

Headphone Power Calculator

By Rob Robinette

V1.6

Enter Values In Yellow		
Headphone Impedance	70	ohms Ω
<i>Enter either Headphone Sensitivity: dB/mW OR dB/V</i>		
dB/mW Headphone Sensitivity	101	dB/mW (dBSPL at 1 milliwatt)
OR dB/V Headphone Sensitivity	0	dB/V (dBSPL at 1Vrms)
Calculated Headphone Sensitivity	112.55	dB/V (dBSPL at 1Vrms)
Power	14.29	milliwatts at 1Vrms
Current	14.29	milliamps rms at 1Vrms

What's Required to Reach a Loudness Level

Target Headphone Loudness	100.0	dB Sound Pressure Level
Power Required	100.00	milliwatts
Voltage Required	0.2358	Volts RMS
Current Required	3.37	milliamps rms

How Loud Will an Amp Drive Your Headphones

Amplifier Vrms Rating	5.9400	Volts RMS
Amplifier Power	504.05	milliwatts
Amplifier Current	84.86	milliamps rms
Headphone Loudness	128.02	dB Sound Pressure Level

120 dB SPL 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 dB SPL

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 dB SPL 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 dBSPL.

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

Sound levels and maximum exposure time.