

# PRODUCT DATA

## 1/2" Prepolarized Free-field Microphone — Type 4188

Type 4188 is designed for free-field measurements where an economy microphone with medium sensitivity is required. Being prepolarized, Type 4188 can be used with both DeltaTron® and classical preamplifiers.



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### USES

- Medium class sound level meters
- Equipment complying with IEC 61672 class 1
- Random-incidence measurements
- Portable sound measuring equipment

### FEATURES

- Sensitivity: 31.6 mV/Pa
- Frequency: 8 Hz – 12.5 kHz
- Dynamic Range: 15.8 – 146 dB
- Temperature: –30 to +125°C (–22 to +257°F)
- Polarization: Prepolarized

### Use of Free-field Microphones

At higher frequencies, reflections and diffraction cause a pressure increase in front of the diaphragm of a microphone. If not corrected for, this would result in an increased output voltage. A free-field optimisation means that the frequency response of the microphone has been designed in such a way that the free-field response at 0 degrees incidence is flat. This microphone is optimised for use with the protection grid in place.

Free-field microphones are commonly used for sound measurement in an anechoic chamber or far away from reflecting buildings, etc. Another area for free-field microphones is for general electroacoustic measurements like loudspeaker and microphone measurements.

Type 4188 is suited for use in IEC 61672 class 1 Sound Level Meters and for general acoustic measurements where a robust and stable free-field microphone with an upper frequency of 12.5 kHz is sufficient. When used with Random Incidence Corrector DZ-9566, Type 4188 can also be used for random-incidence measurements according to ANSI standards.

### Manufacturing and Stability

A press-fitted, stainless-steel diaphragm and a special way of mounting the back-plate make Type 4188 especially robust without sacrificing the excellent long-term stability

– Type 4188 will withstand the 1 m drop test of IEC 60068–2–32.

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 high temperature.

### Polarization Voltage

Being prepolarized, Type 4188 is especially well suited for battery-operated equipment or for operation in environments with high humidity.

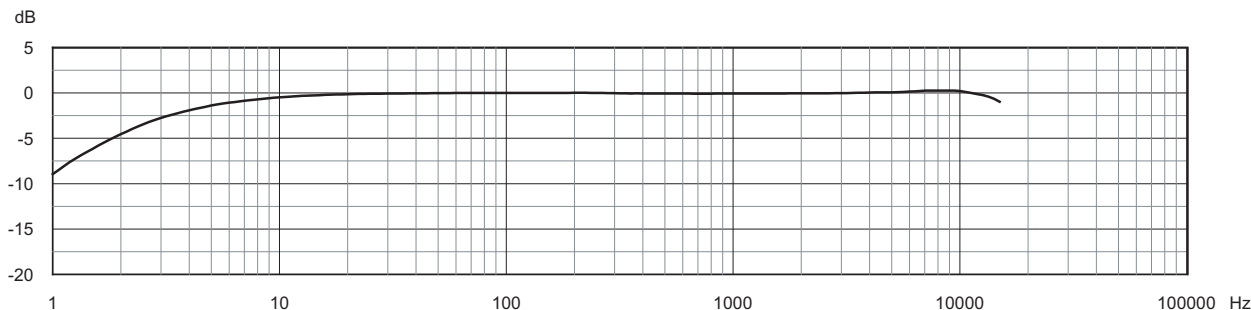
### TEDS Microphones

Type 4188 is available in TEDS combinations with either classical or DeltaTron type preamplifier. 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 according to IEEE P1451.4 but TEDS to IEEE 1451.4 is available on request.

### Individual Calibration Data

Each Type 4188 is delivered with individual calibration of its open-circuit sensitivity and a graph showing the typical free-field frequency response.

**Fig. 1** Typical free-field response of the microphone with protection grid. The low-frequency response is valid when the vent is exposed to the sound field



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## Specifications – 1/2" Free-field Microphone Type 4188

**IEC 61094–4 Type Designation:** WS 2F

**Polarization Voltage:** 0 V (prepolarized)

**Open-circuit Sensitivity (250 Hz)<sup>a</sup>:**

31.6 mV/Pa,

-30 dB ±2 dB re 1 V/Pa

**0° Incidence Free-field Response<sup>a</sup>:**

12.5 Hz to 8 kHz: ±1 dB

8 Hz to 12.5 kHz ±2 dB

**Lower Limiting Frequency (-3 dB):**

1 to 5 Hz

**Pressure Equalization Vent:** Rear vented

**Diaphragm Resonance Frequency:**

9 kHz (90° phase shift)

**Cartridge Capacitance<sup>a</sup>:** 12 pF at 250 Hz

**Equivalent Air Volume:** 65 mm<sup>3</sup> (250 Hz)

**Pistonphone Correction** (Type 4228 with

DP-0776): 0.02 dB

**Cartridge Thermal Noise:**

14.2 dB(A), 14.5 dB(Lin)

**Upper Limit of Dynamic Range**

(3% Distortion): >146 dB SPL<sup>b</sup>

**Max. Sound Pressure Level:** 157 dB (peak)

a. Individually calibrated

### ENVIRONMENTAL

**Operating Temperature Range:**

-30 to +125°C (-22 to +257°F)

Max. 70°C (158°F) with DZ-9566

**Storage Temperature:**

**In Microphone Box:** -30 to +70°C

(-22 to +158°F)

**Temperature Coefficient (250 Hz):**

0.005 dB/K (-10 to +50°C, 14 to 122°F)

**Pressure Coefficient:** -0.021 dB/kPa

**Operating Humidity Range:**

0 to 100% RH (without condensation)

**Influence of Humidity:**

<0.1 dB in the absence of condensation

**Vibration Sensitivity (<1000 Hz):** 63.5 dB

equivalent SPL for 1 m/s<sup>2</sup> axial vibration

**Magnetic Field Sensitivity:**

7 dB SPL for 80 A/m, 50 Hz field

**Estimated Long-term Stability:**

>1000 years/dB in dry air at 20°C (68°F)

b. 140 dB (peak) with DeltaTron preamplifier and 24 V supply; 140 dB (143 dB peak) with ±15 V supply

>10 hours/dB in dry air at 150°C (302°F)

>40 years/dB in air at 20°C (68°F), 90% RH

>6 months/dB in air at 50°C (122°F), 90% RH

### DIMENSIONS

**Diameter with Grid:** 13.2 mm (0.52")

**Diameter without Grid:** 12.7 mm (0.50")

14.35 mm (0.56") with DZ-9566

**Height with Grid:** 14.9 mm (0.59")

**Height without Grid:** 14 mm (0.55")

16.7 mm (0.66") with DZ-9566

**Thread for Preamplifier Mounting:**

11.7 mm–60 UNS

**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 4188 1/2" Prepolarized Free-field Microphone

Includes the following accessories:

- BC-0251 Calibration Chart<sup>c</sup>
- DZ-9566 Random Incidence Corrector

### TEDS COMBINATIONS

4188-A-021 1/2" Free-field Microphone with Preamplifier Type 2671

4188-A-031 1/2" Free-field Microphone with Preamplifier Type 2699

c. State microphone serial number if re-ordering calibration data

4188-B-001 1/2" Free-field Microphone with Preamplifier Type 2669-B

4188-C-001 1/2" Free-field Microphone with Preamplifier Type 2669-C

4188-L-001 1/2" Free-field Microphone with Preamplifier Type 2669-L

### OPTIONAL ACCESSORIES

Type 2669 1/2" Microphone Preamplifier

Type 2671 1/2" DeltaTron Preamplifier

2671-W-001 1/2" DeltaTron Preamplifier

(version with LLF <1.2 Hz)

Type 2699 1/2" DeltaTron Preamplifier,

A-weighted

Type 4231 Sound Calibrator

Type 4228 Pistonphone

Type 4226 Multifunction Acoustic Calibrator

DP-0776 Calibration Adaptor for 1/2" Microphones

UA-0033 Electrostatic Actuator

UA-1260 1/2" Angle Adaptor (approx. 80°)

UA 0386 Nose Cone for 1/2" Microphone

UA-0237 Windscreen for 1/2" Microphone,

90 mm diameter

UA-0459 Windscreen for 1/2" Microphone,

65 mm diameter

BA 5105 The Microphone Handbook

### CALIBRATION SERVICES

4188-CFF Factory Standard Calibration

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

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