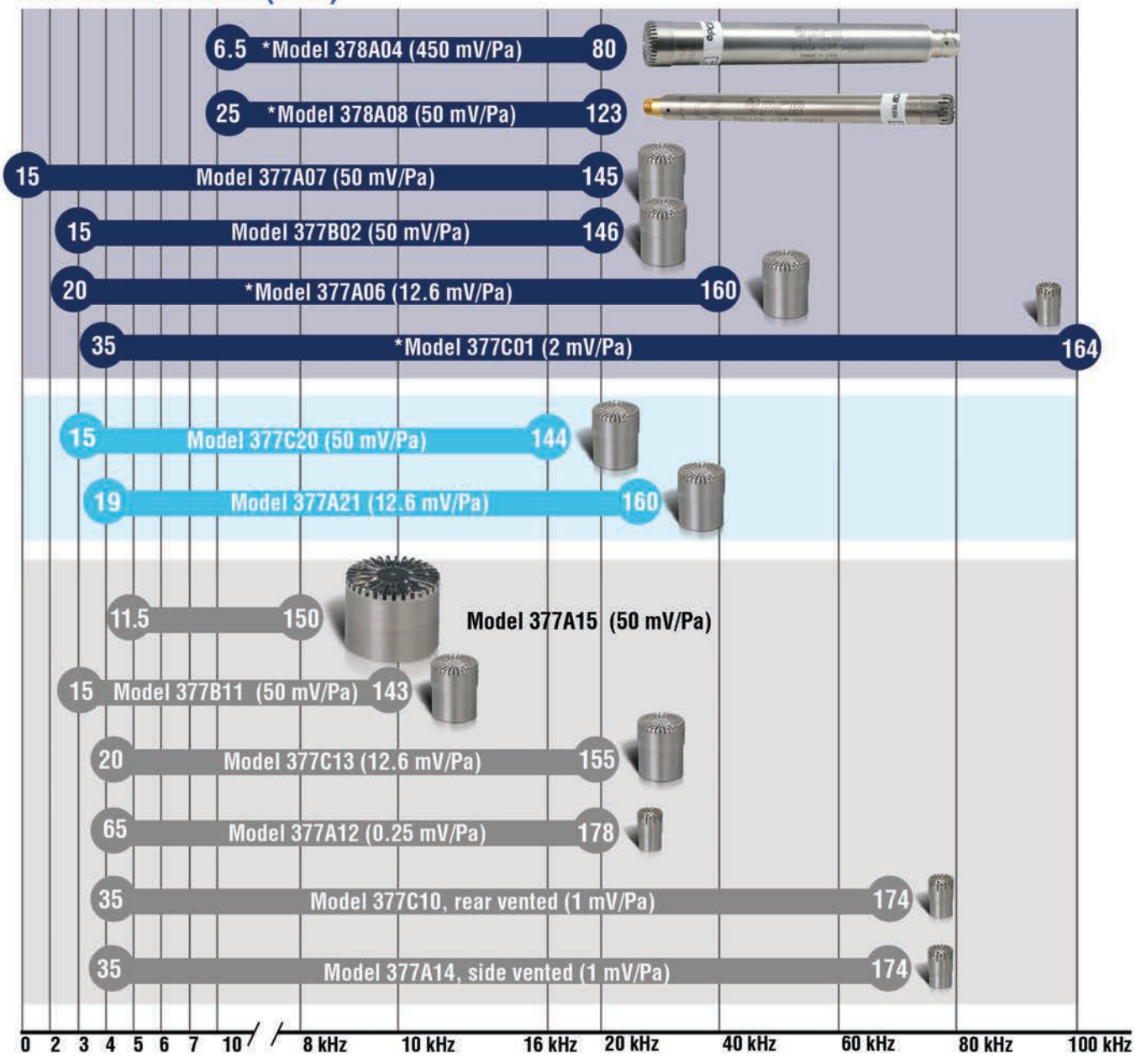


Random Incidence

Cabin Noise Measurements for Rider Comfort

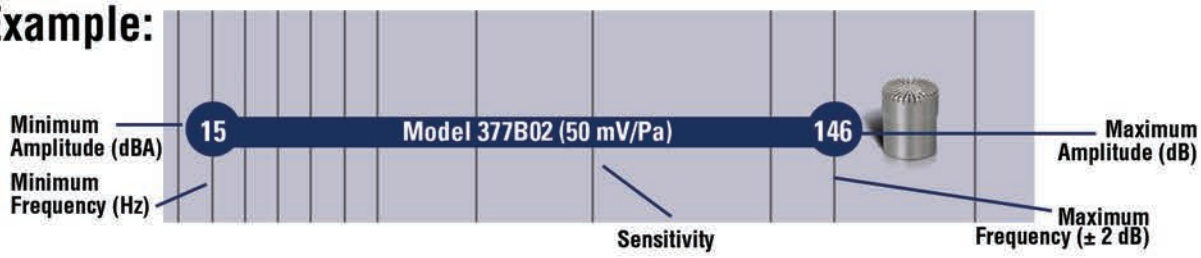
MICROPHONE COMPARISON

PREPOLARIZED (0 V)

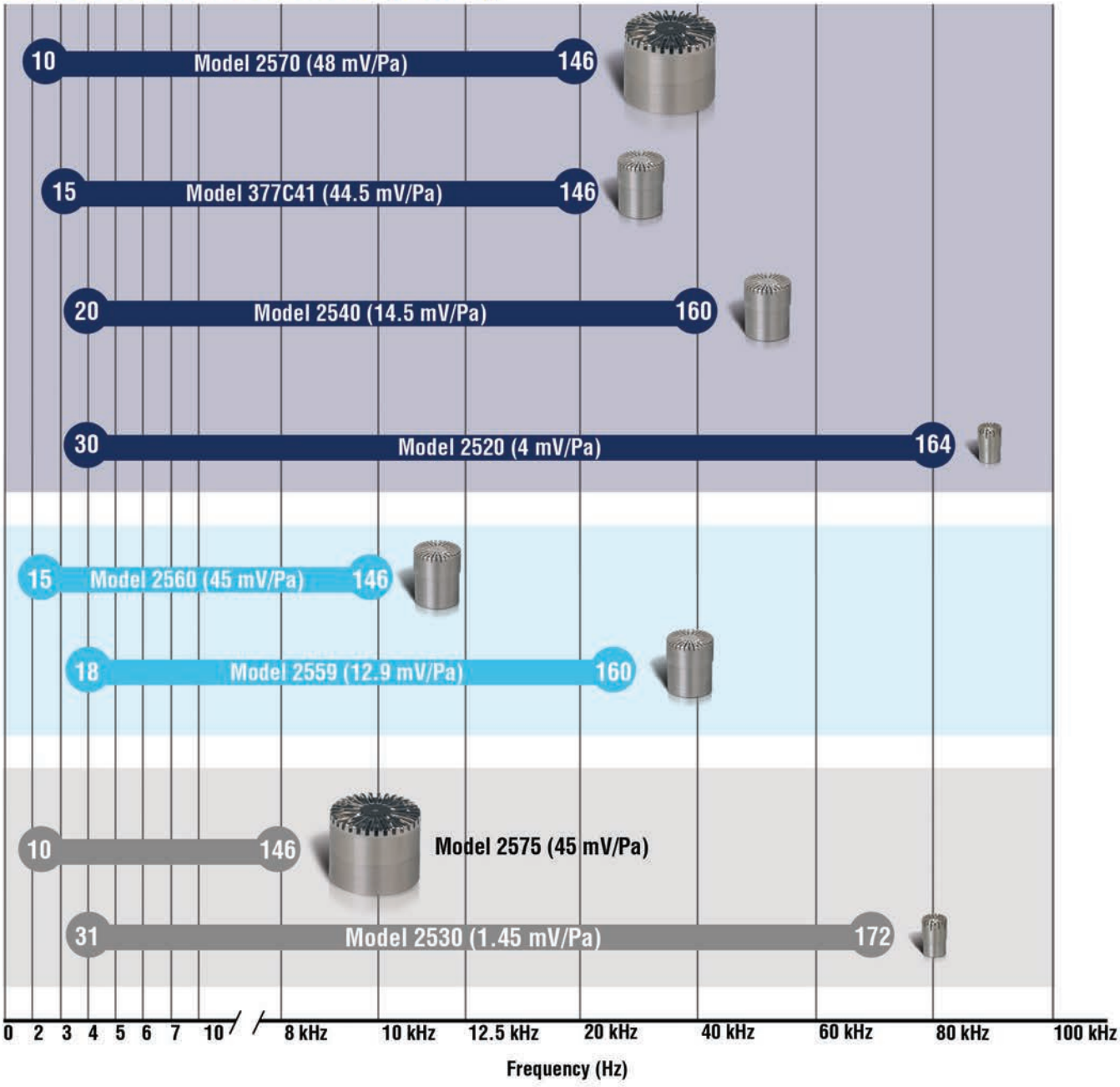


*See on-line specifications for frequency tolerance.

Example:



EXTERNALLY POLARIZED (200 V)



Size:

1/4” 1/2” 1” (Not to scale)

PREPOLARIZED ICP® PRECISION CONDENSER MICROPHONES & PREAMPLIFIERS

Prepolarized microphones have many advantages over externally polarized models. They use low power circuitry and do not require an external polarization voltage. PCB invented ICP® power. Applying a polymer coating to the top of the backplate and embedding a charge on it eliminates the need for expensive 200 V power supplies and cables, and allows use of a 2-20 mA constant current supply or signal conditioner as the power source.

Prepolarized microphones are especially useful in applications that require battery powered equipment. Prepolarized microphones are less susceptible to the influence of high humidity environments because of the high electrical resistance of the polymer coating on the backplate.

Prepolarized microphone systems use common coaxial cables with BNC connectors and can be shared with other ICP® compatible products including: accelerometers, force, and pressure sensors. Portability and interchangeability with other sensors minimizes test set-up time and reduces the cost per-channel.

Phantom Powered Microphones and Preamplifier

TEDS MICROPHONE & PREAMPLIFIER SYSTEMS, IEEE 1451.4 COMPLIANT

	Free-field										
TEDS Version 1.0	**378C01**	**378B02**	**EX378B02**	**HT378B02**	**378A04**	**378A06**	**378A07**	**378A08**	**376A31**	**376A32**	**376A33**
Mated Pair System Components	377C01 426B03	377B02 426E01	Single piece construction	377B02 HT426E01	Single piece construction	377A06 426E01	377A07 426E01	377A08 426E01	377C01 426A14	377B02 426A14	377A06 426A14
Diameter	1/4"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/4"	1/4"	1/2"	1/2"
Notes	High amplitude, high frequency measurements	Audible range, low to medium amplitudes, most common	Instrinsically safe	High temperature version of 378B02	Extreme low noise measurements	Medium to high amplitude and frequency measurments	Extreme low frequency infrasound measurments	Extreme low frequency infrasound measurments	High amplitude, high frequency measurements	Audible range, low to medium amplitudes	Medium to high amplitude and frequency measurments
Application	Ultrasound, blast, gun shot, noise identification	Pass-by, noise identification, sound power, sound intensity, Class 1 sound level meters	For use in hazardous locations, leak detection, mining	Engine analysis, exhaust testing, HVAC, leak detection	Computer fan and disk drives appliance testing, electric vehicle sound quality	Railway and horn testing, alarm monitoring	Wind turbine testing, sonic boom detection	Wind turbine testing, sonic boom detection	Clarity and life cycle testing for musical equipment	Speaker design and "Rub and Buzz" noise testing	Live and studio recording

Transducer Electronic Data Sheets (TEDS) enhance the identification of each microphone. All PCB microphone and preamplifier systems come standard with TEDS functionality and are compliant with the IEEE 1451.4 standard.

Computer Fan and Disk Drive Noise Test (Model 378A04)

ENGINEERED TO MAXIMIZE SYSTEM PERFORMANCE

For optimum performance, PCB matches the microphone and preamplifier to complement each other. The model 378 microphone system series takes the precision and durability of the standard model 377 microphone series line and mates it with one of PCB's model 426 preamplifiers. This system approach provides a convenient and user friendly option for purchasing acoustic measurement equipment and allows for use of TEDS to store calibration data.

Hazardous Approved Microphone & Preamplifier
Model EX378B02

TEDS MICROPHONE & PREAMPLIFIER SYSTEMS, IEEE 1451.4 COMPLIANT								
	Pressure System					Random Incidence System		
TEDS Version 1.0	**378A12**	**378A14**	**378C10**	**378B11**	**378C13**	**378A21**	**378C20**	**HT378C20**
Mated Pair System Components	377A12 426A03	377A14 426A05	377C10 426B03	377B11 426E01	377C13 426E01	377A21 426E01	377C20 426E01	377C20 HT426E01
Diameter	1/4"	1/4"	1/4"	1/2"	1/2"	1/2"	1/2"	1/2"
Notes	Extreme high amplitude measurements	High frequency, high amplitude measurements side vented	High frequency, high amplitude measurements rear vented	High sensitivity, low frequency, low noise measurements	Mid range frequency and amplitude measurements	Medium to high amplitude and frequency measurements	Audible range, high sensitivity, low - medium amplitudes	High temperature version of 378C20
Application	Blast detection, cavity analysis, gunshot noise measurements	Ultrasound, impedance tubes, cavity analysis	Ultrasound, impedance tubes, cavity analysis	Infrasound, impedance tubes, cavity analysis, panel testing	Impedance tubes, cavity analysis, panel testing	Cabin noise, consumer product testing	Cabin testing, environmental noise, room acoustics, Class 1 sound level meters	Environmental noise, HVAC testing

PREPOLARIZED (0 V) PRECISION CONDENSER MICROPHONES

1/4" MICROPHONES

MODELS

377C01, 377C10, 377A12, 377A14

1/2" MICROPHONES

MODELS

377B02, 377A06, 377A07, 377B11, 377C13, 377C20, 377A21

1" MICROPHONE

MODEL 377A15

PREPOLARIZED (0 V) PRECISION CONDENSER MICROPHONES						
	Free-field				Random Incidence	
TEDS Version 1.0	**377C01**	**377B02**	**377A06**	**377A07**	**377C20**	**377A21**
Diameter	1/4"	1/2"	1/2"	1/2"	1/2"	1/2"
Open Circuit Sensitivity	2 mV/Pa	50 mV/Pa	12.6 mV/Pa	50 mV/Pa	50 mV/Pa	12.6 mV/Pa
Frequency Range (± 2 dB)	4 Hz to 80 kHz	3.15 Hz to 20 kHz	3 Hz to 31.5 kHz	0.07 Hz to 20 kHz	3.14 Hz to 16 kHz	4 Hz to 25 kHz
Dynamic Range Upper Limit - 3% Distortion Limit [1]	164 dB	146 dB	160 dB	145 dB	144 dB	160 dB
Dynamic Range Lower Limit - Cartridge Thermal Noise [1]	35 dB (A)	15 dB (A)	20 dB (A)	15 dB (A)	15 dB (A)	19 dB (A)
Temperature Range	-40 to +248 °F -40 to +120 °C	-40 to +302 °F -40 to +150 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C
	Pressure					
TEDS Version 1.0	**377A12**	**377A14**	**377C10**	**377B11**	**377C13**	**377A15**
Diameter	1/4"	1/4"	1/4"	1/2"	1/2"	1"
Open Circuit Sensitivity	0.25 mV/Pa	1 mV/Pa	1 mV/Pa	50 mV/Pa	12.6 mV/Pa	50 mV/Pa
Frequency Range (± 2 dB)	4 Hz to 20 kHz	4 Hz to 70 kHz	4 Hz to 70 kHz	3.15 Hz to 10 kHz	4 Hz to 20 kHz	5 Hz to 8 kHz
Dynamic Range Upper Limit - 3% Distortion Limit [1]	178 dB	174 dB	174 dB	143 dB	155 dB	150 dB
Dynamic Range Lower Limit - Cartridge Thermal Noise [1]	65 dB (A)	35 dB (A)	35 dB (A)	15 dB (A)	20 dB (A)	11.5 dB (A)
Temperature Range	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C

Notes: [1] re 20 µPa

1/4” PREAMPLIFIER

MODEL 426B03

1/2” PREAMPLIFIER

MODELS HT426E01, 426E01, 426A10

1/2” SHORT PREAMPLIFIER

MODEL 426A13

1/2” PREAMPLIFIER

MODEL 426A11

1/4” SHORT PREAMPLIFIER

MODEL 426A07

1/4”- 1/2” PREAMPLIFIER

MODEL 426A14

These low noise, general purpose, preamplifiers are powered by any constant current (2-20 mA) ICP® sensor power supply. They are designed to be used with prepolarized microphones.

ICP® PREAMPLIFIERS FOR PREPOLARIZED MICROPHONES					
Model Number	**426B03**	**426A05**	**426A07**	**426E01**	**HT426E01**
Microphone Diameter	1/4”	1/4”	1/4”	1/2”	1/2”
Gain (Attenuation)	-0.08 dB [1]	-0.19 dB [1]	-0.19 dB [1]	-0.05 dB [1]	-0.06 dB [2]
Frequency Response (± 0.1 dB)	5 Hz to 126 kHz	5 Hz to 126 kHz	2.5 Hz to 126 kHz	6.3 Hz to 125 kHz	6.3 Hz to 126 kHz
Electrical Noise (A-weight)	≤ 3.2 µV [1]	≤ 3.2 µV [1]	≤2.5 µV [1]	≤ 2.8 µV [1]	≤ 4.9 µV [2]
Electrical Noise (Linear)	≤ 5.6 µV [1]	≤ 5.6 µV [1]	≤ 5.6 µV [1]	≤ 5 µV [1]	≤ 13.4 µV [2]
Output Voltage (Maximum)	± 8 V pk	± 8 V pk	± 8 V pk	± 7 V pk	± 7 V pk
Temperature Range	-40 to +158 °F -40 to +70 °C	-40 to +158 °F -40 to +70 °C	-40 to +158 °F -40 to +70 °C	-40 to +176 °F -40 to +80 °C	-40 to +257 °F -40 to +125 °C
Output Connector	10-32 Coaxial jack	10-32 Coaxial jack	10-32 Coaxial jack	BNC jack	BNC jack
TEDS IEEE 1451.4	Yes	Yes	Yes	Yes	Yes
Application	General purpose	Used with side vented microphones	Confined areas	General purpose	High temperature
Model Number		**426A10**	**426A11**	**426A13**	**426A14**
Microphone Diameter		1/2”	1/2”	1/2”	1/4” & 1/2”
Gain (Attenuation)		-0.1 dB [1]	-0.16 dB [1]	-0.20 dB [1]	-0.20 dB [1]
Frequency Response (± 0.1 dB)		80 Hz to 125 kHz	5 Hz to 125 kHz	10 Hz to 126 kHz	11 Hz to 100 kHz
Electrical Noise (A-weight)		≤ 3.6 µV [1]	≤ 7.5 µV[1]	≤ 3 µV [1]	≤ 2µV [1]
Electrical Noise (Linear)		≤ 11.2 µV [1]	≤ 5.7 µV [1]	≤ 6 µV [1]	≤ 4.5 µV [1]
Output Voltage (Maximum)		± 7 V pk	± 5 V pk	± 8 V pk	± 10 V pk
Temperature Range		-40 to +176 °F -40 to +80 °C	-4 to +158 °F -20 to +70 °C	-40 to +158 °F -40 to +70 °C	-40 to +149 °F 40 to +65 °C
Output Connector		BNC jack	BNC jack	BNC jack	3 Pin XLR
TEDS IEEE 1451.4		Yes	Yes	Yes	No
Features		High pass filter	Gain, filter	Confined areas	12 V, 24 V, or 48 V

Notes: [1] Measured with an 18 pF reference microphone [2] Measured with a 12 pF reference microphone

PREPOLARIZED ICP®
ARRAY MICROPHONES

Prepolarized ICP® array microphones are a cost-effective alternative to the higher end, test and measurement microphones. They are suitable for sound measurements within the normal human hearing range. Array microphones have excellent phase characteristics and can be combined with the appropriate software to effectively map acoustic energy flow. The number of microphones, spacing and predetermined patterns, which are typically dictated by the software and application, allow you to analyze spatial transformation of complex sound fields to understand hot spots. The location of a noise source can be pinpointed and the speed and direction of sound can be determined.

These value-priced array microphones are an excellent choice for large channel count applications such as noise identification, nearfield acoustic holography, sound pressure mapping, acoustic cameras, and beamforming.

All PCB array microphones come standard with Transducer Electronic Data Sheets (TEDS) for microphone identification.

HIGHLIGHTS

- Low Per Channel Cost
- Powered by ICP® Sensor Signal Conditioners
- Integrated Preamplifier
- Water & Dust Resistant Model Available

APPLICATIONS

- Holography
- Sound Pressure Mapping
- Noise Source Identification
- Beamforming

Model 130F20
(BNC Jack)

Model 130F21
(10-32 Jack)

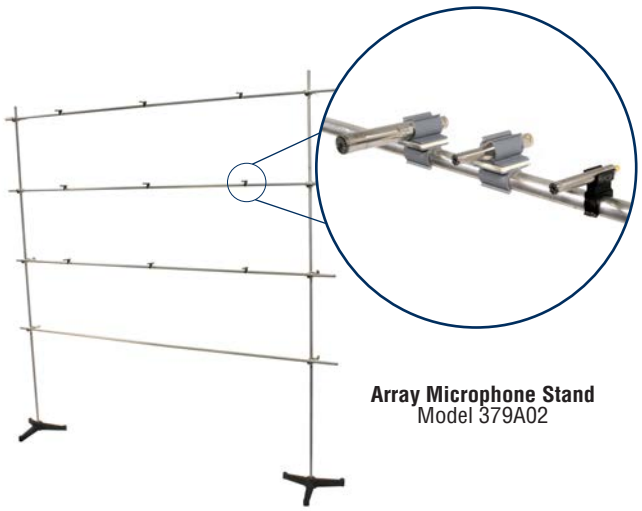
Model 130F22
(SMB Socket)

Model 130A25
(Small Profile, 10-32 Jack)

Model 130A23
Higher Amplitude & Wider Frequency
(SMB Socket)

Model 130B40
Low Profile
Surface Microphone Pad

Model 130A24
Water & Dust Resistant
(BNC Jack)



Array Microphone Stand
Model 379A02

TEDS COMPLIANCE

Transducer Electronic Data Sheets (TEDS) enhance the identification of each microphone. This is very helpful in large channel count applications. All series 130 microphones are CE marked and contain IEEE 1451.4 TEDS memory circuitry.

CE TEDS CIRCUITRY COMPATIBLE All preamplifiers are CE marked and contain TEDS memory circuitry.

PREPOLARIZED ARRAY MICROPHONES WITH INTEGRAL PREAMPLIFIER							
Model Number	**(New) 130A24**	**130A23**	**130A25**	**130F20**	**130F21**	**130F22**	**130B40**
Microphone Diameter	1/2"	1/4"	1/4"	1/4" [4]	1/4"	1/4"	1/4"
Response	Free-field	Free-field	Free-field	Free-field	Free-field	Free-field	Pressure
Sensitivity (± 3 dB at 250 Hz)	10 mV/Pa	14 mV/Pa	45 mV/Pa	45 mV/Pa	45 mV/Pa	45 mV/Pa	8.5 mV/Pa
Frequency response (± 2 dB)	20 Hz to 16 kHz [2]	20 Hz to 20 kHz	10 Hz to 20 kHz [1]	10 Hz to 20 kHz [1]	10 Hz to 20 kHz [1]	10 Hz to 20 kHz [1]	20 Hz to 10 kHz [2]
Dynamic Range	< 30 dBA to >143 dB [3]	< 30 dBA to >143 dB [3]	24 dBA to >122 dB	24 dBA to >122 dB	24 dBA to >122 dB	24 dBA to >122 dB	<32 dBA to >142 dB [3]
Polarized Voltage	0 V	0 V	0 V	0 V	0 V	0 V	0 V
Temperature Range (°F)	-14 to +122 °F	-14 to +122 °F	-14 to +122 °F	+14 to +122 °F	+14 to +122 °F	+14 to +122 °F	-40 to +176 °F
Temperature Range (°C)	-10 to +50 °C	-10 to +50 °C	-10 to +50 °C	-10 to +50 °C	-10 to +50 °C	-10 to +50 °C	-40 to +80 °C
Connector	BNC Jack	SMB Socket	10-32 Jack	BNC Jack	10-32 Jack	SMB Socket	10-32 Jack
Features	Rugged water and dust resistant	High frequency and high amplitudes	Small profile for confined areas	General purpose	General purpose	Quick release connector	Low profile and surface mount to minimize wind

Notes: [1] ± 4 dB. [2] 20 Hz to 10 kHz ± 3 dB, 20 to 20 kHz ± 6 dB. [3] 150 dB max without clipping. [4] 1/2" preamplifier diameter.

EXTERNALLY POLARIZED PRECISION CONDENSER MICROPHONES & PREAMPLIFIERS

Externally polarized microphones were the original standard for all acoustic measurement applications. This design utilizes a separate 200 V power supply and special cables with 7 pin style connectors. Their ease of design enables a large product offering. Externally polarized microphones are typically used to replace microphones in existing systems or when a prepolarized alternative is not available.

1/4" MICROPHONES

MODELS

2520

2530

1/2" MICROPHONES

MODELS

2540

2559

2560

377C4

1" MICROPHONES

MODELS

2570

2575

EXTERNALLY POLARIZED (200 V) PRECISION CONDENSER MICROPHONE CARTRIDGES

	Free-field				Pressure		Random Incidence	
Model Number	**2520**	**2540**	**377C41**	**2570**	**2530**	**2575**	**2559**	**2560**
Diameter	1/4"	1/2"	1/2"	1"	1/4"	1"	1/2"	5 mV/µ 1/2"
Open Circuit Sensitivity	4 mV/Pa	14.5 mV/Pa	44.5 mV/Pa	48 mV/Pa	1.4 mV/Pa	45 mV/Pa	12.9 mV/Pa	45.2 mV/Pa
Frequency Range (± 2 dB)	4 Hz to 80 kHz	4 Hz to 40 kHz	3.15 Hz to 20 kHz	2.6 Hz to 20 kHz	4 Hz to 70 kHz	2.6 Hz to 80 kHz	4 Hz to 25 kHz	2.6 Hz to 10 kHz
Dynamic Range Upper Limit - 3% Distortion Limit [1]	164 dB	160 dB	146 dB	146 dB	172 dB	146 dB	160 dB	146 dB
Dynamic Range Lower Limit - Cartridge Thermal Noise [1]	30 dB (A)	20 dB (A)	15 dB (A)	10 dB (A)	31 dB (A)	10 dB (A)	18 dB (A)	15 dB (A)
Temperature Range	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC	-40 to +302 ºF -40 to +150 ºC
Notes								
[1] re 20 µPa								

PREAMPLIFIERS FOR EXTERNALLY POLARIZED MICROPHONES

Model 426A30 is a rugged 1/2” diameter preamplifier optimized for use with externally polarized microphones. It is compatible with microphones as defined in the international standard IEC 61094, and connects to a 200 V power supply requiring a 7 pin cable with connectors. Model 426B31 is a 1/4” diameter preamplifier with integral 10 ft. cable that terminates with a 7 pin connector.

1/4” PREAMPLIFIER AND CABLE

MODEL 426B31

1/2” PREAMPLIFIER

MODEL 426A30

PREAMPLIFIERS		
Model Number	**426B31**	**426A30**
Diameter	1/4”	1/2”
Gain (Attenuation)	-0.14 dB [2]	-0.2 dB [1]
Frequency Response (± 0.5 dB)	3.98 Hz to 126 kHz	3.0 Hz to 126 kHz
Electrical Noise (A-weight)	≤ 4.8 µV [2]	≤ 2.8 µV [1]
Electrical Noise (Linear) [1]	≤ 12 µV [2]	≤ 5 µV [1]
Output Voltage (Maximum)	± 25 V pk	± 14 V pk
Temperature Range	-4 to +167 °F -20 to +75 °C	-40 to +185 °F -40 to +85 °C
Output Connector	Integral Cable with 7 Pin	7 Pin
TEDS IEEE 1451.4	Yes	No

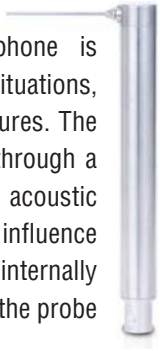
MICROPHONE PREAMPLIFIER POWER SUPPLY

MODEL 2221

- 0 V and 200 V polarization options
- Extended battery life
- 0, 20, and 40 dB gain
- Selectable flat (Z), A, and C-weighting

ADDITIONAL ACOUSTIC PRODUCTS & ACCESSORIES

HIGH TEMPERATURE PROBE MICROPHONE (UP TO 800°C)



Model 377B26 Prepolarized Probe Microphone is designed for use in difficult measurement situations, such as small cavities and very high temperatures. The acoustic signal is guided to the microphone through a detachable, stainless-steel probe. The high acoustic input impedance of the probe tip minimizes its influence on the acoustic field. Probe microphones are internally compensated to equalize the static pressure at the probe tip with the internal microphone pressure.

IN-LINE "A-WEIGHTING" FILTER

Model 426B02 In-line A-weighting Filter is powered by constant current excitation and is compatible with ICP® microphone preamplifiers. When using this filter, a minimum of 4 mA excitation current is required of the ICP® sensor signal conditioner or readout device which incorporates ICP® sensor power.

A-weighting Filter
Model 426B02

079A02 079B03 079B25
079A24 079A29 079A41 079A42

ADAPTORS

079A02 – 1/4" Microphone to 1/2" Preamplifier Adaptor
079B03 – 1/2" Microphone to 1/4" Preamplifier Adaptor
079B25 – 1" Microphone to 1/2" Preamplifier Adaptor
079A24 – Tripod Stand Adaptor to Convert 5/8" Stud to 1/4" for Microphone Holder
079A29 – Swivel Head, Stand to Holder Adaptor
079A41 – Right Angle Adapter for 1/4" Microphone
079A42 – Right Angle Adapter for 1/2" Microphone

EXA010
003C10
003D10
003U10
003V10
003V30

CABLES (additional lengths available)

EXA010 – 10' Cable with 7 Pin Connector
003C10 – 10' Coaxial Cable with 10-32 Plug and BNC Plug
003D10 – 10' Coaxial Cable with BNC Plugs
003U10 – 10' Coaxial Cable with SMB Plugs
003V10 – 10' Coaxial Cable with SMB Plug and BNC Plug
003V30 – 30' Coaxial Cable with SMB Plug and BNC Plug

ADP021 ADP024 079A31

CALIBRATION ACCESSORIES

ADP021 – CAL250 to 1/4" Microphone Adaptor
ADP024 – CAL200 to 1/4" Microphone Adaptor
079A31 – 8-Channel Coupler for 1/4" Microphones

079A06

079A07

079A53

EPS2116

079C20

079B21

ENVIRONMENTAL PROTECTION

079A06 – 3-1/2" Windscreen for 1/2" Mic

079A07 – 3-1/2" Windscreen for 1/4" Mic

079C20 – Nose Cone for 1/4" Mic

079B21 – Nose Cone for 1/2" Mic

079A53 – 3/4" Windscreen for 1/4" Mic

EPS2116 – Outdoor Protection, 3/4" Mount and 1/4" Side Exit Mount

079B10

079A11

079C23

079B32

079A13

079A49

HOLDERS

079B10 – Holder for 1/4" Mic

079A11 – Holder for 1/2" Mic

079C23 – Swivel Head with 1/4" and 1/2" Holders

079B32 – Clip Holder for 1/4" Mic

079A13 – Clip Holder for 1/2" Mic

079A49 – Holder for phantom powered preamplifier

079A15

079B16

079A17

079A18

079A44

379A02

STANDS AND MOUNTS

079A15 – Tripod Stand with Boom Arm

079B16 – Miniature Tripod Stand with Adjustable Legs

079A17 – Camera Tripod Stand

079A18 – Adjustable Clamp

079A44 – 5 Link Extension Arm for Clamp Holders

379A02 – Array Microphone Stand

Battery Powered ICP®
Model 480C02

3-Channel Battery Powered ICP®
Model 480B21

USB Dual Channel ICP®
Model 485B36

DIN-rail mount with Gain
Model 410D01

4-Channel ICP® 4 to 20 mA
Model 482C05

8-Channel ICP®
Model 483C05

ICP® SIGNAL CONDITIONERS

ADDITIONAL ACOUSTIC PRODUCTS

SOUND LEVEL METERS

Model 831C is the most recent Larson Davis sound level meter platform. This model provides superior performance, reliability, and 2GB of internal memory. Various firmware modules expand the functionality of Model 831C for a variety of environmental noise and architectural acoustics measurements. The Model 831C also includes the easy-to-use personal health and safety measurement features of other advanced SLM products.

SOUNDTRACK LXT®

The SoundTrack LxT® sound level meter represents a significant advance in performance, reliability, and ease-of-use. This ergonomically designed meter ensures that gathering, analyzing, and presenting detailed workplace and environmental noise data is simple, fast, and accurate.

LARSON DAVIS
A PCB DIVISION

Please visit **www.LasonDavis.com** for further details.

ENVIRONMENTAL PROTECTION SHROUDS

Model EPS2116 environmental shrouds are complete weather protection systems for ½" microphone systems. The environmental shrouds are the perfect choice for longer-term measurements in inclement weather. Their special acoustic windscreen material and configuration protect the microphones from rain, sleet, and snow. The shroud seals the preamplifier in a desiccated chamber, thus preserving performance in high humidity environments. The desiccant volume is many times greater than that of inline desiccant cartridges, for lasting protection without interference between the microphone and preamplifier. The shroud is also equipped with bird-spikes to deter winged intruders.

OUTDOOR PREAMPLIFIER & MICROPHONE WITH CALIBRATION CHECK

The Larson Davis PRM2103-FF is designed to be used with the Model 831C sound level meter and an environmental shroud. It can be used in a wide range of weather conditions.

The PRM2103-FF provides a five frequency calibration check which is automatically controlled by the Model 831C sound level meter. It does not require routine maintenance. It includes a built-in humidity and temperature sensor and can automatically turn on an internal heater when there is a risk of condensation. The low power usage makes the PRM2103-FF an excellent solution for battery powered applications.

ACOUSTIC CALIBRATION

PRODUCTS

THE MODAL SHOP
AN AMPHENOL COMPANY

TURNKEY ACOUSTIC CALIBRATION WORKSTATION

The Precision Acoustic Calibration Workstation Model 9350C is an accurate, turnkey, automated, PC-based system. The 9350C offers efficient and cost-effective calibration of 1/4", 1/2", and 1" microphone cartridges (open-circuit sensitivity), microphone cartridges with preamplifiers (closed-circuit sensitivity), and microphone frequency response function.

The 9350C generates ISO 17025 compliant calibration certificates for:

- Microphone and Preamplifier Calibration
- Preamplifier Conformance Test
- Source Calibration (example: pistonphone)

MODEL CAL200

MODEL CAL250

PRECISION HANDHELD ACOUSTIC CALIBRATORS

PCB offers calibrators for microphones that meet IEC 60942 and ANSI S1.40 standards. These units are easy-to-use and available with optional adaptors for use with a variety of microphone diameters. Calibrators are lightweight, portable, and battery operated.

PRECISION CALIBRATORS		
Model Number	**CAL200**	**CAL250**
Microphone Sizes	1/4" (6 mm)*, 1/2" (12 mm)	1/8" (3 mm)*, 1/4" (6 mm)*, 1/2" (12 mm), 1" (25 mm)
Frequency	1 kHz ± 1%	251.2 Hz ± 2 Hz
Output Level (re 20 µPa)	94 dB,114 dB ± 0.2 dB	114 ± 0.1 dB
Barometric Compensation	Automatic	Automatic
ANSI S1.40	Yes	Yes
IEC 60942 Class 1	Yes	Yes

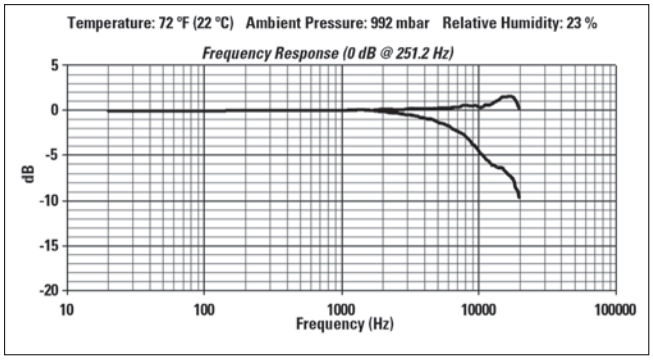
Notes:* With optional adaptors

SERVICES

PCB HAS A "STATE-OF-THE-ART" ACOUSTIC CALIBRATION SYSTEM

All calibrations include test documentation showing the actuator response, corrected responses, the conditions under which the calibration was performed, and the equipment used. Calibrations are performed with reference microphones traceable to national laboratories specializing in acoustic measurements (NIST, PTB, or DFM). PCB's quality system is certified to AS9100:2016 QMS Certified by DQS, Inc. and ISO 9001:2015 QMS Certified by DQS, Inc. PCB's calibration service is accredited to ISO17025 & ANSI-Z540.3 by A2LA (see ILAC MRA) and compliant with ISO10012.

PCB is equipped to calibrate most competitors' microphones and preamplifiers: **www.pcb.com/calibration-services**



Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)
20.0	-0.08	-0.08	1584.9	-0.14	0.07	6683.4	-2.14	0.38
25.1	-0.02	-0.02	1678.8	-0.16	0.07	7079.5	-2.35	0.43
31.6	0.00	0.00	1778.3	-0.17	0.08	7498.9	-2.61	0.46
39.8	0.01	0.01	1883.7	-0.19	0.09	7943.3	-2.94	0.45
50.1	0.01	0.01	1995.3	-0.22	0.09	8414.0	-3.24	0.49
63.1	0.02	0.02	2113.5	-0.24	0.10	8912.5	-3.58	0.53
79.4	0.02	0.02	2238.7	-0.26	0.11	9440.6	-3.98	0.54
100.0	0.02	0.02	2371.4	-0.30	0.11	10000.0	-4.54	0.41
125.9	0.01	0.01	2511.9	-0.33	0.13	10592.5	-4.98	0.42
158.5	0.01	0.01	2660.7	-0.37	0.14	11220.2	-5.32	0.54
199.5	0.01	0.01	2818.4	-0.41	0.15	11885.0	-5.77	0.55
251.2	0.00	0.00	2985.4	-0.46	0.16	12589.3	-6.06	0.71
316.2	0.00	0.01	3162.3	-0.51	0.17	13335.2	-6.16	1.03
398.1	-0.01	-0.01	3349.7	-0.57	0.17	14125.4	-6.41	1.18
501.2	-0.02	0.02	3548.1	-0.64	0.18	14962.4	-6.50	1.47
631.0	-0.03	0.01	3758.4	-0.72	0.18	15848.9	-6.83	1.52
794.3	-0.04	0.05	3981.1	-0.82	0.18	16788.0	-7.13	1.59
1000.0	-0.06	0.06	4217.0	-0.91	0.20	17782.8	-7.63	1.48
1059.3	-0.07	0.06	4466.8	-1.01	0.22	18836.5	-8.50	1.01
1122.0	-0.08	0.06	4731.5	-1.12	0.25	19952.6	-9.83	0.10
1188.5	-0.08	0.07	5011.9	-1.25	0.28	-	-	-
1258.9	-0.09	0.07	5308.8	-1.41	0.29	-	-	-
1333.5	-0.10	0.08	5623.4	-1.57	0.31	-	-	-
1412.5	-0.11	0.08	5956.6	-1.75	0.32	-	-	-
1496.2	-0.13	0.07	6309.6	-1.94	0.35	-	-	-

Upper curve: Free-field microphone response at 0° sound incidence with grid cover

Lower curve: Pressure response as tested with electrostatic actuator

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