A-Weighted Sound Level from Octave-Band Levels

Overall A-weighted and unweighted sound pressure levels from octave-band levels at 63 Hz to 8 kHz, with the dominant band after weighting.

Method: A-weighting at octave-band centre frequencies (IEC 61672-1 values) and logarithmic addition

Input parameters

Unit system: SI

Parameter	Value	Unit
63 Hz band (dB)	85.000	
125 Hz band (dB)	88.000	
250 Hz band (dB)	86.000	
500 Hz band (dB)	84.000	
1 kHz band (dB)	82.000	
2 kHz band (dB)	79.000	
4 kHz band (dB)	75.000	
8 kHz band (dB)	70.000	

Calculated results

Parameter	Value	Unit
A-weighted level (dBA)	87.009	
Unweighted (linear) level (dB)	92.732	
Dominant band after A-weighting	1,000.0	Hz

Notes for this case

• A-weighting corrections at octave centres: −26.2, −16.1, −8.6, −3.2, 0, +1.2, +1.0, −1.1 dB (IEC 61672 values). The dominant A-weighted band shows where noise control will pay off most.

Formula and method

$$L_A = 10\log_{10}\sum_i 10^{(L_i+A_i)/10}, \quad L_Z = 10\log_{10}\sum_i 10^{L_i/10}$$

Variables

L_{63}	63 Hz band (dB)	-
L_{125}	125 Hz band (dB)	-
L_{250}	250 Hz band (dB)	-
L_{500}	500 Hz band (dB)	-
L_{1k}	1 kHz band (dB)	-
L_{2k}	2 kHz band (dB)	-
L_{4k}	4 kHz band (dB)	-
L_{8k}	8 kHz band (dB)	-
L_A	A-weighted level (dBA)	-
L_Z	Unweighted (linear) level (dB)	-
f_{dom}	Dominant band after A-weighting	1/s

Method and standards

Logarithmic addition with A-weighting.

Assumptions and limits

- Octave bands 63 Hz–8 kHz.

References

• A-weighting at octave-band centre frequencies (IEC 61672-1 values) and logarithmic addition

Report details

Report reference	FCC-BE1C-VYQZ (the same inputs always give the same reference)
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Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/instrumentation/vibration-noise/octave-band-a-weighted

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.