

PRODUCT DATA

½" Free-field Microphone — Type 4176

USES

- Sound measurements to IEC 61672, and ANSI S 1.4 -1983
- As a sound level meter microphone

FEATURES

- Sensitivity: 50 mV/Pa
- Frequency: 6.5 Hz to 12.5 kHz
- Dynamic Range: 14 to 142 dB
- Temperature: -30 to 100°C (-22 to 212°C)
- Prepolarized

Description*

Type 4176 is a prepolarized ½" Free-field Microphone designed for accurate and reliable sound measurements, as required for sound level meters in accordance with IEC 61672 class 1 and ANSI S 1.4 Type 1. Prepolarization has a number of benefits. First, power consumption and space are reduced, desirable for portable instruments. Second, the reliability of the associated preamplifier is improved in humid and polluted atmospheres. Together with a robust construction, these factors make the prepolarized condenser microphone particularly suitable for field measurements, both outdoors and in industrial environments.

Static pressure equalization between the internal cavity and the atmosphere takes place at the rear of the cartridge via a vent whose size determines the lower limiting frequency. Rear venting permits the use of a dehumidifier for operation in especially humid environments.

The pressed on stainless steel diaphragm ensures both robustness and corrosion resistance. The microphone is fitted with a non-removable protection grid. The microphone comes with a calibration chart with typical frequency response and an individual sensitivity value.

Calibration

The sensitivity of Type 4176 can be calibrated at 250 Hz using Pistonphone Type 4228 with Adaptor DP0776, or

* Valid from serial no. 2410900



- High resistance to humidity

at 1 kHz using Sound Level Calibrator Type 4231. Calibration in an extended frequency range is possible using Multifunction Acoustic Calibrator Type 4226.

Free-field Correction

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

Fig. 1 Free-field correction curves for Type 4176

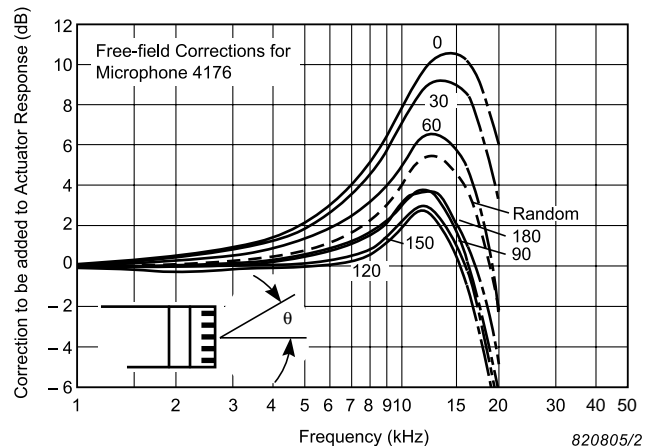
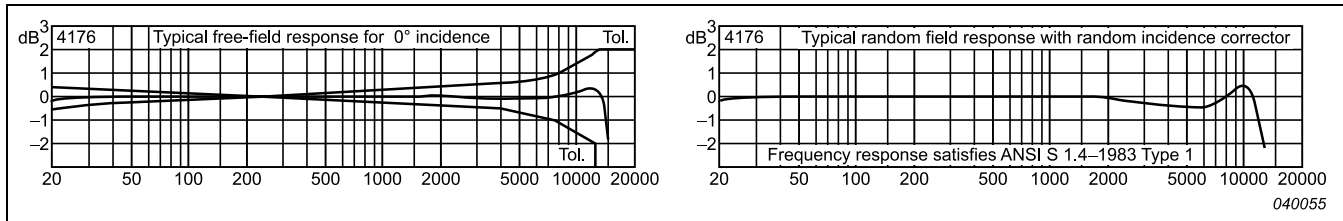


Fig. 2 Typical frequency response curves for Type 4176, as shown on the reverse of the calibration chart



Specifications – ½" Free-field Microphone Type 4176

COMPLIANCE WITH STANDARDS



compliance with EMC Directive

The data below are valid at 23°C, 101.3 kPa and 50% RH unless otherwise specified

NOMINAL DIAMETER

½"

POLARIZATION VOLTAGE

External: 0 V

OPEN CIRCUIT SENSITIVITY (250 Hz)*

-26 ±2 dB re 1 V/Pa, 50 mV/Pa

FREQUENCY RESPONSE*

Free-field, 0° Incidence and Random-incidence with corrector DZ 9566
6.5 Hz to 12.5 kHz: ±2 dB

LOWER LIMITING FREQUENCY (-3 dB)

0.5 Hz to 5 Hz

*Individually calibrated

PRESSURE EQUALIZATION VENT

Rear vented

DIAPHRAGM RESONANCE FREQUENCY

12.5 kHz (90° phase-shift)

EQUIVALENT AIR VOLUME

50 mm³ (250 Hz)

CARTRIDGE THERMAL NOISE

13.5 dB(A)

3% DISTORTION LIMIT (UPPER)

> 142 dB re 20 µPa at 100 Hz

NOMINAL CARTRIDGE CAPACITANCE*

12.5 pF at 250 Hz

EXPECTED LONG-TERM STABILITY

< 0.004 dB/year at 20°C

Environmental

OPERATING TEMPERATURE RANGE

-30 to +100°C (-22 to +212°F)

MEAN TEMPERATURE COEFFICIENT

-0.004 dB/°C (-10°C < t < +50°C)

PRESSURE COEFFICIENT

-0.02 dB/kPa, typical

INFLUENCE OF HUMIDITY

< 0.1 dB in the absence of condensation

INFLUENCE OF VIBRATION

60 dB re 20 µPa and 1 ms⁻² axial vibration

INFLUENCE OF MAGNETIC FIELD

30 dB re 20 µPa in 50 Hz, 80 A/m field

Dimensions

DIAMETER

13.2 mm (0.52") (with grid)

12.7 mm (0.50") (without grid)

HEIGHT

16.7 mm (0.65") (with grid)

14.9 mm (0.58") (without grid)

THREAD FOR PREAMPLIFIER MOUNTING

11.7 mm – 60 UNS

Ordering Information

Type 4176 ½" Microphone

Includes the following accessory:

DZ 9566 Random-incidence Corrector

OPTIONAL ACCESSORIES

Type 2669 B ½" Microphone Preamp, cable w. B&K 7-pin connector

Type 2669 C ½" Microphone Preamp, no cable

Type 2669 L ½" Microphone Preamp, cable w. with LEMO connector

Type 2673 ½" Microphone Preamp w. insert voltage calibration

Type 2671 ½" DeltaTron Preamp

Type 4228 Pistonphone

Type 4231 Sound Calibrator

Type 4226 Multifunction Acoustic Calibrator

DP 0776 ½" Adaptor for Pistonphone Type 4228

UA 0237 ½" Windscreen Ø90 mm

UA 0459 ½" Windscreen Ø65 mm

UA 0386 ½" Nose Cone

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

HEADQUARTERS: DK-2850 Nærum · Denmark · Telephone: +45 4580 0500
Fax: +45 4580 1405 · www.bksv.com · info@bksv.com

Australia (+61) 2 9889-8888 · Austria (+43) 1 865 74 00 · Brazil (+55) 11 5188-8166
Canada (+1) 514 695-8225 · China (+86) 10 680 29906 · Czech Republic (+420) 2 6702 1100
Finland (+358) 9-755 950 · France (+33) 1 69 90 71 00 · Germany (+49) 421 17 87 0
Hong Kong (+852) 2548 7486 · Hungary (+36) 1 215 83 05 · Ireland (+353) 1 807 4083
Italy (+39) 0257 68061 · Japan (+81) 3 3779 8671 · Republic of Korea (+82) 2 3473 0605
Netherlands (+31) 318 55 9290 · Norway (+47) 66 77 11 55 · Poland (+48) 22 816 75 56
Portugal (+351) 21 47 11 4 53 · Singapore (+65) 377 4512 · Slovak Republic (+421) 25 443 0701
Spain (+34) 91 659 0820 · Sweden (+46) 8 449 8600 · Switzerland (+41) 1 880 7035
Taiwan (+886) 2 2502 7255 · United Kingdom (+44) 14 38 739 000 · USA (+1) 800 332 2040

Local representatives and service organisations worldwide

Brüel & Kjær