

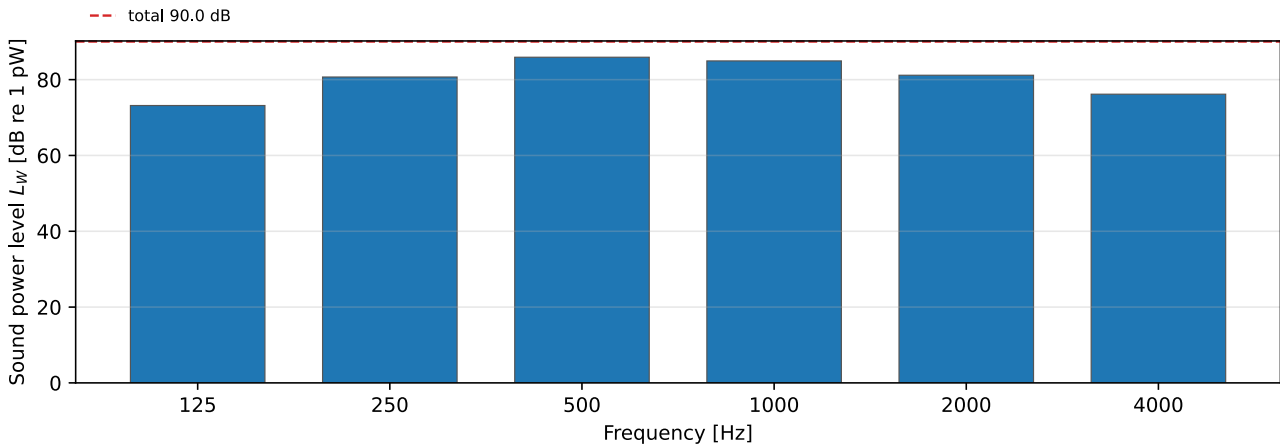
Sound power determination

Determination of the airborne sound power level from the surface vibratory velocity with a determined radiation factor, engineering method (ISO/TS 7849-2:2009).

Client:	Example manufacturing plant	Noise source:	Gearbox casing (steel panel)
Test environment:	Machine hall (source vibration survey)	Instrumentation:	Piezoelectric accelerometer (ISO 16063-21 calibration), s/n 0042
Temperature [°C]:	21	Relative humidity [%]:	45
Ambient pressure [kPa]:	101.1	Date of test:	2026-07-22

Octave-band sound power levels

f [Hz]	L_v [dB]	L_w [dB]
125	78.0	73.2
250	82.0	80.7
500	85.0	85.9
1000	83.0	84.9
2000	79.0	81.2
4000	74.0	76.2



Sound power level $L_{WA} = 88.7 \text{ dB(A) re 1 pW}$

Total $L_w = 90.0 \text{ dB re 1 pW}$
Radiating area $S = 1.60 \text{ m}^2$
Method: engineering, determined radiation factor ϵ

Result vs requirement: $L_{WA} = 88.7 \text{ dB(A)}$, declared limit $\leq 90.0 \text{ dB(A)}$ → **PASS**

$L_w = L_v + 10 \lg(S/S_0) + 10 \lg(\epsilon) + 10 \lg(Z_{c,n}/Z_{c,0})$, $S_0 = 1 \text{ m}^2$ (ISO/TS 7849-1:2009 Eq. 12, -2:2009 Eq. 15), with the surface velocity level $L_v = 20 \lg(v/v_0)$, $v_0 = 5 \cdot 10^{-8} \text{ m/s}$ (Eq. 3) and the fixed impedance term $10 \lg(Z_{c,n}/Z_{c,0}) = 10 \lg(411/400) = 0.12 \text{ dB}$.

The engineering method uses a band-wise radiation factor $\epsilon = P/(Z_{c,n} v^2 S)$ determined from an independent power measurement (ISO/TS 7849-2:2009 Eq. 8, ISO 9614). The A-weighted sound power level L_{WA} combines the band levels with the A-weighting band corrections of ISO 3744:2010 Annex E. Levels are referenced to the reference sound power 1 pW.

Laboratory: Phonometry reference example

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Notes: Sound power from surface vibration, engineering method (ISO/TS 7849-2:2009).

Operator: phonometry Signature: _____

■ The results relate only to the tested specimen.

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