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Product Data

Reference Sound Source — Type 4204

FEATURES:

- ❍ Fulfils ISO 3741, ISO 3747 and ISO 6926 for calibrated sound power sources
- ❍ Frequency range from 100 Hz to 20 kHz
- ❍ Sound power output 91 dB re 1 pW (A-weighted, 50 Hz line frequency) and 95 dB re 1 pW (A-weighted, 60 Hz line frequency)
- ❍ Temperature range –10°C to +50°C
- ❍ 50 and 60 Hz operation
- ❍ Long-term stability
- ❍ Individual calibration chart supplied
- ❍ Compact and rugged
- ❍ Fitted with safety grid

USES:

- ❍ Comparison method for determination of sound power of noise sources according to ISO 3741
- ❍ Substitution and Juxtaposition methods for determination of sound power of noise sources according to ISO 3747
- ❍ Sound absorption measurements
- ❍ Sound insulation measurements

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Reference Sound Source Type 4204 is a calibrated source of sound power with very well defined operating characteristics and a predictable performance. It is rugged, compact and stable, and is therefore suitable for both field and laboratory use.

Type 4204 is intended for use as a reference source for determination of the sound power output of equipment by the various comparison methods including the method described in ISO 3741, and by the survey methods described in ISO 3747. It is also useful in the field of building acoustics to determine the sound absorption and sound insulation of a room.

The reference sound source consists essentially of a specially designed centrifugal fan driven by a powerful asynchronous motor. The motor is of the external rotor type, and due to the high moment of inertia of the rotor it has a very constant speed of rotation. The motor is mounted on a cast aluminium base, shaped to minimize reflections. The complete assembly of motor and fan is mounted in a cylindrical safety grid fitted with two carrying handles.

The directional characteristic of the reference sound source in the vertical plane varies less than 6 dB for any frequency in the range 100 Hz to 10 kHz (measured in $^1/_3$-octaves). In the horizontal plane, the variation is less than 0.2 dB for frequencies up to 10 kHz (measured in $^1/_3$-octaves). Fig. 1 shows some typical vertical directional characteristics.



The reference sound source fulfils the requirements for reference sound sources as stated in ISO 3741, ISO 3747, ISO 6926 and ANSI S1.31. The use of a reference sound source in noise and sound power measurements on machines is also described in DIN 45635.

The reference sound source has a frequency range of 100 Hz to 20 kHz. In the range from 100 Hz to 10 kHz, the acoustic power output is greater than 70 dB re 1 pW* in any $^1/_3$-octave frequency band. The A-weighted output is typically 91 dB (50 Hz line frequency) and 95 dB (60 Hz line frequency). Fig. 2 shows a typical $^1/_3$-octave frequency response curve of the Type 4204.

* 1 pW = 10^{-12} W

NIST, ISO, IEC, ANSI, NCSL, MIL-STD by www.raeservices.com

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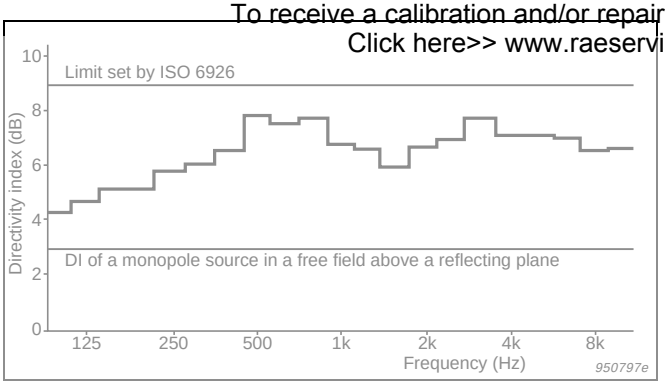


Fig.1 Directivity index measured vertically above the 4204 in 1/3-octave bands

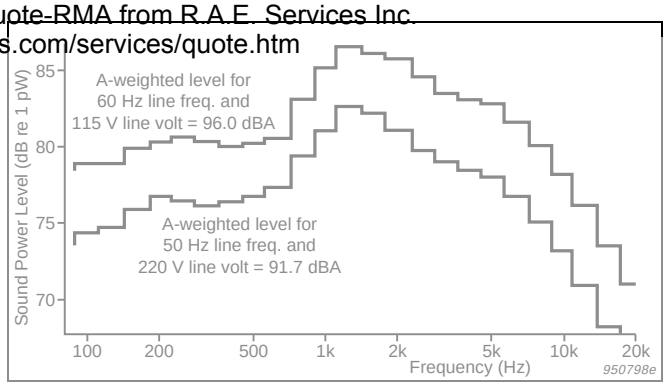


Fig.2 Typical sound power spectrum of Type 4204

Each reference sound source is individually calibrated and, as standard, a calibration table is supplied showing the sound power output from 100 Hz to 20 kHz at 220 V/50 Hz, and 115 V/60 Hz, operating voltages. Temperature, barometric pressure, humidity and rotational speed are all given on the calibration table.

In the field, the sound power produced may differ from the calibrated value. Changes in mains supply line voltage and frequency, ambient pressure, and temperature all affect the rotational speed of the Type 4204. In addition, changes in ambient pressure and temperature alter the specific acoustic impedance of the air, also changing the sound power. Once the values are measured, however, simple formulae can be used to calculate the correct sound power levels from the values given on the calibration table.

Specifications 4204

SOUND POWER OUTPUT:
Measured in $^1/_3$-octaves from 100 Hz to 20 kHz:
> 70 dB re 1 pW
A-WEIGHTED SOUND POWER OUTPUT:
(nominal)
91 dB re 1 pW @ 50 Hz line freq.
95 dB re 1 pW @ 60 Hz line freq.
A-WEIGHTED SOUND PRESSURE LEVEL:
(nominal; diffuse field in a room with an equivalent absorption area of 10 m^2)
87 dB(A) @ 50 Hz line freq.
91 dB(A) @ 60 Hz line freq.
VARIATION OF SOUND INTENSITY WITH DIRECTION:
(100 Hz to 10 kHz measured in $^1/_3$-octaves under free-field conditions)
Vertical Plane: < 6 dB
Horizontal Plane: < 0.2 dB
VARIATION OF SOUND POWER OUTPUT:
With Supply Voltage:
(±10% (50 Hz) And +5% (60 Hz) Of Nominal Voltage):
< ±0.2 dB @ 50 Hz line freq.
< ±0.3 dB @ 60 Hz line freq.
With Barometric Pressure:
Sound power output is proportional to barometric pressure at a constant speed of rotation.
FREQUENCY OF ROTATION:
(nominal):
48 Hz @ 50 Hz line freq.
56 Hz @ 60 Hz line freq.
The frequency of rotation during calibration is given on the calibration chart
POWER SUPPLY:
Supply Voltage:
110, 115, 127, 220 or 240 V AC, 50 or 60 Hz

Power Consumption:
50 Hz: 500 VA; **60 Hz:** 700 VA
DIMENSIONS:
Height: 300 mm (11.8″)
Diameter: 300 mm (11.8″)

Weight: 21 kg (46 lb.)
ACCESSORIES INCLUDED:
VF 0044: 6.3 Amp fuse
2×VF 0043: 12.5 Amp fuses

COMPLIANCE WITH STANDARDS:

CE	CE-mark indicates compliance with: Machinery Directive, EMC Directive and Low Voltage Directive.
Safety	IEC 348 (1978): Safety requirements for electronic measuring apparatus. Safety Class I.
EMC Emission	EN 50081–1 (1992): Generic emission standard. Part 1: Residential, commercial and light industry. EN 50081–2 (1993): Generic emission standard. Part 2: Industrial environment. 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. EN 50082–2 (1995): Generic immunity standard. Part 2: Industrial environment.
Temperature	IEC 68–2–1 & IEC 68–2–2: Environmental Testing. Cold and Dry Heat. Operating Temperature: –10 to +55 °C Storage Temperature: –25 to +70 °C
Humidity	IEC 68–2–3: 90% RH (non-condensing at 30°C)
Mechanical	IEC 68–2–6: Vibration: 0.3 mm, 20 m/s^2, 10–500 Hz IEC 68–2–27: Shock: 750 m/s^2

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

Brüel & Kjær

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