Adding and Subtracting Sound Levels (dB)

Total sound pressure level of up to four sources added logarithmically, and the level of one source after subtracting the background noise.

Method: Logarithmic addition of incoherent sources; L = 10 log₁₀ Σ 10^(Lᵢ/10)

Input parameters

Unit system: SI

Parameter	Value	Unit
Level of source 1 (dB)	85.000	
Level of source 2 (dB)	85.000	
Level of source 3 (dB, −50 if none)	80.000	
Level of source 4 (dB, −50 if none)	-50.000	
Background level (for subtraction)	82.000	

Calculated results

Parameter	Value	Unit
Total of the sources	88.648	
Source 1 with the background subtracted	81.979	

Formula and method

$$L_t = 10\log_{10}\sum 10^{L_i/10}, \quad L_s = 10\log_{10}\left(10^{L_1/10} - 10^{L_b/10}\right)$$

Variables

L_1	Level of source 1 (dB)	-
L_2	Level of source 2 (dB)	-
L_3	Level of source 3 (dB, −50 if none)	-
L_4	Level of source 4 (dB, −50 if none)	-
L_b	Background level (for subtraction)	-
L_t	Total of the sources	-
L_s	Source 1 with the background subtracted	-

Method and standards

Sound powers add, not decibels.

Assumptions and limits

- Incoherent sources; a level of −50 dB means no source.
- The total and the background subtraction are independent: if source 1 is not above the background only the subtraction is left out.

References

- Logarithmic addition of incoherent sources
- L = 10 log₁₀ Σ 10^(Lᵢ/10)

Report details

Report reference	FCC-TR8Y-7WB6 (the same inputs always give the same reference)
Generated	17 November 2026, 19:36 UTC
Calculator	Adding and Subtracting Sound Levels (dB)
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	3 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/sound-level-addition

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.