

SOUND LEVELS - WARNING LEVEL INTERFERENCE CHALLENGES

ALL VEHICLES SHOULD HAVE A WARNING PANEL WITH MULTIPLE WARNING LEVELS SPECIFICALLY TO WARN THE DRIVER PRIOR TO ENTERING THE VEHICLE. PER NFPA 52 2010, SAE J2343-2009 AND THE CAL HIGHWAY PATROL TITLE 13 WITH SAFETY EXEMPTION.

Decibel Level	Sound Level	Real-World Equivalents
0	VERY FAINT	Threshold of Hearing
10		
20		Rustle of leaves, whispering
30	FAINT	Country dwelling (indoors)
40		City dwelling (indoors)
50	MODERATE	Quiet auto at low speed
60		Ordinary conversation at 3 feet, office interior
70	LOUD	Department store interior
80		Busy street
90	VERY LOUD	Motorcycle at 25 feet, stereo music
100		DC-10 at 300 feet on approach, industrial noise
110	DEAFENING	Rock band
120		Turbo-fan aircraft takeoff at 200 feet, pneumatic drill
130		Military jet takeoff at 50 feet
140		Threshold of pain

COMPARISON OF SOUND PRESSURES AND LEVELS

<u>Outdoor Sound Levels</u>	<u>Sound Pressure</u> <u>(μPa)</u>	<u>Sound Level</u> <u>(dBA)</u>	<u>Indoor Sound Levels</u>
	6,324,555	110	Rock Band at 5m
Jet Over-Flight at 300m		105	
	2,000,000	100	Inside NY Subway Train
Gas Lawn Mower at 1m		95	
	632,456	90	Food Blender at 1m
Diesel Truck at 15m		85	
Noisy Urban Area (daytime)	200,000	80	Garbage Disposal at 1m
		75	Shouting at 1m
Gas Lawn Mower at 30m	63,246	70	Vacuum Cleaner at 3m
Suburban Commercial Area		65	Normal Speech at 1m
	20,000	60	
Quiet Urban Area (daytime)		55	Quiet Conversation at 1m
	6,325	50	Dishwasher in Adjacent Room
Quiet Urban Area (nighttime)		45	
	2,000	40	Empty Theater or Library
Quiet Suburb (nighttime)		35	
	632	30	Quiet Bedroom at Night
Quiet Rural Area (nighttime)		25	Empty Concert Hall
Rustling Leaves	200	20	
		15	Broadcast and Recording Studios
	63	10	
		5	
Reference Pressure Level	20	0	Threshold of Hearing

Notes: μ Pa - MicroPascals describe pressure levels (force per unit area).
dBA - A-weighted decibels describe pressure logarithmically with respect to 20 μ Pa (reference pressure level).

Sound level comparison: Here are the real-world equivalents of various decibel levels.

Note: The following chart is based on a Wisconsin State Journal article which included noise level analysis prepared as part of an environmental impact statement for the new runway at the Dane County Regional Airport.

Environmental Noise	
Weakest sound heard	0dB
Whisper Quiet Library	30dB
Normal conversation (3-5')	60-70dB
Telephone dial tone	80dB
City Traffic (inside car)	85dB
Train whistle at 500', Truck Traffic	90dB
Subway train at 200'	95dB
<i>Level at which sustained exposure may result in hearing loss</i>	<i>90 - 95dB</i>
Power mower at 3'	107dB
Snowmobile, Motorcycle	100dB
Power saw at 3'	110dB
French horn	90 - 106dB
Trombone	85 - 114dB
Tympani & bass drum	106dB
Walkman on 5/10	94dB
Symphonic music peak	120 - 137dB
Amplifier rock, 4-6'	120dB
Rock music peak	150dB

NOTES: High frequency sounds of 2-4,000 Hz are the most damaging. The uppermost octave of the piccolo is 2,048-4,096 Hz. Aging causes gradual hearing loss, mostly in the high frequencies. Speech reception is not seriously impaired until there is about 30 dB loss.