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Product Data

Mouth Simulator — Type 4227

USES:

- ❍ Quality control testing of frequency response and distortion of telephone transmitters and close-talking microphones
- ❍ Sound source for acoustic measurements

FEATURES:

- ❍ Accurate simulation of human voice field
- ❍ Continuous SPL of 110 dB at 25 mm from lip ring
- ❍ Low distortion
- ❍ Built-in overload protection circuit
- ❍ Optional regulating microphone for very accurate frequency response control
- ❍ Calibration Jig included
- ❍ Conforms to Standards: IEEE 269, 661 and ITU-T Rec. P.51

Mouth Simulator Type 4227 has been developed for use in the testing of telephone transmitters and other microphones where a sound field similar to the human voice field is required.

Type 4227 produces a guaranteed minimum continuous output of 110 dB SPL (200 Hz to 2 kHz) at a distance of 25 mm from the lip ring. A sound pressure level of more than 120 dB is possible with pulsed operation. A built-in overload protection circuit minimizes the risk of accidental damage to the loudspeaker.

Provision exists for fitting a microphone at the mouth opening, for use in a compressor loop to give constant sound pressure output.

Accurate calibration is facilitated by a calibration jig provided with the 4227.



Brüel & Kjær Mouth Simulator Type 4227 is a stable, low distortion sound source used for the testing of acoustic transducers. When testing telephone transmitters and close talking microphones it is required that the sound field closely replicates the sound field generated by the human mouth, as specified in IEEE 269. Type 4227 fulfills this requirement.

Calibration of 4227 can be made with the aid of the Calibration Jig UA 0901 provided. The jig is designed to hold a $^1/_2$″ measuring microphone at a distance of 25 mm from the lip ring (see Fig. 1.). It consists of two interlocking plates which can be fitted together in two ways enabling the microphone to be held with its axis at either 0° or 90° to the mouth axis.

Description

Type 4227 consists of a high quality loudspeaker mounted in a specially shaped housing. A lip ring is mounted on the upper surface of the unit, providing a convenient reference plane for measurements.

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Fig. 1 Mouth Simulator shown with pressure Microphone Type 4134 in jig for calibration according to CCITT P.51. Fpr calibration to IEEE 269, free-field Microphone Type 4133 can be fitted (0° incidence)

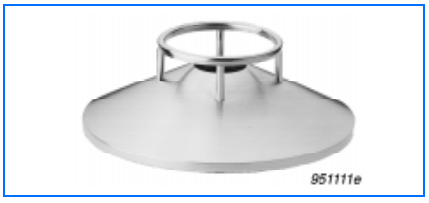


Fig. 2 Special Mouthpiece UA 0899 included for simulating sound field of ealier Type 4219

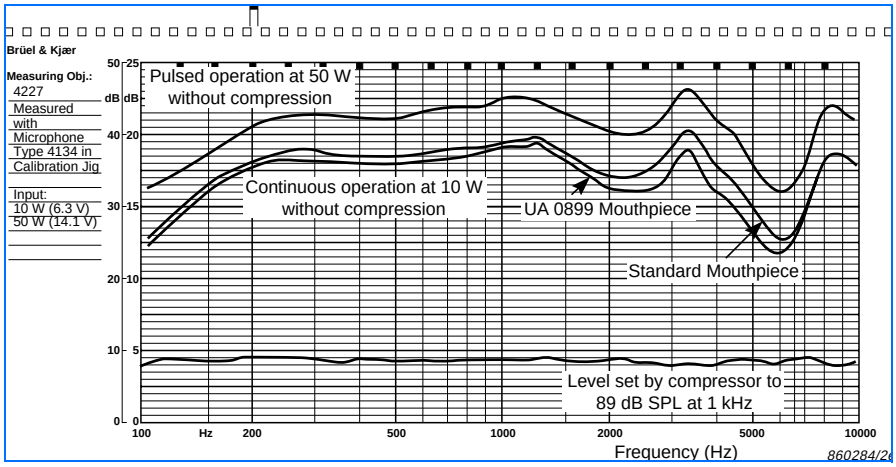


Fig. 3 Frequency response of 4227 at 25 mm distance at 10 W and 50 W without compression, and frequency response with equalization in compressor loop

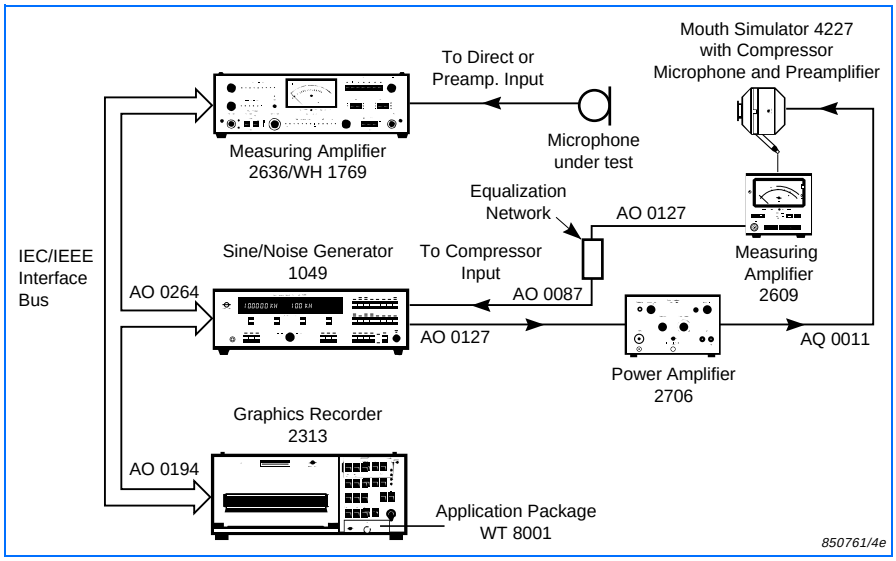


Fig. 4 Microphone tests using Transducer Test System Type 9596, Power Amplifier Type 2706, Mouth Simulator 4227 and a compressor loop facility

Provision is made in the 4227 for fitting a Brüel & Kjær $^1/_4$″ microphone with $^1/_4$″ preamplifier in the mouth opening to monitor the acoustic output level. The use of such a microphone, e.g. in a compressor loop, is strongly recommended whenever an extremely stable system with a flat frequency response is required without sacrificing ease of operation. The 4227 is fitted with a removable plastic dummy $^1/_4$″ microphone in the mouth opening. This ensures that the Mouth Simulator has the same acoustic characteristics whether a monitoring microphone is installed or not.

Frequency Response

Typical frequency responses without regulation for 10 W continuous and 50 W pulsed operation are shown in Fig. 3. A frequency response with less than ± 1 dB deviation over the frequency range (100 Hz to 10 kHz) at 25 mm distance from the lip ring can be easily obtained with the aid of a compressor loop arrangement. The compressor loop consists of a $^1/_4$″ microphone, inserted in the mouth opening of the 4227, and a simple correction network (see Fig. 3.).

The 4227 is delivered with a calibration chart giving the frequency response measured at a distance of 25 mm from the lip ring. Detailed operating characteristics, including frequency response relationships are given in the 4227 Instruction Manual.

Output SPL

Type 4227 can produce a minimum SPL of 110 dB in the frequency range 200 Hz to 2 kHz and 100 dB in the range 100 Hz to 8 kHz, at a distance of 25 mm from the lip ring. This is achieved with the maximum continuous power consumption of 10 W.

The Mouth Simulator can be operated at higher power levels for short periods. Power levels of up to 50 W can be safely used for periods of less than 2 s (with 20 s pulse intervals), producing a corresponding SPL of 120 dB, 25 mm from the lip ring.

Applications

Testing of telephone handsets is facilitated with Telephone Test Head Type 4602. This permits the accurate mounting of the handset relative to the 4227 and can also hold various types of artificial ear assemblies.

Accurate automated quality control checks of audio communication transducers can be made with Transducer Test System Type 9596 (Fig. 4) and Electroacoustic Test Systems Types 9598 and 9620.

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Specifications 4227

CONTINUOUS OUTPUT LEVEL:
Min. 110 dB SPL, 200 Hz to 2 kHz
Min. 100 dB SPL, 100 Hz to 8 kHz
Measured 25 mm from lip ring.
See graph abve for SPL range.

DISTORTION (harmonic components up to 8 kHz):
at 94 dB SPL, 25 mm from lip ring
<2%, 200 Hz to 250 Hz
<1% >250 Hz

LOUDSPEAKER:
Max. average power: 10 W at 20 °C (68 °F)
Max. pulsed power: 50 W for 2 seconds
(limited by protection circuit)
Impedance: 4
Diameter: 88 mm (3.5 in)

MOUTH OPENING:
Diameter: 20 mm (0.8 in)

LIP RING:
Position: 10 mm (0.4 in) from mouthpiece
Outer diameter: 48 mm (1.9 in)

DIMENSIONS:
Heigh: 104 mm (4.1 in) to top of lip ring
Diameter: 104 mm (4.1 in)

WEIGHT:
2.2 kg (4.8 in)

COMPLIANCE WITH STANDARDS:

CE	CE-mark indicates compliance with: EMC Directive.
EMC Emission	EN 50081–1 (1992): Generic emission standard. Part 1: Residential, commercial and light industry. CISPR 22 (1993): Limits and methods of radio disturbance characteristics of information technology equipment. Class B Limits. FCC Class B limits.
EMC Immunity	EN 50082–1 (1992): Generic immunity standard. Part 1: Residential, commercial and light industry. **Note:** The above is guaranteed using accessories listed in this Product Data sheet only.
Temperature	IEC 68–2–1 & IEC 68–2–2: Environmental Testing. Cold and Dry Heat. Operating Temperature: –5° to +40°C Storage Temperature: –25° to +70°C
Humidity	IEC 68–2–3: 90% RH (non-condensing at 40°C)
Mechanical	IEC 68–2–6: Vibration: 0.3 mm, 20 m/s^2, 10–500 Hz IEC 68–2–27: Shock: 1000 m/s^2 IEC 68–2–29: Bump: 3000 bumps at 250 m/s^2

Ordering Information

Type 4227 Mouth Simulator

Optional Accessories

UA 0901 Calibration Jig
SO 0005 2 x Lip Ring
DA 0150 1/4″ Plastic Microphone Dummy

UA 0899 Mouthpiece with lip ring (for simulating sound field of ealier Type 4219)

ACCESSORIES AVAILABLE:

4135 or 4136 1/4″ Condenser Microphone for monitoring acoustic output level

2670 Preamplifier for 1/4″ microphone cartridges1/2″ Condenser
4191 or 4192 Microphone for calibration
2669 Preamplifier for 1/2″ microphone cartridges

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

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WORLD HEADQUARTERS:
DK-2850 Naerum · Denmark · Telephone: +45 45 80 05 00 · Fax: +45 45 80 14 05 · Internet: http://www.bk.dk · e-mail: info@bk.dk
Australia (02) 9450-2066 · Austria 00 43-1-865 74 00 · Belgium 016/44 92 25 · Brazil (011) 246-8166 · Canada: (514) 695-8225 · China 10 6841 9625 / 10 6843 7426
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