

Headphone Power Calculator

By Rob Robinette

V1.6

Enter Values In Yellow	
Headphone Impedance	250 ohms Ω
Enter either Headphone Sensitivity: dB/mW OR dB/V	
dB/mW Headphone Sensitivity	96 dB/mW (dBSPL at 1 milliwatt)
OR dB/V Headphone Sensitivity	0 dB/V (dBSPL at 1Vrms)

Calculated Headphone Sensitivity	102.02	dB/V (dBSPL at 1Vrms)
Power	4.00	milliwatts at 1Vrms
Current	4.00	milliamps rms at 1Vrms

What's Required to Reach a Loudness Level

Target Headphone Loudness	90.0	dB Sound Pressure Level
Power Required	100.00	milliwatts
Voltage Required	0.2506	Volts RMS
Current Required	1.00	milliamps rms

How Loud Will an Amp Drive Your Headphones

Amplifier Vrms Rating	5.9400	Volts RMS
Amplifier Power	141.13	milliwatts
Amplifier Current	23.76	milliamps rms
Headphone Loudness	117.50	dB Sound Pressure Level

120 dbSPL is threshold of pain

Instructions

Fill in the yellow boxes:

Enter Headphone Impedance

Enter Headphone Sensitivity in dB/mW OR dB/V

If dB/mW is entered then dB/V will be calculated and vice versa

For the "Target Loudness" calculation enter your desired loudness in dBSPL

For the "How Loud" calculation enter the amplifier's rated Vrms.

dB = decibel

SPL = Sound Pressure Level

RMS = root-mean-square

dB/mW = decibel Sound Pressure Level at 1 milliwatt

dB/V = decibel Sound Pressure Level at 1 volt root-mean-square

Vrms = volt root-mean-square

Example: My HE-500 headphones are rated at 38 ohms impedance and 89 dB/mW sensitivity (enter in dB/mW box). The spreadsheet calculates 103.2 dB/V sensitivity, 26.3 milliwatts and milliamps at 1Vrms. To reach a Target Loudness of 95 dBSPL an amplifier will have to provide 3.98 milliwatts of power, 0.389 volts rms and 10.24 milliamps.

When I enter my Schiit Mjolnir's Vrms rating of 16 Vrms into 32 ohms the spreadsheet calculates 8000 milliwatts (8 watts) and headphone loudness of 128.0 dB SPL.

dB	DIRECT SOUNDS	EXPOSURE TIME
140	Jet take e-off, Gun shot	DANGER ZONE
130	Jack hammer	
120	Threshold of pain	Less than 7 minutes
115	Rock concert	15 Minutes
110	Dance club	30 Minutes
105	Voice shouting	1 Hour
100	Factory	2 Hours
95	Subway	4 Hours
90	Heavy traffic	8 Hours
80	Busy street	
70	Restaurant	
60	Average conversation	
50	Average suburban home	
40	Quiet auditorium	
30	Quiet whisper	
20	Extremely quiet recording studio	
10	Anechoic chamber	
0	Threshold of hearing	

Sound levels and maximum exposure time.