

PRODUCT DATA

1/8" Pressure-field Microphone — Type 4138

Type 4138 is designed for high-level and very high-frequency measurements and measurements in confined spaces. Being externally polarized, Type 4138 must be used with a classical preamplifier.



080207

USES

- High-level and very high-frequency measurements
- Pulse measurements
- Applications which require a high degree of spatial resolution or where space is limited, for example, model testing

FEATURES

- Sensitivity: 1 mV/Pa
- Frequency: 6.5 Hz to 140 kHz
- Dynamic Range: 52.2 to 168 dB
- Temperature: -30 to 100°C (-22 to 212°C)
- Polarization: 200 V external

Description

Use of Pressure-field Microphones

Pressure-field microphones should be used for making measurements in small, closed couplers or close to hard, reflective surfaces. Such microphones are optimised to have a flat frequency response in a pressure field. Because of its small size, Type 4138 can also be used for random-incidence measurements at audio frequencies, where its frequency response is less dependent on angle of incidence.

Polarization Voltage

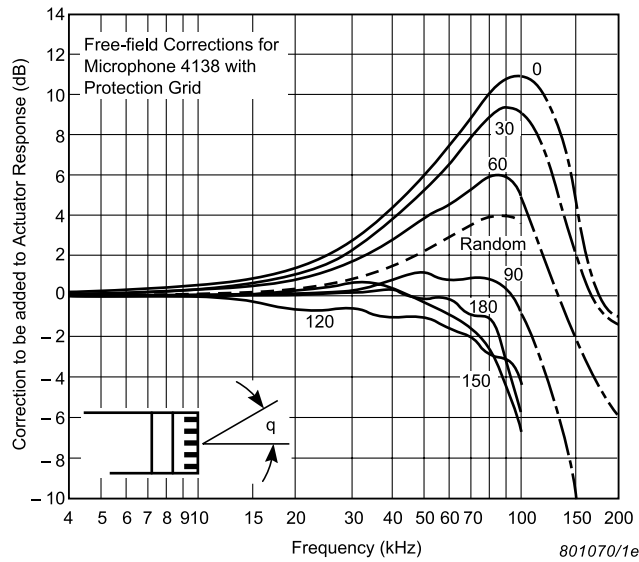
Type 4138 requires an external polarization voltage and therefore must be used with a classical preamplifier such as Brüel & Kjær Type 2670 together with 1/8" to 1/4" Adaptor UA-0160.

Calibration

The sensitivity of Type 4138 can be calibrated at 250 Hz using Pistonphone Type 4228, or at 1 kHz using Sound Calibrator Type 4231, in both cases using Adaptor DP-0774. The pressure-field response can be measured using Electrostatic Actuator UA-0033 with Actuator Adaptor DB-0900.

Free-field Correction

Fig. 1
Free-field correction curves for Type 4138



Free-field corrections must be added to the pressure (actuator) response of the microphone in order to obtain the free-field response at a particular angle of incidence. The free-field correction represents the increase of sound pressure caused by diffraction of the sound waves around the microphone and is only significant at very high frequencies where the wavelength is comparable with the external dimensions of the microphone. The free-field corrections for various angles of incidence are given in Fig. 1.

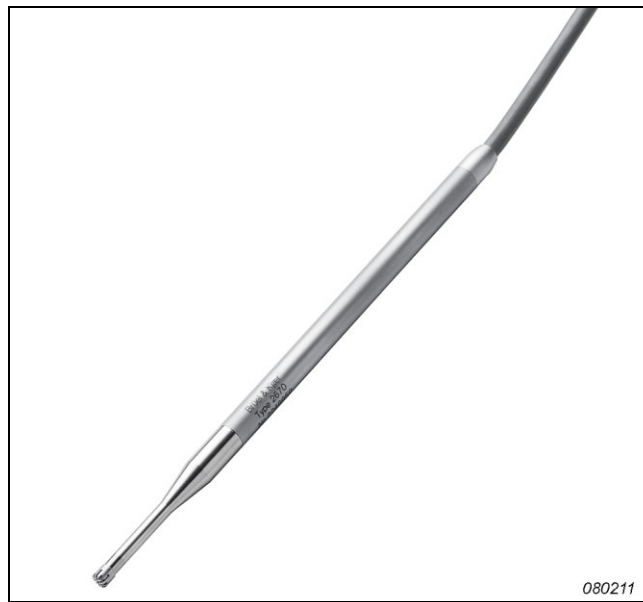
Manufacturing and Stability

Due to its small dimensions, a 1/8" microphone should be treated more carefully than, for example, a robust, 1/2" microphone. When not in use, the microphone should be kept on the adaptor/preamplifier, preferably in the microphone box.

All Brüel & Kjær Measuring Microphones are assembled in a clean room. This ensures that the microphones maintain their inherent low noise floor and high stability, even when used in environments with a combination of high humidity and at high temperature.

TEDS Microphones

Fig. 2
Type 4138 used with Preamplifier Type 2670

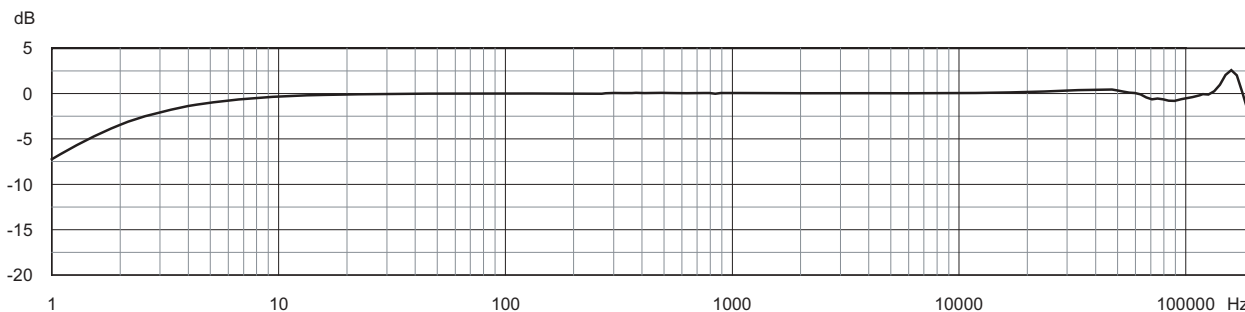


Type 4138 is available in TEDS combinations with the classical preamplifier Type 2669 or 2670 and a suitable adaptor. The TEDS microphone is considered one unit and has been sealed in a clean environment. The TEDS is programmed with the loaded sensitivity of the actual cartridge and the data is therefore readily available. The default TEDS template is to IEEE P1451.4 but TEDS to IEEE 1451.4 is available on request.

Individual Calibration Data

Each Type 4138 comes with an individual calibration chart with information about the open-circuit sensitivity and the electrostatic actuator response.

Fig. 3 Typical frequency response of Type 4138 recorded by means of the electrostatic actuator method



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Specifications – 1/8" Pressure-field Microphone Type 4138

IEC 61094-4 Type Designation: N/A
Polarization Voltage: 200 V (external)
Open-circuit Sensitivity (250 Hz)^a:
 1 mV/Pa, -60 dB ± 1.5 dB re 1 V/Pa
Random-incidence and Pressure-field Response^a:
 6.5 Hz to 140 kHz: ± 2 dB
Lower Limiting Frequency (-3 dB)^a: 0.05 – 5 Hz
Pressure Equalization Vent: Side vented
Diaphragm Resonance Frequency:
 160 kHz (90° phase shift)
Cartridge Capacitance^a (Polarized): 3.5 pF at 250 Hz
Equivalent Air Volume: 0.1 mm³ (250 Hz)
Cartridge Thermal Noise: 43 dB(A)
Upper Limit of Dynamic Range (3% Distortion): >168 dB SPL
Max. Sound Pressure Level: 171 dB (peak)

ENVIRONMENTAL

Operating Temperature Range:
 -30 to +100°C (-22 to +212°F)

a. Individually calibrated

Storage Temperature (in Microphone Box):
 -30 to +70°C (-22 to +158°F)
Temperature Coefficient (250 Hz):
 -0.01 dB/K (-10 to +50°C, 14 to 122°F)
Pressure Coefficient: -0.01 dB/kPa, typical
Influence of Humidity: < 0.1 dB (without condensation)
Vibration Sensitivity (< 1000 Hz):
 58 dB equivalent SPL for 1 m/s² axial vibration
Magnetic Field Sensitivity: 40 dB SPL for 80 A/m, 50 Hz field
DIMENSIONS
Diameter with Grid: 3.5 mm (0.14")
Diameter without Grid: 3.175 mm (0.12")
Height with Grid: 6.7 mm (0.26")
Height without Grid: 6 mm (0.23")
Thread for Preamplifier Mounting: M3 × 0.2

Note: All values are typical at 23°C (73.4°F), 101.3 kPa and 50% RH unless otherwise specified



Compliance with EMC Directive

Ordering Information

Type 4138 1/8" Pressure-field Microphone

TEDS COMBINATIONS

4138-A-015 1/8" Pressure-field Microphone Type 4138, UA-0160, Type 2670
 4138-B-006 1/8" Pressure-field Microphone Type 4138, UA-0036, Type 2669-B
 4138-C-006 1/8" Pressure-field Microphone Type 4138, UA-0036, Type 2669-C
 4138-L-006 1/8" Pressure-field Microphone Type 4138, UA-0036, Type 2669-L

OPTIONAL ACCESSORIES

Type 2670 1/4" Microphone Preamplifier
 UA-0160 1/8" to 1/4" Adaptor
 Type 2669-B 1/2" Microphone Preamplifier, Cable with B&K 7-pin connector
 Type 2669-C 1/2" Microphone Preamplifier, no cable

Type 2669-L 1/2" Microphone Preamplifier, cable with LEMO connector
 UA-0036 1/8" to 1/2" Adaptor
 UA-0355 1/8" Nose Cone
 DB-0900 Adaptor for Electrostatic Actuator UA-0033
 UA-0033 Electrostatic Actuator
 DP-0774 1/8" Calibration Adaptor for Types 4228 and 4231
 EW-9004 Removal Tool for Flush Mounted 1/8" Microphone

CALIBRATION SERVICES

4138-CAI Accredited Initial Calibration
 4138-CAF Accredited Calibration
 4138-CFF Factory Standard Calibration

For information on microphone calibration equipment and microphone accessories, please refer to the relevant product data sheets



Brüel & Kjær reserves the right to change specifications and accessories without notice

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