

# Headphone Power Calculator

By Rob Robinette

V1.6

<b>Enter Values In Yellow</b>		
Headphone Impedance	32	ohms $\Omega$
<i>Enter either Headphone Sensitivity: dB/mW OR dB/V</i>		
dB/mW Headphone Sensitivity	104	<b>dB/mW</b> (dB SPL at 1 milliwatt)
<b>OR</b> dB/V Headphone Sensitivity	0	<b>dB/V</b> (dB SPL at 1Vrms)

Calculated Headphone Sensitivity	118.95	dB/V (dB SPL at 1Vrms)
Power	31.25	milliwatts at 1Vrms
Current	31.25	milliamps rms at 1Vrms

## What's Required to Reach a Loudness Level

Target Headphone Loudness	113.5	dB Sound Pressure Level
Power Required	8.91	milliwatts
Voltage Required	0.5340	Volts RMS
Current Required	16.69	milliamps rms

## How Loud Will an Amp Drive Your Headphones

Amplifier Vrms Rating	7.2500	Volts RMS
Amplifier Power	1642.58	milliwatts
Amplifier Current	226.56	milliamps rms
Headphone Loudness	136.16	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 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	<b>DANGER ZONE</b>	
130	Jack hammer		
120	<b>Threshold of pain</b>		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	<b>Threshold of hearing</b>		

Sound levels and maximum exposure time.