

# PRODUCT DATA

## 1/4" Free-field Microphone — Type 4939

Type 4939 is designed for high-level and high-frequency measurements where a microphone with free-field response is needed. Being externally polarized, Type 4939 must be used with a classical preamplifier.



080110

### USES

- High-level measurements
- High-frequency measurements
- Model testing

### FEATURES

- Sensitivity: 4 mV/Pa
- Frequency: 4 Hz – 100 kHz
- Dynamic Range: 28 – 164 dB
- Temperature: –40 to +150°C (–40 to +302°F)
- Polarization: 200 V external

### Use of Free-field Microphones

At higher frequencies, reflections and diffractions cause a pressure increase in front of the diaphragm. If not corrected for, this would result in an increased output voltage from the microphone. 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 is only valid when the microphone is used without the protection grid.

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

Type 4939 is suited for all high-level, high-frequency measurements where a robust and stable free-field microphone is required.

### Manufacturing and Stability

A laser-welded, stainless-steel diaphragm ensures superior long-term stability and mechanical robustness – Type 4939 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 noise floor and high stability, even

when used in environments with a combination of high humidity and high temperature.

### Polarization Voltage

Type 4939 requires an external polarization voltage and must therefore be used with a classical preamplifier. Externally polarized microphones may be used at higher temperatures without severe changes in sensitivity.

### TEDS Microphones

Type 4939 is available in TEDS combinations with different variants classical preamplifiers. 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 in the transducer. The default TEDS template is according to IEEE P1451.4 but TEDS to IEEE 1451.4 is available on request.

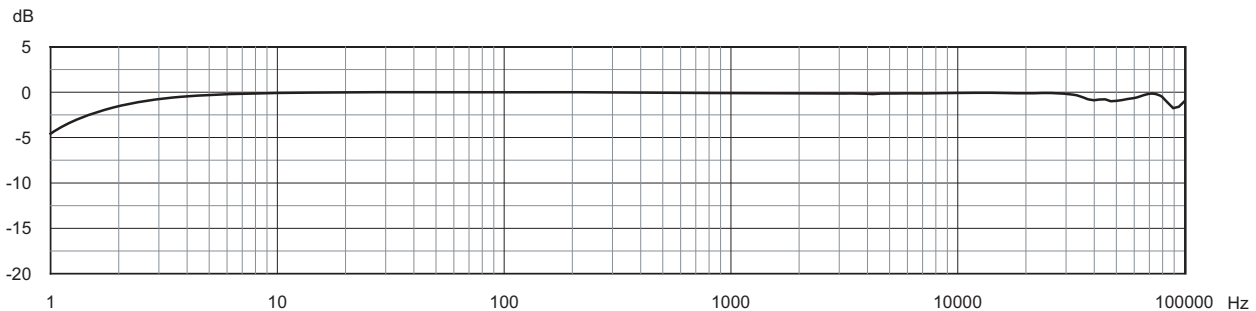
### Individual Calibration Data

Each Type 4939 comes with an individual calibration chart including information about the open-circuit sensitivity, the frequency response in a free field as well as the electrostatic actuator response.

An enclosed mini-CD contains the individual calibration data at 1/12-octave frequencies plus a wealth of technical information, such as the influence of different accessories,

response in different sound fields and much more. Using time correction for different measurement situations, can the CD data and the REq-X feature of PULSE™, a real-increase measurement accuracy.

**Fig. 1** Typical free-field response of Type 4939 without protection grid. The low-frequency response is valid when the vent is exposed to the sound field



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## Specifications – 1/4" Free-field Microphone Type 4939 (valid from serial number 2496612)

**IEC 61094-4 Type Designation:** WS 3F

**Polarization Voltage:** 200 V

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

4 mV/Pa, -48 dB ±3 dB re 1 V/Pa

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

4 Hz to 100 kHz: ±2 dB

**Lower Limiting Frequency (-3 dB)<sup>a</sup>:**

0.3 to 3 Hz

**Pressure Equalization Vent:** Side vented

**Diaphragm Resonance Frequency:**

80 kHz (90° phase shift)

**Polarized Cartridge Capacitance<sup>a</sup>:**

6.1 pF at 250 Hz

**Equivalent Air Volume:** 0.6 mm<sup>3</sup> (250 Hz)

**Cartridge Thermal Noise:**

28 dB(A), 33 dB(Lin, 20 Hz – 100 kHz)

**Upper Limit of Dynamic Range**

**(3% Distortion):** >164 dB SPL<sup>b</sup>

**Max. Sound Pressure Level:** 174 dB (peak)

### ENVIRONMENTAL

**Operating Temperature Range:**

-40 to +150°C (-40 to +302°F)

**Storage Temperature:**

**In Microphone Box:** -30 to +70°C

(-22 to +158°F)

**With Mini-CD:** 5 to 50°C (41 to 122°F)

**Temperature Coefficient (250 Hz):**

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

**Pressure Coefficient:** -0.007 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):** 60 dB

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

**Magnetic Field Sensitivity:**

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

### DIMENSIONS

**Diameter with Grid:** 7 mm (0.27")

**Diameter without Grid:** 6.35 mm (0.25")

**Height with Grid:** 10.5 mm (0.41")

**Height without Grid:** 9 mm (0.35")

**Thread for Preamp Mounting:**

5.7 mm-60 UNS

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

a. Individually calibrated

b. 162 dB (peak) with ±15 V preamplifier supply voltage



Compliance with EMC Directive

## Ordering Information

Type 4939 1/4" Free-field Microphone

Includes the following accessories:

- BC-0229: Calibration Chart<sup>c</sup>
- BC-5002: Microphone Data CD<sup>c</sup>

### TEDS COMBINATIONS

4939-A-011 1/4" Free-field Microphone, with Preamplifier Type 2670

4939-B-002 1/4" Free-field Microphone, with Preamplifier Type 2669-B and Adaptor UA-0035

4939-C-002 1/4" Free-field Microphone, with Preamplifier Type 2669-C and Adaptor UA-0035

4939-L-002 1/4" Free-field Microphone, with Preamplifier Type 2669-L and Adaptor UA-0035

### OPTIONAL ACCESSORIES

Type 2670 1/4" Microphone Preamplifier

Type 4231 Sound Calibrator

Type 4228 Pistonphone

Type 4226 Multifunction Acoustic

Calibrator

DP-0775 Calibration Adaptor for 1/4" Microphones

UA-0033 Electrostatic Actuator

DB-0264 1/4" Adaptor for UA-0033

UA-0035 1/4" to 1/2" Adaptor, L = 72.5 mm

WA-0375 1/4" to 1/2" Adaptor, L = 32 mm

EU-4000 Angle Piece

UA-0385 Nose Cone for 1/4" Microphone

WQ-1099 Windscreen for 1/4" Microphone, 65 mm diameter

WQ-1133 Windscreen for 1/4" Microphone, elliptical

### CALIBRATION SERVICES

4939-CAI Accredited Initial Calibration

4939-CAF Accredited Calibration

4939-CFF Factory Standard Calibration

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

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

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