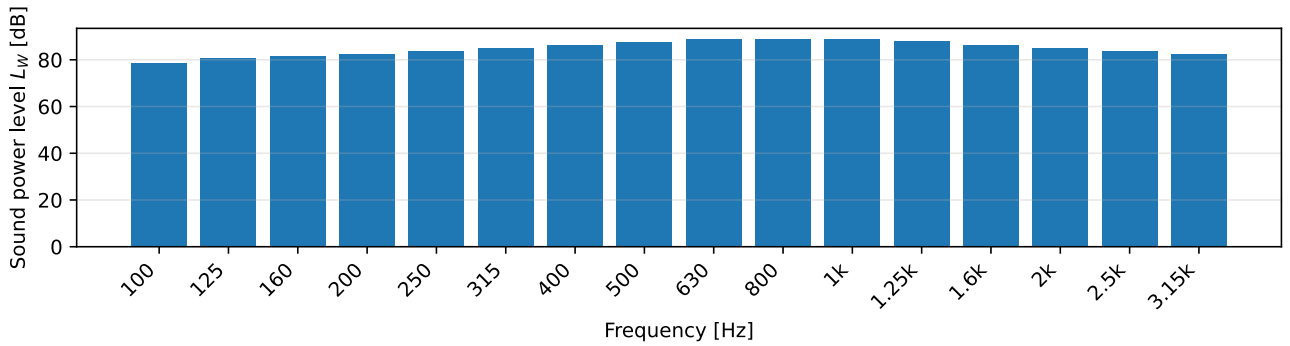
Sound power determination

Determination of the sound power level from the normal sound intensity scanned over a surface enclosing the source, qualified by the Annex C procedure (ISO 9614-3:2002, precision grade (accuracy grade 1)).

Client:	Example manufacturing plant	Noise source:	Hydraulic power pack (floor-standing)
Test environment:	Machine hall with steady background noise	Instrumentation:	Class 1 p-p intensity probe (IEC 61043), 12 mm spacer, s/n 0042
Temperature [°C]:	28	Relative humidity [%]:	40
Ambient pressure [kPa]:	94	Date of test:	2026-08-14

One-third-octave-band sound power levels, 100 Hz to 3150 Hz

f [Hz]	L_W [dB]	L_{W0} [dB]	U [dB]	f [Hz]	L_W [dB]	L_{W0} [dB]	U [dB]
100	78.7	79.3	4.0	630	88.7	89.2	2.0
125	80.8	81.4	4.0	800	89.0	89.6	2.0
160	81.5	82.1	4.0	1000	88.7	89.3	2.0
200	82.4	83.0	3.0	1250	87.8	88.4	2.0
250	83.5	84.1	3.0	1600	86.4	87.0	2.0
315	84.9	85.5	3.0	2000	85.0	85.6	2.0
400	86.4	87.0	2.0	2500	83.7	84.3	2.0
500	87.7	88.3	2.0	3150	82.4	83.0	2.0



Sound power level L_{WA} = **96.7 dB(A)** re 1 pW

Total L_W = 97.9 dB, normalized L_{W0} = 98.5 dB re 1 pW
Normalized L_{WA0} = 97.3 dB(A) re 1 pW
Measurement surface S = 7.11 m^2
Expanded uncertainty U = 2.0 dB

Result vs requirement: L_{WA} = 96.7 dB(A), declared limit ≤ 98.0 dB(A) → **PASS**

$L_W = 10\ \lg(P/P_0)$, P the sum of the partial-surface powers $P_i = I_{n,i}\,S_i$, P_0 = 1 pW (ISO 9614-3:2002 Eq. 5/8/9); $L_{W0} = L_W - 15\ \lg[(B/101\,325)(296.15/(273.15+\theta))]$ refers it to 23 °C, 101 325 Pa (Eq. 10), applied normalization −0.60 dB. Annex B indicators F_T = 0.04, $F_{pI|n|}$ = 1.5 to 11.0 dB, F_{pIn} = 1.5 to 12.5 dB, F_S = 0.24 to 1.10; pressure-residual intensity index δ_{pI0} = 18.0 dB (IEC 61043), dynamic capability L_d = 8.0 dB.

Annex C qualifies a band when the two scans repeat within $|L_{In}(1) - L_{In}(2)| \le s/2$, s from Table 1 (criterion 1), $L_d \ge F_{pIn}$ with K = 10 dB (2), $F_{pIn} - F_{pI|n|} \le 3$ dB (3) and $F_S \le 2$ (4), or a doubled scan-line density gives $0.83 \le F_S(1)/F_S(2) \le 1.2$ (5), which qualifies the band even where $F_S(2) \ge 2$. The A-weighted L_{WA} sums the qualified bands only: a band whose criteria are not satisfied is omitted (clause 10 f) 2)), even where 4.3 would allow a negligible contribution to be kept, as is a band with net power $P \le 0$, to which the method is not applicable (clause 9.2). U is twice the Table 1 standard deviation of reproducibility (clause 4.3, coverage probability 95 %); its A-weighted value holds for the relatively flat 50 Hz to 6.3 kHz spectrum of the Table 1 footnote. Bands omitted from L_{WA}: 100 Hz (criterion 2).

Laboratory: Phonometry reference example
Report no.: EXAMPLE-9614-3
Date: 2026-08-14
Notes: Box surface at 0.25 m; five partial surfaces, four segments each, scanned twice at 0.15 m/s.
Operator: phonometry Signature: _____

■ The results relate only to the tested specimen.