

Horn-coupled Probe Microphone

type 4170

FEATURES:

- Wide frequency range 30 Hz to 8 kHz
- High sensitivity
- High acoustic impedance
- All data individually calibrated and supplied
- Small size and low weight

The probe Microphone Type 4170 is a high precision measuring microphone having the same excellent performance as the other B&K measuring microphones.

The microphone is calibrated and delivered with a calibration chart giving the frequency response and all data necessary for accurate measurements.

It is designed to cover a wide range of measurements where minimum disturbance of the sound field is important. This is achieved by giving the probe a very small diameter and a very high orifice acoustic impedance. The 4170 uses an acoustical exponential horn to couple a very thin probe tube to a 1/2" condenser microphone. The probe is attached to the narrow end of the horn and the microphone is connected to the wide end. An acoustic matching impedance in the microphone end of the horn equalizes the frequency response of the assembly. A frequency response of 30 Hz to 8 kHz within 4 dB is thereby obtained (Fig.1).

In order to measure correctly, a probe microphone must be much more sensitive to sound pressures at the probe orifice than it is to sound transmission through the side walls of probe and horn. In the 4170 the sound attenuation of the walls is greater than 20 dB at all frequencies between 30 Hz and 10 kHz. Fig. 2 shows the sensitivities of the 4170 with open and closed probe orifice, when placed in a plane sinusoidal sound wave.

USES:

- Measurements in the ear
- Measurements inside intricate machinery
- Measurements in sound-insulating materials
- Acoustical studies of musical instruments
- Measurements in exhausts, burners, and chimneys

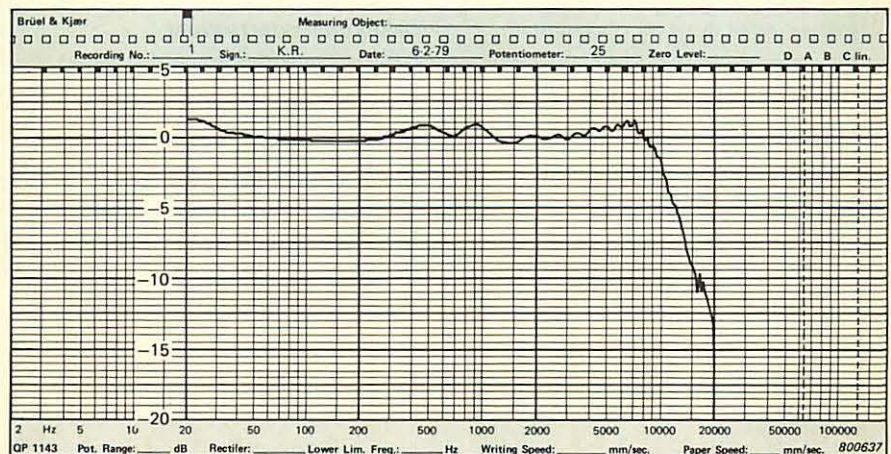
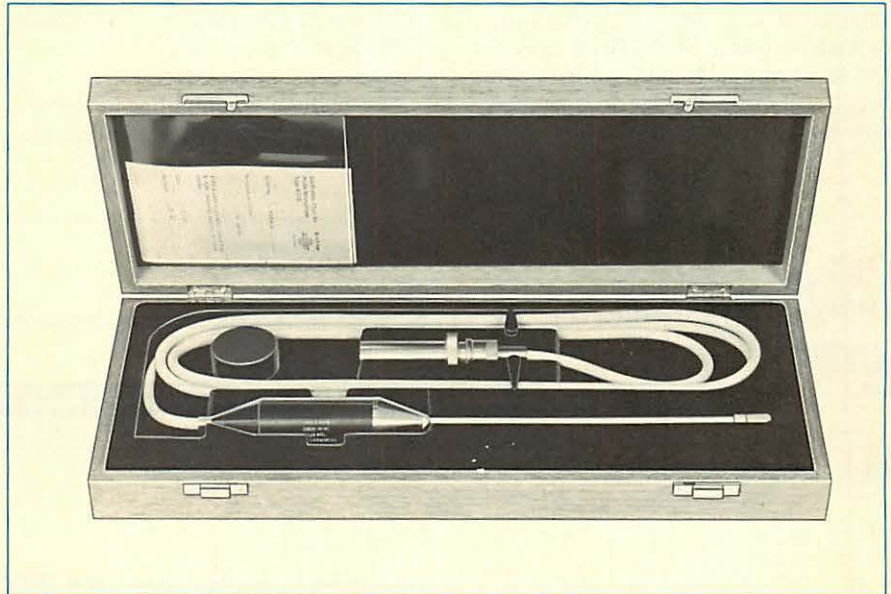


Fig.1 Frequency response of the 4170

An Adaptor DP 0181 for fitting the 4170 to the Pistonphone Type 4220 or the Sound Level Calibrator Type 4230 is supplied for calibration.

The probe has an outer diameter of 1,25mm at the tip. The horn is 120mm long. The horn and the probe are normally covered by a stainless steel tube, which protects them and gives them a uniform outer diameter. The protection tube may be removed if the probe only can be inserted at the measuring spot. (See Fig. 3).

The maximum allowable temperature that the tip of the probe tube may be exposed to during continuous operation is 200°C, with the protection tube removed. Intermittent use at temperatures up to 400°C is possible. This allows measurements to be carried out inside furnaces, ovens etc. In such applications it should be noted that the tip filter may be adversely affected due to accelerated corrosion at high temperatures and clogging of the filter in dusty environments. This may result in a change in sensitivity and frequency response.

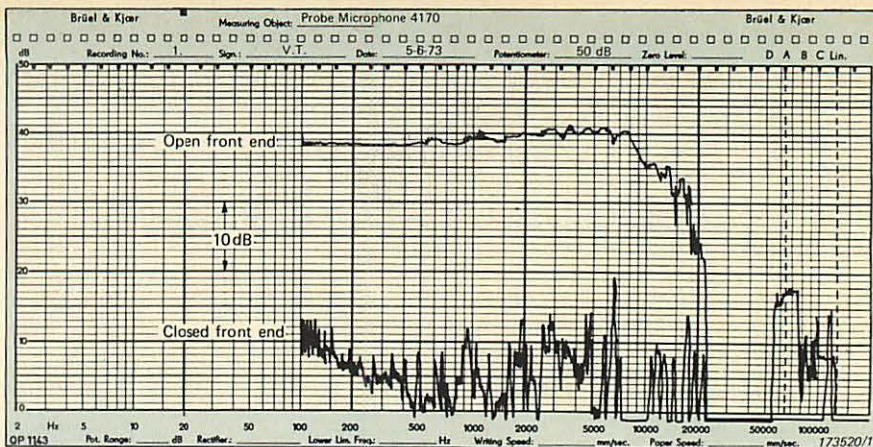


Fig.2. Sensitivities of the 4170 with open and closed probe tube

A preamplifier is mounted inside the handle of the 4170 and connects, via a cable and a standard 7-pin plug, directly to B & K's extensive range of Measuring Amplifiers and Frequency Analyzers.

The built-in preamplifier is electrically and mechanically similar to the

B & K 1/2" Microphone Preamplifier Type 2639 and the condenser microphone used corresponds to the 1/2" Condenser Microphone Type 4134.

For detailed information on the 2639 and the 4134 see the Microphone Preamplifier and Condenser Microphone data sheets.

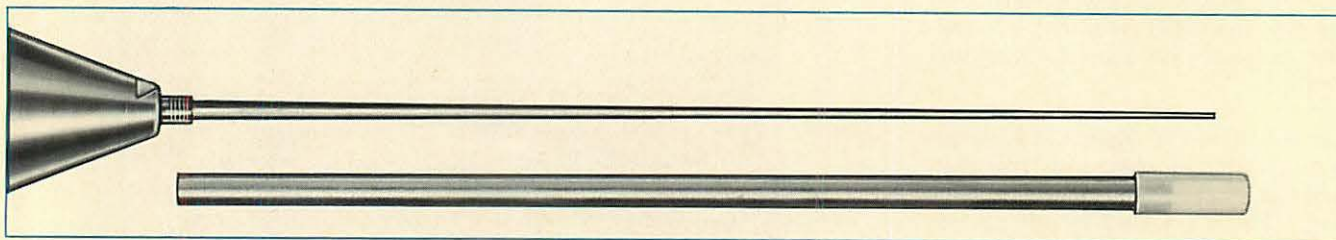


Fig.3. The Probe Microphone with protection tube removed

Specifications 4170

FREQUENCY RESPONSE*:

30 Hz to 8 kHz + 3, -1 dB re 250 Hz

SENSITIVITY AT 250 Hz*:

Typically -58 dB re 1 V/Pa (1,25 mV/Pa)

DISTORTION:

< 1% for SPL's below 170 dB

ACOUSTIC IMPEDANCE OF PROBE

ORIFICE:
> $4 \times 10^8 \text{ Nsm}^{-5}$

* Individually calibrated

NOISE:

$11 \times 10^{-3} \text{ Pa}$ (55 dB re $2 \times 10^{-5} \text{ Pa}$)
(equivalent SPL from 20 Hz to 20 kHz)

OPERATING TEMPERATURE:

Normal use: up to 70°C

HIGH TEMPERATURE OPERATION†

(specified for the tip of the probe tube)

Without Protection Tube: max. 400°C with intermittent use

With Protection Tube: max. 200°C

† There is a risk of degradation of specifications when operated at high temperatures

DIMENSIONS:

Probe Diameter: 1,25 mm (0,05 in)

Diameter of Protection Tube: 5,5 mm (0,22 in)

Length of Protection Tube: 170 mm (6,7 in)

Maximum Diameter of 4170: 28 mm (1,1 in)

Maximum Length of 4170: 315 mm (12,4 in)

WEIGHT:

300 g (0,66 lb)

ACCESSORIES INCLUDED:

Adaptor DP 0181 for connection to Pistonphone Type 4220 and Sound Level Calibrator Type 4230