Noise Navigator™ Sound Level Database
with Over 1700 Measurement Values

E-A-R 88-34/HP

Elliott H. Berger, Rick Neitzel[1], and Cynthia A. Kladden
3M Personal Safety Division
E•A•RCAL Laboratory
7911 Zionsville Road, Indianapolis, IN 46268-1650
317-692-3031

[1] Univ. of Michigan, Dept. of Environmental Health Science, Ann Arbor, MI

June 26, 2015; Version 1.8

Welcome to the Noise Navigator spreadsheet of sound levels for more than 1700 occupational, recreational, and military noise sources. The data are compiled from references in the literature and from our own measurements. For each source the reference is listed, and as available additional notes are provided. When the primary reference cites sources for its data, those too are listed.

The tabled values are primarily A-weighted sound levels, as opposed to time-weighted average levels or L_{eq}s. To determine exposures the user will have to factor in the total exposure time as well as the actual sound level that is present at the ear. For impulsive sounds, such as gunfire, the values are generally peak sound pressure levels (SPLs) and are so designated. A few of the sound levels are specified as "linear" indicating that they are unweighted; such levels will almost always be equal to or greater than A-weighted values, depending upon the amount of low-frequency energy that is present in the signal.

The data are separated into groups by categories as shown on the Worksheet tabs. Additionally, for certain of the categories we have provided one or more additional worksheets with the data grouped by type, for example "lawnmowers," showing the average and the range of values for that source. The labels on the tabs are a brief indicator; see the top yellow row of each spreadsheet for an complete description of the source found on that sheet.

The values are for representative sources at typical distances. When available, the distance at which the measurement was recorded is listed in the appropriate column. The actual sound levels for a situation are strongly influenced by the particular characteristics of the source in question, as well as the sound environment (reverberance) and the distance the user is from the source.

Another critical factor, often unspecified in the references is the meter response of the instrument - slow, fast, peak, or integrated values such as Leq or other. As an example of how such parameters can influence the results note that for typical popular music the difference between dBA slow and peak values is around 9 - 14 dB, and for broadband pink noise about 12 dB.

The values in this spreadsheet can be sorted according to noise source, category of noise, and sound pressure level, or by any of the other columns, using the sort function in Excel.

We are interested in refining and expanding this resource. If the reader has suggestions for improvement, or documented sound levels that they wish to share, or finds any items requiring explanation or correction, please contact Elliott Berger at Elliott.Berger@mmm.com.

Sound Levels

Category 1	Category 2
Construction	Aircraft
Farm	Appliances
Firearms and Explosives	Automotive
Hand tools	Boat
Hearing testing	Concert
Household	Construction
Industrial	Disco/Music Club
Logging	Earphones
Machinery	Exercise
Marine	Fishing
Medical	Hobbies
Mining	Live Show
Music/Recording	Machinery
Nature	Military
Office	Motorcycle
Personal	Movies/Theater
Power Tools	Music
Public	Open pit (mining)
Recreation	Racing
Rocket	Recreation
Schools	Restaurant/Bar
Toys	Snowmobile

Sound Levels

Nonoccupational and Community/Environmental A-weighted sound levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Aerobic exercise class	94	80 cm	Recreation	Exercise	155
Air conditioner	55	90 cm	Household	Appliances	18
Air conditioner	60	6 m	Household	Appliances	42
Air conditioner	60		Household		16
Air conditioner	80		Household	Appliances	6
Air conditioner	60-72		Household	Appliances	8
Air conditioner, window	61	3 m	Household	Appliances	24
Air conditioner, window	80		Household	Appliances	3
Air conditioner, window	60-73		Household	Appliances	10
Air conditioner, window	60	7.5 m	Household	Appliances	20
Air conditioning unit	60	6 m	Household		2
Air heater	51	3 m	Household		24
Airbag discharge in automobile	169	driver's ear	Transportation	Automotive	128
Airport terminal, Minneapolis airport	70		Transportation	Aircraft	117
Armored personnel carrier	113		Transportation	Military	10
Artificial motor- wind up	96	30 cm	Toys		12
ATV	80-110		Recreation	Motorcycle	8
ATV passby, off road, 7 different models	75-89	15 m	Recreation	Motorcycle	169
Audiometric test booth	35		Hearing testing		1
Automobile	60-90	15 m	Transportation	Automotive	8
Automobile	60-90	15 m	Transportation	Automotive	10
Automobile at 50 mph	72	15 m	Transportation	Traffic	99
Automobile -inside mid-size (60 mph)	70		Transportation	Automotive	1
Automobile passenger	60-90		Transportation	Automotive	8
Automobile, 1964 VW bus, 53 mph	82	at driver's head	Transportation	Automotive	162
Automobile, convertible, top and windows down, 60 mph	88	at driver's right ear	Transportation	Automotive	164
Automobile, Dodge Ram pickup, 1986, interior at 40 mph	71		Transportation	Automotive	117
Automobile, Dodge Ram Pickup, 1986, interior at 60 mph	74		Transportation	Automotive	117
Automobile, door slamming	65	10 m	Transportation	Automotive	13
Automobile, engine idling	36	30 m	Transportation	Automotive	13
Automobile, horn	120		Warning	Automotive	20
Automobile, inside	80		Transportation	Automotive	9
Automobile, inside at 30 mph, windows closed	68-73		Transportation	Automotive	27
Automobile, inside at 30 mph, windows open	72-76		Transportation	Automotive	27
Automobile, inside at 65 mph	77		Transportation	Automotive	16
Automobile, inside sports car 50 mph	75		Transportation	Automotive	15
Automobile, inside sports car 50 mph	75		Transportation	Automotive	22
Automobile, on higway	98		Transportation	Automotive	22
Automobile, passenger	69		Transportation	Automotive	22
Automobile, passenger	60-90		Transportation	Automotive	10
Automobile, passenger 50 mph	65	15 m	Transportation	Automotive	20
Automobile, quiet	55		Transportation	Automotive	20
Automobile, warming up	47	30 m	Transportation	Automotive	13
Baby rattle	86	30 cm	Toys		12
Baby rattle	73	30 cm	Toys		12
Baby rattle (tamborine shape)	89	30 cm	Toys		12
Baby rattle (telephone shape)	76	30 cm	Toys		12
Baby, crying	70		Personal		6
Bar, neighborhood, Friday evening	79		Recreation	Restaurant/Bar	117
Baseball game, cheering + thunder-sticks	107		Recreation	Sporting Event	83
Baseball game, cheering + thunder-sticks, last out	114		Recreation	Sporting Event	83
Baseball game, Cincinnati Reds vs. St. Louis, 2006	89	in stands	Recreation	Sporting Event	1
Baseball game, Indianapolis Indians vs. Norfolk Tides, 2012	85.8	in stands	Recreation	Sporting Event	1
Baseball game, sustained averages	94		Recreation	Sporting Event	83

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Baseball game, World Series	97		Recreation	Sporting Event	25
Basement, quiet	20		Household		27
Bathing	72		Household		61
Bedroom	25		Household		11
Bedroom	40		Household		6
Bedroom - asphault noise problem	35		Household		23
Bedroom at night	30		Household		9
Bell tower, Tomb of the Unknown Soldier, Arlington, VA	66	60 ft. from tomb	Public		162
Bike, trail	57	100 m	Transportation	Automotive	13
Bike, trail	74	15.2 m	Transportation	Automotive	13
Bird, flying along lakeshore	31	15 m	Nature		13
Bird, singing	30		Nature		6
Birds	48		Nature		13
Birds, chaffinch song notes	34-41	30-100 m	Nature		13
Birds, crows call notes	45	20 m	Nature		13
Birds, singing	60		Nature		3
Birds, terns and gulls, call notes	50-62		Nature		13
Birds, woodpeckers, call notes	54	5 m	Nature		13
Birds, woodpeckers, call notes	53	5 m	Nature		13
Blender	73	90 cm	Household	Appliances	18
Blender	80		Household	Appliances	7
Blender	85		Household	Appliances	6
Blender	88		Household	Appliances	2
Blender	88		Household	Appliances	16
Blender	91	90 cm	Household	Appliances	24
Blender	64-87		Household	Appliances	10
Blender	65-85		Household	Appliances	8
Boardgame	65		Household		61
Boring machine	94		Power Tools		10
Bowling	86		Recreation	Recreation	45
Brake, locomotive, crew (vented into cab)	85-115		Transportation	Train	10
Breathing	10		Personal		6
Breathing, normal	10		Personal		17
Brook, babbling, from wooden bridge, Hoh Valley	42	2.5 m	Nature		162
Buddy L F-14 Tomcat, by Empire Industries, Inc.	79	typical use position	Recreation	Toys	96
Bus, intercity	74-84		Transportation	Automotive	10
Bus, MTA, New York City	76	at bus stop	Transportation	Automotive	165
Bus, MTA, New York City	75	in bus	Transportation	Automotive	165
Bus, passing	70-90	15 m	Transportation	Automotive	8
Campfire	53	5 m	Nature		13
Campfire	60	2 m	Nature		13
Camping chores	55-68	15 m	Household		13
Can opener	64	90 cm	Household	Appliances	18
Can opener	69	90 cm	Household	Appliances	24
Can opener, electric	81-83		Household	Appliances	27
Canoe	45	50	Recreation		113
Cast removal with saw	92	20 cm	Medical		105
Chainsaw	82		Power Tools		18
Chainsaw	83	15.2 m	Power Tools		13
Chainsaw	100		Power Tools		1
Chainsaw	100		Power Tools		4
Chainsaw	100		Power Tools		6
Chainsaw	109		Power Tools		1
Chainsaw	109	90 cm	Power Tools		24
Chainsaw	110		Power Tools		5

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Chainsaw	118		Power Tools		16
Chainsaw	120		Power Tools		7
Chainsaw	103-116		Power Tools		10
Chainsaw	105-115		Power Tools		8
Chainsaw, cutting log 3/4 to full throttle	110	operator's shoulder	Power Tools		118
Chainsaw, idle	92	operator's shoulder	Power Tools		118
Chainsaw, running, 3/4 to full throttle	113	operator's shoulder	Power Tools		118
Chevrolet Nova, 1986, interior, 55 mph on asphalt	72		Transportation	Automotive	117
Children screaming while being treated in the operating room	95	1 m	Medical		103
Children's sporting event - Basketball	74	at field boundaries	Recreation	sporting event	150
Children's sporting event - Hockey	75	at field boundaries	Recreation	sporting event	150
Children's sporting event - Karate	83	at field boundaries	Recreation	sporting event	150
Children's sporting event - Soccer	74	at field boundaries	Recreation	sporting event	150
Children's sporting event - Swimming	88	at field boundaries	Recreation	sporting event	150
Children's sporting event - Volleyball	78	at field boundaries	Recreation	sporting event	150
Chipmunks	40-46	10 m	Nature		13
Chopping wood	66-71	5 m	Hand tools		13
Chopping wood	50	5 m	Hand tools		13
Chopping wood	64	15.2 m	Hand tools		13
Chores	75		Household		61
City street corner	70		Public	Traffic	9
Classroom, median background noise level, unoccupied	46	room average	Schools		159
Clattering pans	66	15.2 m	Household		13
Cleaning	70		Household		61
Clipper, hair	60		Household	Appliances	18
Clipper, hair	72	8 cm	Household	Appliances	24
Clipper, pet	62	90 cm	Household	Appliances	24
Clock, alarm	80		Household	Appliances	4
Clock, alarm	80		Household	Appliances	6
Clock, alarm	60-80		Household	Appliances	27
Clock, alarm - ringing	80		Household	Appliances	14
Clock, electric	30		Household	Appliances	6
Clothes washer	78		Household	Appliances	42
Cocktail party (100 guests)	100		Recreation		3
Community noise level	48-70		Public		23
Computer	37-45		Office	Household	27
Computer game	69		Household		61
Computer terminal noise	44		Office		23
Concert - avg. of 14 rock, pop, and rap concerts	106	loudest location	Music/Recording	Concert	75
Concert, Depeche Mode	110	5 m	Music/Recording	Concert	25
Concert, Fiona Apple	90-95	30 m	Music/Recording	Concert	1
Concert, Judy Collins at Elliott Hall of Music, Purdue, 2002	80	25 m	Recreation	Concert	1
Concert, Midnight Oil	99	25 m	Music/Recording	Concert	25
Concert, Moore, Gary	104	25 m	Music/Recording	Concert	25
Concert, Oral lavage	72	90 cm	Household	Appliances	18
Concert, Pink Floyd, Soldiers' Field, Chicago, 1994	103	32nd row	Music/Recording	Concert	1
Concert, rock	90-115		Music/Recording	Concert	8
Concert, rock	98-101		Music/Recording	Concert	57
Concert, Rock concert with amplifiers	120	2 m	Music/Recording	Concert	17
Concert, rock concert, Alice Cooper	100	25 m	Music/Recording	Concert	25
Concert, rock concert, Phil Collins	97	35 m	Music/Recording	Concert	25
Concert, rock concert, Santana, 1997	105	25 m	Music/Recording	Concert	1
Concert, rock concert, Tina Turner	99	10 m	Music/Recording	Concert	25
Concert, rock group	110		Music/Recording	Concert	11
Concert, Tori Amos, 1996	92-95	25 m	Music/Recording	Concert	1

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Concert, Tornado Babies and Kyyria	102	15 m	Music/Recording	Concert	25
Concert, Yngwie Malmsteen	105	25 m	Music/Recording	Concert	25
Concerts at two Swedish concert halls	83-92		Music/Recording	Concert	71
Cooking	73		Household		61
Creek, medium	50	15 m	Nature		13
Creek, small with rapids	61	5 m	Nature		13
Creek, small with rapids	47-48	15 m	Nature		13
Crickets	50		Nature		13
Cross-country skiing	45		Recreation		61
Crowd, basketball	99-118		Public	Sporting Event	23
Crowd, hockey game	120		Public	Sporting Event	3
Crystal singing bowl at maximum output	86	1 m	Music/Recording	Music	1
Cutting wood	82		Household		61
Dance, ASHA social	91-103		Recreation		23
Dehumidifier	52	90 cm	Household	Appliances	18
Dehumidifier	61	3 m	Household		24
Dental drilling	74	30	Medical		112
Dental irrigator	76	60 cm	Household	Appliances	24
Dental micromotor handpieces at idle	65-76	30 cm	Medical		110
Dental micromotor handpieces drilling	76-82	30 cm	Medical		110
Dental surgeries including noise from all sources	73	30	Medical		111
Dental surgeries including noise from all sources	80	30	Medical		111
Dental ultrasonic scaling	72	30	Medical		112
Dental ultrasonic scaling	78	30	Medical		111
Diesel locomotive at 50 mph	88	15 m	Transportation	Train	99
Dishes, washing	55-68	15 m	Household		13
Dishwasher	60		Household	Appliances	4
Dishwasher	64	90 cm	Household	Appliances	18
Dishwasher	67	3 m	Household	Appliances	24
Dishwasher	71	150 cm	Household	Appliances	18
Dishwasher	75		Household	Appliances	2
Dishwasher	75		Household	Appliances	6
Dishwasher	75		Household	Appliances	16
Dishwasher	63-66		Household	Appliances	27
Disney's Baby's First Play Radio, by Arco Toys, Inc.	76	typical use position	Recreation	Toys	96
Dog, barking	85		Nature		6
Dogs, barking	60		Nature		13
Dogs, howling	73		Nature		13
Drag racing, in stands	145	15 m	Recreation	Racing	26
Drag racing, NHRA nationals, in stands	107-125	at listener	Recreation	Racing	1
Drill bit sharpener	88	90 cm	Power Tools		24
Drill press 1/2 HP	87		Power Tools		21
Drill, 1/4"	92-95		Power Tools		27
Drill, electric	90		Power Tools		1
Drill, electric	92		Power Tools		1
Drill, electric	93	90 cm	Power Tools		24
Drill, electric	94		Power Tools		19
Drill, hammer	105		Power Tools		19
Drill, hammer	114		Power Tools		5
Drill, hand	98		Power Tools		5
Drill, multipurpose	102	90 cm	Power Tools		24
Drill, pneumatic	80	15 m	Power Tools		22
Drill, pneumatic 50'	80	15 m	Power Tools		15
Drill, pneumatic precision	119		Power Tools		5
Drill, rock	98	15 m	Power Tools		22
Drill, rock	92		Power Tools		16

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Drill, rock, pneumatic	130		Power Tools		20
Dryer, clothes	55	90 cm	Household	Appliances	18
Dryer, clothes	60		Household	Appliances	6
Dryer, clothes	73	3 m	Household	Appliances	24
Dryer, clothes	45-80		Household	Appliances	8
Dryer, clothes	50-72		Household	Appliances	10
Dryer, clothes	56-58		Household	Appliances	27
Dryer, clothes	64-78	150 cm	Household	Appliances	18
Dryer, hair	50		Household	Appliances	6
Dryer, hair	66		Household	Appliances	18
Dryer, hair	90		Household	Appliances	5
Dryer, hair	91	9 cm	Household	Appliances	24
Dryer, hair	80-95		Household	Appliances	27
Dryer, hair, Conair Supermax	84	at ear	Household	Appliances	1
Dryer, hair, Target Salon Series Model 1875	85	at ear	Household	Appliances	1
Dryer, hair: cold	63-79	10 cm	Household	Appliances	18
Dryer, hair: hot	65-78	10 cm	Household	Appliances	18
Dryer, hand: Dyson Airblade AB 02	90	at ear	Public	Appliances	187
Dryer, hand: Xlerator XL-BW	100	at ear	Public	Appliances	187
Dryer, hand: Xlerator	97	at ear	Public	Appliances	1
Dryer, hand: World Dryer Model A XA5-974	82	at ear	Public	Appliances	187
Dryer, hot air tumble	63	150 cm	Household	Appliances	18
Dryer, spin	69-74	150 cm	Household	Appliances	18
Drying hair	79		Household	Appliances	61
E-A-R test facility background noise	10		Hearing testing		1
Earcanal suctioning for cerumen (wax) removal	68-114	at eardrum	Medical		156
Eating at home	75		Household		61
Edger and trimmer	81		Household	Yard & Garden	18
Edger, lawn	78		Household	Yard & Garden	18
Elk browsing, walking, twig snaps, leaf rustles, Hoh Valley	32	20 m	Nature		162
Engine, diesel crew	84-89		Transportation	Train	10
Engraving pen	85	90 cm	Power Tools		24
Exhibit hall, 1989 National Hearing Aid Society	73-79				117
Facial brush	75	10 cm	Household	Appliances	24
Fan	64	3 m	Household	Appliances	24
Fan heater (fan only)	41	150 cm	Household	Appliances	18
Fan heaters (fan only) 1kW	37-53	150 cm	Household	Appliances	18
Fan heaters (fan only) 2kW	41-53	150 cm	Household	Appliances	18
Fan heaters (fan only) 3 kW	47-51	150 cm	Household	Appliances	18
Fan, bathroom exhaust	54-55		Household		27
Fan, extractor	56-60	150 cm	Household	Appliances	18
Fan, floor	51	90 cm	Household	Appliances	18
Fan, kitchen exhaust on high	69-71		Household	Appliances	27
Fan, stove hood exhaust	61	90 cm	Household	Appliances	18
Fan, window	54	90 cm	Household	Appliances	18
Fan, window on high	60-66		Household	Appliances	27
Faucet	66	90 cm	Household		18
Faucet, dripping	40		Household		3
Ferry, Staten Island, New York City	73	station	Transportation	Boat	165
Ferry, Staten Island, New York City	78	on ferry	Transportation	Boat	165
Fireworks show, WENS Skyconcert, Indpls., 2001	93	100 m	Recreation		1
Fish, bass slaps surface of water, C & O Canal	54	14 m	Nature		162
Fishing	73		Recreation		61
Food processor	92	90 cm	Household	Appliances	24
Food processor	93-100		Household	Appliances	27
Football game, KC Chiefs, Guinness record of 137-dB	99	in stands	Recreation	Sporting Event	188

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Football game, high-school finals, Lucas Oil Stadium Dec. 2013	87	in stands	Recreation	Sporting Event	1
Football game, avg. of med & large college and NFL stadiums	91	in stands	Recreation	Sporting Event	172
Football game, Indianapolis Colts, Hoosier Dome, Nov. 2000	97	in stands	Recreation	Sporting Event	1
Football game, Super Bowl 2012, Indpls. Giants vs. Patriots	94	in stands	Recreation	Sporting Event	184
Football game, Colts vs. Patriots, Nov 2012	94	sidelines	Recreation	Sporting Event	189
Football game, Ohio State at Penn State, Oct 2012	101	sidelines	Recreation	Sporting Event	189
Football game, 49ers at Seahawks, Dec 12, 2014	97	sidelines	Recreation	Sporting Event	189
Football (soccer) match, South African premier match	100	in stands	Recreation	Sporting Event	175
Forest, coniferous, low wind	35		Nature		13
Formula One (F1), Indianapolis Raceway, qualifications (2007)	90-115	in stands	Recreation	Racing	1
Formula One (F1), Indianapolis Raceway, race (2006)	105-115	in stands	Recreation	Racing	1
Freezer	41	90 cm	Household	Appliances	18
Friction ringer (telephone)	85	30 cm	Toys		12
Games, handheld electronic	68-76		Toys		27
Garage work	76		Household		61
Garbage collection	85		Public		14
Garbage disposal	67	150 cm	Household	Appliances	18
Garbage disposal	70		Household	Appliances	6
Garbage disposal	76	90 cm	Household	Appliances	18
Garbage disposal	78	90 cm	Household	Appliances	20
Garbage disposal	80		Household	Appliances	2
Garbage disposal	80		Household	Appliances	6
Garbage disposal	80		Household	Appliances	16
Garbage disposal	82	90 cm	Household	Appliances	24
Garbage disposal	67-93		Household	Appliances	10
Garbage disposal	68-92		Household	Appliances	8
Garbage disposal	76-83		Household	Appliances	27
Gas cooker	37-54	150 cm	Household	Appliances	18
Gas fire logs with blower	55		Household		23
Gas fires - full on	28-42	150 cm	Household		18
Getting haircut	69		Recreation		61
Gibbons (apes) making love at Bristol Zoo, southwest England	100	unspecified	Nature	Hobbies	161
Go cart	80-110		Recreation	Racing	8
Golf	65		Recreation		61
Grand Canyon at night	10		Nature		27
Grand Canyon, along river	35		Nature		94
Grand Canyon, remote trail	15		Nature		94
Grand Canyon, rim	16		Nature		13
Grinder, bench	84	90 cm	Power Tools		24
Grinder, coffee	80	90 cm	Household	Appliances	24
Grinder, coffee	84-95		Household	Appliances	27
Grinder, rotary	105	90 cm	Power Tools		24
Guitar	52	15.2 m	Music/Recording		13
Haleakala volcano (Maui), in crater, no wind	5		Nature		94
Hammer and peg board	94	30 cm	Toys		12
Hammer, chipping, large	120		Power Tools		22
Hammer, pneumatic peen	100		Power Tools		15
Hammer, pneumatic peen	100		Power Tools		22
Harbor activities	74		Public		48
Harmonica	72	15.2 m	Music/Recording		13
Hawaii volcanoes, crater overlook	25		Nature		94
Headphone, Aiwa supra-aural, maximum volume	106	Eqiv. Dif. Field	Music/Recording	Earphones	143
Headphone, Koss insert, maximum volume	105	Eqiv. Dif. Field	Music/Recording	Earphones	143
Headphone, Optimus insert, maximum volume	114	Eqiv. Dif. Field	Music/Recording	Earphones	143
Headphone, Panasonic supra-aural, maximum volume	98	Eqiv. Dif. Field	Music/Recording	Earphones	143
Headphone, RCA supra-aural, maximum volume	98	Eqiv. Dif. Field	Music/Recording	Earphones	143

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Headphone, Sony insert, maximum volume	113	Eqiv. Dif. Field	Music/Recording	Earphones	143
Headphone, Sony supra-aural, maximum volume	96	Eqiv. Dif. Field	Music/Recording	Earphones	143
Headphone, Sony vertical, maximum volume	104	Eqiv. Dif. Field	Music/Recording	Earphones	143
Heater, electric	44	90 cm	Household	Appliances	18
Heating system, forced hot air	42-52		Household		27
Heavy truck at 50 mph	83	15 m	Transportation	Traffic	99
Hedge clippers	84		Household	Yard & Garden	18
Hedge cutter	95		Household	Yard & Garden	19
Hedge trimmer	81	90 cm	Household	Yard & Garden	24
Highway annoyance problem	61		Public		23
Hockey game	99		Recreation	Sporting Event	25
Hockey game	103	in stands	Recreation	Sporting Event	147
Home repairs	63		Household		61
Home, typical movement of people, no TV or radio	40-45		Household		146
Horn, auto	100		Warning	Automotive	6
Horn, locomotive	110		Transportation	Train	6
Horn, locomotive, crew	92-111		Transportation	Train	10
Hospital operating rooms at Johns Hopkins	58-67	in reverberant field	Medical		149
Hospital pediatric intensive care	56	within 45 cm of head	Medical		106
Hospital, avg. of 4 different floors, Johns Hopkins Hospital	53	various	Medical		133
Hospital, neonatal intensive care, avg. of two units	59	4' from head	Medical		148
Hospital, pediatric intensive care unit, Johns Hopkins Hospital	60	various	Medical		133
Hotel bar, Miami Hilton lobby, no music	62		Recreation	Restaurant/Bar	117
Housekeeping	76		Household		61
Humidifier	50	90 cm	Household	Appliances	18
Humidifier	52	3 m	Household		24
Ice crusher	82	90 cm	Household	Appliances	24
Indianapolis 500 practice session	104-109	in stands	Recreation	Racing	1
Indianapolis 500 race, 1999	104-109	in stands	Recreation	Racing	1
Industrial noise	67		Public		48
Insects	22-27		Nature		13
Intercity rail	60-75		Transportation	Train	10
Japanese music from speakers	75	1.2 m	Music/Recording		56
Jazz Club, Brian Auger, Jazz Kitchen, Indianapolis, 2004	100	5 tables from stage	Recreation	Concert	1
Jazz Club, Killer Ray Appleton, Jazz Kitchen, Indianapolis, 2004	93	5 tables from stage	Recreation	Concert	1
Jazz Club, Tad Robinson, Jazz Kitchen, Indianapolis, 2005	96	5 tables from stage	Recreation	Concert	1
Jazz Concert, Winton Marsalis and Lincoln Ctr. Jazz Orch.	70-85	70 m	Music/Recording	Concert	1
Jet ski	82	50	Recreation	Boat	113
Jet ski, out of water	92	50	Recreation	Boat	113
Jointer	101	90 cm	Power Tools		24
Jointer, 1/2 HP	101		Power Tools		21
Juicer	78	90 cm	Household	Appliances	24
Karaoke, one singer	98		Music/Recording		40
Karaoke, two singers	103		Music/Recording		40
Kawasaki air guitar by DSI Toys	80	typical use position	Recreation	Toys	96
Kettle,whistling	69-93	150 cm	Household		18
Knife, electric	68	90 cm	Household	Appliances	18
Knife, electric	93	90 cm	Household	Appliances	24
Lake, quiet	30		Nature		113
Lakeshore, moderate wind	65		Recreation	Nature	117
Lathe	89	90 cm	Power Tools		24
Laundry	76		Household		61
Lawm mower, gas push	84-90	at operator	Household	Yard & Garden	28
Lawn mower	74		Household	Yard & Garden	18
Lawn mower	83	1.8 m	Household	Yard & Garden	24

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Lawn mower	89		Household	Yard & Garden	1
Lawn mower	90		Household	Yard & Garden	4
Lawn mower	90		Household	Yard & Garden	5
Lawn mower	96		Household	Yard & Garden	16
Lawn mower	100		Household	Yard & Garden	3
Lawn mower	100		Household	Yard & Garden	6
Lawn mower	80-92		Household	Yard & Garden	8
Lawn mower	80-95		Household	Yard & Garden	10
Lawn mower	88-94		Household	Yard & Garden	27
Lawn mower	90	150 cm	Household	Yard & Garden	6
Lawn mower at operator's ear	93		Household	Yard & Garden	20
Lawn mower, electric cordless	77-79	at operator	Household	Yard & Garden	28
Lawn mower, cordless electric reel	68	at operator	Household	Yard & Garden	28
Lawn mower, electric	75		Household	Yard & Garden	18
Lawn mower, electric	103		Household	Yard & Garden	38
Lawn mower, electric corded	79	at operator	Household	Yard & Garden	28
Lawn mower, gas powered push circa 2004	82-91		Household	Yard & Garden	27
Lawn mower, gas self propelled	82-91	at operator	Household	Yard & Garden	28
Lawn mower, loud	105		Household	Yard & Garden	16
Lawn mower, push reel	68-72		Household	Yard & Garden	27
Lawn mower, reel	63-76	at operator	Household	Yard & Garden	28
Lawn mower, riding	91	90 cm	Household	Yard & Garden	24
Lawn thatcher	79	1.8 m	Household	Yard & Garden	24
Leaf blower	76		Household	Yard & Garden	18
Leaf blower	77	1.8 m	Household	Yard & Garden	24
Leaf blower	95-105		Household	Yard & Garden	27
Leaf falling onto fern fronds, single big maple leaf, Hoh Valley	30	1.8 m	Nature		162
Library	38		Public		11
Library	40		Public		17
Live show, Chris Rock, Clowes Hall, Butler Univ., Indianapolis, 2004	85	row 15	Recreation	Live Show	1
Live show, Lily Tomlin, Clowes Hall, Butler Univ., Indianapolis, 2005	85	row 15	Recreation	Live Show	1
Live show, Penn & Teller, Emmens Auditorium, Ball State, 2002	85		Recreation	Live Show	1
Living room	40		Household		9
Living room	40		Household		11
Living room, typical	40		Household		27
Locomotive horns	96-110	15 m	Transportation	Train	99
Locomotive, diesel	87-102	15 m	Transportation	Train	10
Lounging	71		Household		61
Magnetic resonance image scanner	123	at ear	Medical		108
Magnetic resonance image scanner	138	at ear	Medical		108
Magnetic resonance image scanner	92-105	center of magnet	Medical		109
Magnetic resonance image scanner	94-108		Medical		104
Magnetic resonance image scanner, GE Signa Imager	117	at ear	Medical		107
Magnetic resonance image scanner, GE Signa Imager	128	at ear	Medical		107
Magnetic resonance imager	100-110	inside scanner	Medical		152
Magnetic resonance imager circa 1984	92-96	inside scanner	Medical		100
Maple grove, Hoh Valley, still air, no leave movement	20		Nature		162
Massager	50	60 cm	Household	Appliances	24
Meadow, low wind conditions	30		Nature		13
Mechanic work	69		Household		61
Medium truck at 50 mph	79	15 m	Transportation	Traffic	99
Microwave	55-59		Household	Appliances	27
Mixer, electric	60		Household	Appliances	6
Mixer, electric	65	90 cm	Household	Appliances	18
Mixer, electric	75	90 cm	Household	Appliances	24
Mixer, electric - liquidiser attachment fast speed	75-81	100 cm	Household	Appliances	18

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Mixer, electric - liquidiser attachment medium speed	70-75	100 cm	Household	Appliances	18
Mixer, electric - liquidiser attachment slow speed	57-66	100 cm	Household	Appliances	18
Mixer, electric fast speed	67-85	100 cm	Household	Appliances	18
Mixer, electric medium speed	62-83	100 cm	Household	Appliances	18
Mixer, electric slow speed	59-71	100 cm	Household	Appliances	18
Mixer, handheld electric	86-91		Household	Appliances	27
Model aircraft	78		Recreation		18
Model airplane	106-117		Recreation	Hobbies	8
Model airplane engines	106-114		Recreation	Hobbies	84
Model airplane engines, muffled	84-95	1 m	Recreation	Hobbies	84
Model airplane engines, muffled and unmuffled	94-117		Recreation	Hobbies	84
Model airplane engines, unmuffled	95-108	1 m	Recreation	Hobbies	84
Molder	100		Power Tools		10
Monster truck races at Roanoke, VA, Civic Center	97	in stands	Recreation	Racing	85
Monster truck show in RCA Dome, Indpls., 1998	94	in stands	Recreation	Racing	1
Motor boat, outboard	85	50	Recreation	Boat	113
Motor boat, V-8 muscle	95	50	Recreation	Boat	113
Motor, hobby	112	50 cm	Toys		12
Motor, loud outboard	102		Transportation	Boat	16
Motor, trolling	65	75 m	Transportation	Boat	13
Motorboat	65-105		Transportation	Boat	10
Motorboat	74-114		Transportation	Boat	10
Motorcycle	105		Transportation	Motorcycle	6
Motorcycle	80-110		Transportation	Motorcycle	8
Motorcycle	80-110		Transportation	Motorcycle	10
Motorcycle	90	7.5 m	Transportation	Motorcycle	16
Motorcycle	90	7.5 m	Transportation	Motorcycle	2
Motorcycle	100		Transportation	Motorcycle	3
Motorcycle passby	90	8 m	Public	Motorcycle	42
Motorcycle passby, off road, 10 different models	81-96	15 m	Recreation	Motorcycle	169
Motorcycle Race	100-115		Transportation	Motorcycle	8
Motorcycle ride with full-face helmet	63-90		Transportation	Motorcycle	46
Motorcycle ride with full-face helmet, 100 mph	113	inside helmet	Transportation	Motorcycle	90
Motorcycle ride with full-face helmet, 20 mph	97-104	inside helmet	Transportation	Motorcycle	87
Motorcycle ride with full-face helmet, 30 mph	83	inside helmet	Transportation	Motorcycle	90
Motorcycle ride with full-face helmet, 30 mph	95		Transportation	Motorcycle	46
Motorcycle ride with full-face helmet, 30 mph	95	inside helmet	Transportation	Motorcycle	89
Motorcycle ride with full-face helmet, 45 mph	101-108	inside helmet	Transportation	Motorcycle	87
Motorcycle ride with full-face helmet, 50 mph	96	inside helmet	Transportation	Motorcycle	90
Motorcycle ride with full-face helmet, 50 mph	103	inside helmet	Transportation	Motorcycle	89
Motorcycle ride with full-face helmet, 60 mph	105		Transportation	Motorcycle	46
Motorcycle ride with full-face helmet, 70 mph	105	inside helmet	Transportation	Motorcycle	89
Motorcycle ride with full-face helmet, 70 mph	107-110	inside helmet	Transportation	Motorcycle	87
Motorcycle ride with full-face helmet, 80 mph	109	inside helmet	Transportation	Motorcycle	90
Motorcycle ride with open-face helmet, 30 mph	89		Transportation	Motorcycle	46
Motorcycle ride with open-face helmet, 30 mph	89	inside helmet	Transportation	Motorcycle	89
Motorcycle ride with open-face helmet, 50 mph	98	inside helmet	Transportation	Motorcycle	89
Motorcycle ride with open-face helmet, 60 mph	98		Transportation	Motorcycle	46
Motorcycle ride with standard helmet, 20 mph	95-105	inside helmet	Transportation	Motorcycle	87
Motorcycle ride with standard helmet, 30 mph	75-86	inside helmet	Transportation	Motorcycle	88
Motorcycle ride with standard helmet, 45 mph	100-106	inside helmet	Transportation	Motorcycle	87
Motorcycle ride with standard helmet, 60 mph	88-100	inside helmet	Transportation	Motorcycle	88
Motorcycle ride with standard helmet, 70 mph	105-111	inside helmet	Transportation	Motorcycle	87
Motorcycle ride with various helmets, 43 mph	94	inside helmet	Transportation	Motorcycle	91
Motorcycle ride with various helmets, 62 mph	100	inside helmet	Transportation	Motorcycle	91
Motorcycle, loud	105		Transportation	Motorcycle	16

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Motorway traffic	76		Public		48
Mountaintop	35		Nature		23
Moutain slope, open	23		Nature		13
Movie projector	63	3 m	Recreation		24
Movie theater	72		Recreation	Movies/Theater	61
Movie, Indiana Jones	90-104		Recreation	Movies/Theater	23
Movies circa 2000 - 2009 measured via dosimetry	77	row 6 - 9	Recreation	Movies/Theater	1
Movies,in Nottingham and London, 4 different cinemas	76		Recreation	Movies/Theater	120
Ms Mega Mike, by Yes! Entertainment Corp.	113	typical use position	Recreation	Toys	96
Music box	68	30 cm	Toys	Music	12
Music box	70	30 cm	Toys	Music	12
Music entertainment venues in Brisbane, Australia	96		Music/Recording	Concert	79
Music entertainment venues in Brisbane, Australia	98		Music/Recording	Concert	79
Music entertainment venues in Brisbane, Australia	106		Music/Recording	Concert	79
Music entertainment venues in Brisbane, Australia	95		Music/Recording	Music	79
Music entertainment venues in Brisbane, Australia	97		Music/Recording	Music	79
Music for ballroom dancing	90		Music/Recording	Disco/Music Club	6
Music on radio	44		Music/Recording		13
Music on radio	52		Music/Recording		13
Music, background	50		Music/Recording		27
Music, living room	76		Music/Recording		16
Music, rock	120		Music/Recording		16
Musical, *Jersey Boys* , Broadway-type event	87	row 27	Music/Recording	Movies/Theater	1
National Cathedral (interior), ambience	55		Public		162
Natural soundscape, Bear Butte, SD	23		Nature	Recreation	82
Niagara Falls	90		Nature		17
Night Club (Baron's- dancing)	93-106		Recreation	Live Show	23
Night clubs, dance floor, Hong Kong	97		Music/Recording	Music	81
Night clubs, dance floor, UK	100		Music/Recording	Music	81
Nightclub, disco	100		Music/Recording	Disco/Music Club	1
Nightclubs, average of 3, 1 am, bar area	89		Recreation	Discotheque/Club	119
Nightclubs, average of 3, 1 am, dancefloor	98		Recreation	Discotheque/Club	119
Nightclubs, average of 3, 1 am, near speakers	105		Recreation	Discotheque/Club	119
Nightclubs, average of 3, 10 pm , near speakers	100		Recreation	Discotheque/Club	119
Nightclubs, average of 3, 10 pm, bar area	83		Recreation	Discotheque/Club	119
Nightclubs, average of 3, 10 pm, dancefloor	93		Recreation	Discotheque/Club	119
Nightclubs, average of 30 venues in Vancouver, Canada	97	dance floor near DJ	Recreation	Discotheque/Club	173
Nightclubs, average of 5 disco venues in Hong Kong	94	avg in bar areas	Music/Recording	Disco/Music Club	72
Nightclubs, average of 60 venues in Toronto, Canada	95	area measurements	Recreation	Discotheque/Club	174
Nitzer Ebb	100	20 m	Music/Recording	Concert	25
Nose hair trimmer, electric	61	at ear	Household	Appliances	1
Patio, suburban party	73		Recreation		117
Pencil sharpener (probably electric but not clearly specified)	74	90 cm	Office		24
Pencil sharpener, battery powered	70	90 cm	Office		1
People eating and talking	52	15 m	Personal		13
Personal cassette player, 162 regular users	85	Eqiv. Dif. Field	Music/Recording	Earphones	67
Personal cassette player, 350 individuals	83	?	Music/Recording	Earphones	70
Personal cassette player, 40 users on the street in Helsinki	82	Eqiv. Dif. Field	Music/Recording	Earphones	68
Personal cassette player, 405 Dutch students	75	Eqiv. Dif. Field	Music/Recording	Earphones	69
Personal cassette player, average of 154 youths	92	Eqiv. Dif. Field	Music/Recording	Earphones	66
Phone	76		Household		61
Piano	85		Music/Recording	Music	6
Planer	101		Power Tools		24
Planer	106		Power Tools		10
Planer, 3 HP	102		Power Tools		21

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Playing music on stereo	80		Music/Recording	Music	61
Polisher, floor	74	1.8 m	Household	Appliances	24
Polisher, shoe	70	90 cm	Household	Appliances	24
Pontiac Bonneville, 1988, interior at 65 mph on concrete	71		Transportation	Automotive	117
Popper, air popcorn	78-85		Household	Appliances	27
Pounding tent stakes	66	15.2 m	Hand tools		13
Power mower	94	7 m	Household	Yard & Garden	42
Power washing	94	at ear	Power Tools	Yard & Garden	1
Printer	58-65		Office	Household	27
Purpose-built liquidiser	87-90	100 cm	Household	Appliances	18
Radio	80		Household		61
Radio, blaring	110		Music/Recording		22
Radio, in background	45-50		Music/Recording		27
Rail cars at 50 mph	80	15 m	Transportation	Train	99
Railway traffic	75		Public		48
Rainfall, light	40		Nature		3
Rainfall, moderate	50		Nature		4
Range hood	68	90 cm	Household	Appliances	24
Reading	70		Household		61
Refrigerator	40		Household	Appliances	6
Refrigerator	40	90 cm	Household	Appliances	18
Refrigerator	50		Household	Appliances	20
Refrigerator	54	3 m	Household	Appliances	24
Refrigerator	40-43		Household	Appliances	27
Refrigerator	45-68		Household	Appliances	8
Refrigerator	46-68		Household	Appliances	10
Residence	35		Household		20
Residence	45		Household		15
Residence	45		Household		22
Residence	49		Household		1
Residence	50		Household		6
Residence, quiet	45		Household		16
Residential area in Chicago at night	40		Public		15
Residential area in Chicago at night	40		Public		22
Restaurant	83		Recreation	Restaurant/Bar	121
Restaurant	86		Recreation	Restaurant/Bar	121
Restaurant bar, 1/3 full	65		Recreation	Restaurant/Bar	117
Restaurant, average	60		Public	Recreation	20
Restaurant, crowded	80		Public	Recreation	3
Restaurant, elegant bistro	50		Recreation	Restaurant/Bar	121
Restaurant, family style	71		Recreation	Restaurant/Bar	121
Restaurant, noisy	70		Public	Recreation	16
Restaurant, small 1/2 full	65		Recreation	Restaurant/Bar	117
Restaurant, small, full	68		Recreation	Restaurant/Bar	117
Restaurant/bar	90		Recreation	Restaurant/Bar	121
Rice Krispies, fresh in cereal bowl just after milk is poured	30		Household		1
Road traffic	69		Public		48
Road traffic and industrial noise	65		Public		48
Rock / symphonic Concert - the Music of Led Zeppelin	94	avg of locations	Music/Recording	Concert	1
Rock and roll music from speakers	93	1.2 m	Muisc/Recording		56
Rock band	110		Music/Recording	Concert	6
Rock band	110		Music/Recording	Concert	20
Rock band	108-114		Music/Recording	Concert	2
Rock music	110		Music/Recording	Concert	4
Rock music (amplified)	120		Music/Recording	Concert	3
Rock music (Live)	89-119		Music/Recording	Concert	10

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Rock Concert, Paul McCartney, Chicago, Wrigley Field, 2011	112	3rd row	Music/Recording	Concert	177
Room quiet	40		Household		20
Room, quiet	40		Household		4
Room, quiet	28-33		Household		27
Router	93		Power Tools		10
Router	97	90 cm	Power Tools		24
Router	78-92		Power Tools		8
Router, Milwaukee 1 HP	103		Power Tools		21
Router, Porter Cable 1 1/2 HP	108		Power Tools		21
Router, Sear 1/2 HP	98		Power Tools		21
Rug Shampooer	88	1.8 m	Household	Appliances	24
Rural ambient	45		Nature		99
Rustling leaves	20		Nature		17
Rustling leaves	20		Nature		20
Rustling leaves	40		Nature		3
Saban's Power Rangers in Space by Bandai America, Inc.	74	typical use position	Recreation	Toys	96
Sailboat	45	50	Recreation	Boat	113
Sander	97		Power Tools		10
Sander, belt	93		Power Tools		5
Sander, belt	96		Power Tools		10
Sander, belt	102	90 cm	Power Tools		24
Sander, disk	100	90 cm	Power Tools		24
Sander, orbital	94	90 cm	Power Tools		24
Sander, orbital	100		Power Tools		19
Sander, upright belt 2 HP	96		Power Tools		21
Sanne Salamonsen	97	varying	Music/Recording	Concert	25
Saw, band	90	90 cm	Power Tools		24
Saw, bandsaw 3/4 HP	95		Power Tools		21
Saw, circular	100-104		Power Tools		27
Saw, circular	103	90 cm	Power Tools		24
Saw, circular, portable	113		Power Tools		19
Saw, cut-off	105		Power Tools		15
Saw, cut-off	105		Power Tools		22
Saw, cut-off	112		Power Tools		10
Saw, hand	85		Power Tools		19
Saw, jigsaw	97		Power Tools		19
Saw, power	100		Power Tools		14
Saw, power	95-112		Power Tools		8
Saw, radial-arm	98		Power Tools		10
Saw, radial-arm	102	90 cm	Power Tools		24
Saw, radial-arm 3/4HP	102		Power Tools		21
Saw, radial-arm 5-HP 14"	110		Power Tools		21
Saw, reciprocating	98	90 cm	Power Tools		24
Saw, saber 1-HP	108		Power Tools		21
Saw, skilsaw 2-HP	108		Power Tools		21
Saw, table	104	90 cm	Power Tools		24
Saw, table	90		Power Tools		6
Saw, table 2 HP	92		Power Tools		21
Scissors, electric	69	90 cm	Household	Appliances	24
Scream, maximum vocal effort, contest in reverberant space	110	1 m	Personal		0
Sewing machine	70	90 cm	Household	Appliances	18
Sewing machine	76	90 cm	Household	Appliances	24
Shaper	104		Power Tools		10
Shaper, 2 HP	95		Power Tools		21
Sharpener, knife	70	90 cm	Household	Appliances	18
Sharpener, knife	84	90 cm	Household	Appliances	24

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Shaver	75	90 cm	Household	Appliances	18
Shaver	81	11 cm	Household	Appliances	24
Shaver, Braun 3025	75	at ear	Household	Appliances	1
Shaver, rotary	75-83	7.5 cm	Household	Appliances	18
Shaver, shuttle	64-71	7.5 cm	Household	Appliances	18
Shock wave lithotripsy	112	at patient's head	Medical		101
Shout, loud	90		Personal		16
Shout, loud	90		Personal		22
Shower	70		Household		6
Shredder	80	1.8 m	Office		24
Singing	60	15.2 m	Personal		13
Singing, loud	80		Personal		16
Siren, 50 HP	135	30 m	Warning		22
Siren, 50 hp	135	30 m	Warning		15
Siren, air raid	130		Warning		6
Siren, air raid	135		Warning		16
Siren, air raid	140		Warning		4
Siren, ambulance	120		Warning		5
Siren, emergency	110		Warning		6
Siren, old fire truck	129	2 m	Warning		23
Siren, police	100	30 m	Warning		16
Sledding	46		Recreation		61
Sleeping	49		Household		61
Slide projector	60	3 m	Office		24
Smoking	76		Household		61
Snow blower	84		Household	Yard & Garden	18
Snow blower	90	1.8 m	Household	Yard & Garden	24
Snow blower	84-92		Household	Yard & Garden	8
Snowmobile	100		Recreation	Snowmobile	3
Snowmobile	100		Recreation	Snowmobile	4
Snowmobile	100		Recreation	Snowmobile	7
Snowmobile	100		Recreation	Snowmobile	16
Snowmobile	80-110		Recreation	Snowmobile	8
Snowmobile	85-109		Recreation	Snowmobile	10
Snowmobile	85-120		Recreation	Snowmobile	10
Snowmobile	73	15.2 m	Recreation	Snowmobile	13
Snowmobile - 22 HP	86-113		Recreation	Snowmobile	43
Snowmobile - 26 HP	105-136		Recreation	Snowmobile	43
Snowmobile race - inside race oval	104	3 m	Recreation	Snowmobile	44
Snowmobile race - spectator stands	100-107	12 m	Recreation	Snowmobile	44
Snowmobile race - spectator stands	103-108	6 m	Recreation	Snowmobile	44
Sony Discman headphones	75		Music/Recording	Music	55
Speech	60		Personal		1
Speech	60		Personal		3
Speech	60		Personal		4
Speech	60		Personal		5
Speech	60		Personal		6
Speech	60		Personal		7
Speech	60		Personal		9
Speech	60		Personal		14
Speech	60		Personal		16
Speech	60	1 m	Personal		17
Speech	60		Personal		20
Speech	60		Personal		20
Speech	65		Personal		15
Speech	65	30 cm	Personal		22

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Speech	65		Personal		22
Speech	70	1 m	Personal		23
Speech	55-65		Personal		27
Speech	60-65		Personal		2
Speech	65-68		Personal		13
Speech	62		Personal		1
Speech	48	15.2 m	Personal		13
Speech	60		Personal		11
Speech, fairly loud	70		Personal		16
Speech, normal voice	55	0.9 m	Personal		146
Spray painter	105		Power Tools		5
Spring peepers	55		Nature		6
Squeeze toy	81	30 cm	Toys		12
Squeeze toy	97	30 cm	Toys		12
Squeeze toy	91	30 cm	Toys		12
Squeeze toy (trumpet shape)	89	30 cm	Toys		12
Squirrel	39		Nature		13
Stereo, home	90-105		Music/Recording	Music	8
Stereo, personal	95-115		Music/Recording	Music	8
Stereo, personal system	74-128		Music/Recording	Music	10
Stock car racing, Bristol Speedway	108	infield	Recreation	Racing	182
Stock car racing, Bristol Speedway	100	in stands	Recreation	Racing	182
Stock car racing, Indianapolis Raceway (Brickyard 400, 2009)	103-108	in stands	Recreation	Racing	1
Stock car racing, Indianapolis Speedway	94	infield	Recreation	Racing	182
Stock car racing, Indianapolis Speedway	92	in stands	Recreation	Racing	182
Stock car racing, Kentucky Speedway	99	infield	Recreation	Racing	182
Stock car racing, Kentucky Speedway	94	in stands	Recreation	Racing	182
Stock car racing, spectators	94	spectators	Recreation	Racing	151
Stock cars in turn one with crowd noise	112	in stands	Recreation	Racing	86
Store, large	60		Public		15
Store, large	60		Public		22
Stove, Camp	43	5 m	Household		13
Stream, water flowing	73		Nature		23
Studio (speech)	30		Music/Recording		15
Studio (speech)	30		Music/Recording		22
Studio for sound pictures	20		Music/Recording		15
Studio for sound pictures	20		Music/Recording		22
Studio, broadcast	30		Music/Recording		20
Suburban ambient	60		Public		99
Subway	90		Transportation	Subway	16
Subway	90	6 m	Transportation	Subway	22
Subway	100		Transportation	Subway	17
Subway	90		Transportation	Subway	7
Subway	90	6 m	Transportation	Subway	15
Subway	80-114		Transportation	Subway	10
Subway train (interior)	100		Transportation	Subway	3
Subway, inside the car at 35 mph	95		Transporation	Train	42
Subway, loud	95		Transportation	Subway	16
Subway, MTA New York City	81	platform	Transportation	Subway	165
Subway, MTA New York City	79	in car	Transportation	Subway	165
Subway, PATH, New Jersey	79	platform	Transportation	Subway	165
Subway, PATH, New Jersey	79	in car	Transportation	Subway	165
Surf, pounding	70		Nature		6
Symphony concert	80-100		Music/Recording	Concert	8
Symphony, full	90		Music/Recording	Concert	9
Talking	75		Household		61

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Talking Jet by Chain Fong Toys	80	typical use position	Recreation	Toys	96
Telephone	66-75		Household		27
Telephone ringing	80		Household		6
Telephone, earlier style cordless	140		Household		23
Telephone, ringing	80		Household		5
Television	75		Household		61
Television	75		Household	Appliances	6
Television audio	70		Household		2
Television audio	70		Household		16
Thunder	110		Nature		6
Thunder, severe	120		Nature		3
Thunderclap	120		Nature		16
Thunder-sticks inflatable tubes	109	45 cm	Recreation	Toys	83
Thunderstorm with torrential rain, peak levels	95-112		Nature		162
Tiller	70		Household	Yard & Garden	18
Tiller, rotary	79	1.8 m	Household	Yard & Garden	24
Toilet flushing	75		Household		6
Toilet, flush - low level	73-82		Household		18
Toilet, flush - high level	80-85		Household		18
Tonka Search and Rescue Talking Transceiver by Hasbro, Inc.	90	typical use position	Recreation	Toys	96
Toothbrush	60	10 cm	Household	Appliances	18
Toothbrush	62	90 cm	Household	Appliances	18
Toothbrush	74	12 cm	Household	Appliances	24
Toothbrush, electric	40		Household	Appliances	6
Toothbrush, electric	60	at ear	Household	Appliances	1
Tractor, diesel powered	80		Transportation	Automotive	3
Tractor, garden	95	90 cm	Household	Yard & Garden	24
Tractor, garden	78		Transportation	Yard & Garden	18
Traffic	100		Public		6
Traffic, average street	83		Public		11
Traffic, busy	70		Public		4
Traffic, busy	70		Public		17
Traffic, freeway	70	15 m	Public		6
Traffic, heavy	90		Public		20
Traffic, heavy	100		Public		7
Traffic, heavy city	90		Public		14
Traffic, light	45	30 m	Public		15
Traffic, light	45	30 m	Public		22
Traffic, light	50	30 m	Public		2
Traffic, light	50		Public		16
Traffic, near freeway	64		Public		16
Traffic, near freeway	65		Public		15
Traffic, near freeway	65		Public		22
Traffic, road	36-52	100 m	Public		13
Train	85-100	15 m	Transportation	Train	8
Train passenger	72-91		Transportation	Train	10
Train passenger	75-90		Transportation	Train	8
Train, diesel	83		Transportation	Train	16
Train, diesel at 50 mph	83	33 m	Transportation	Train	42
Train, elevated - overhead	100		Transportation	Train	20
Train, freight	75		Transportation	Train	15
Train, freight	75	30 m	Transportation	Train	22
Train, in distance	54	1 km	Transportation	Train	13
Train, Long Island Railroad, NY	77	platform	Transportation	Train	165
Train, Long Island Railroad, NY	71	in car	Transportation	Train	165
Train, Metro-North Railroad, NYC	77	platform	Transportation	Train	165

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Train, Metro-North Railroad, NYC	72	in car	Transportation	Train	165
Train, near elevated	110		Transportation	Train	9
Train, Staten Island Railroad, NYC	77	platform	Transportation	Train	165
Train, Staten Island Railroad, NYC	77	in car	Transportation	Train	165
Tram, Roosevelt Island Tramway, New York City	77	platform	Transportation	Train	165
Tram, Roosevelt Island Tramway, New York City	77	in car	Transportation	Train	165
Transformer, large electric	53	70 m	Public		42
Trash compactor	74	3 m	Household	Appliances	24
Triangle (musical instrument)	91	30 cm	Toys	Music	12
Trip to Greenfield Village	75-94		Public		23
Truck, 1 ton	70		Transportation	Automotive	10
Truck, 20 ton	92		Transportation	Automotive	10
Truck, 5 ton	73		Transportation	Automotive	10
Truck, diesel	84		Transportation	Automotive	16
Truck, diesel - accelerating	114		Transportation	Automotive	16
Truck, diesel 40 mph	84	15 m	Transportation	Automotive	2
Truck, diesel 40 mph	85	15 m	Transportation	Automotive	20
Truck, diesel at 40 mph	84	16 m	Transportation	Truck	42
Truck, diesel powered	80		Transportation	Automotive	3
Truck, dump	92	15 m	Transportation	Automotive	22
Truck, garbage at roadside	100		Transportation	Automotive	6
Truck, heavy	91		Transportation	Automotive	11
Truck, heavy	77-89	15 m	Transportation	Automotive	10
Truck, heavy	90	15 m	Transportation	Automotive	17
Truck, passing	70-100	15 m	Transportation	Automotive	8
Truck, passing	80		Transportation	Automotive	20
Truck, trailer at roadside	100		Transportation	Automotive	6
Typewriter	40		Office		6
Typewriter	75		Office		1
Typewriter, quiet	65		Office		20
Typical outdoor close to freeway, urban transit, or major airport	85		Transportation		99
Ultrasonic lithotripsy	66-96	10 cm	Medical		102
Urban ambient	70		Public		99
Vacuum cleaner	65		Household	Appliances	6
Vacuum cleaner	67		Household	Appliances	18
Vacuum cleaner	70		Household	Appliances	4
Vacuum cleaner	70		Household	Appliances	20
Vacuum cleaner	74		Household	Appliances	7
Vacuum cleaner	74		Household	Appliances	16
Vacuum cleaner	75		Household	Appliances	14
Vacuum cleaner	80		Household	Appliances	1
Vacuum cleaner	80		Household	Appliances	1
Vacuum cleaner	80		Household	Appliances	6
Vacuum cleaner	85	1.8 m	Household	Appliances	24
Vacuum cleaner	60-85		Household	Appliances	8
Vacuum cleaner	60-86		Household	Appliances	10
Vacuum cleaner	67-83	150 cm	Household	Appliances	18
Vacuum cleaner	84-89		Household	Appliances	27
Vacuum cleaner	70	3 m	Household	Appliances	15
Vacuum cleaner	70	3 m	Household	Appliances	22
Vacuum, lawn	92	1.8 m	Household		24
Vacuum, shop	78-92		Power Tools	Appliances	8
Video arcade	80-90		Recreation		8
Video arcade	89-94		Recreation		59
Videogame (home)	73		Household		61
Vuvuzela horn as used at South African soccer game	120	1m	Recreation	Sporting event	167

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Wacky Sax by Toy Island	77	typical use position	Recreation	Toys	96
Walking dog	74		Household		61
Washer, clothes	60		Household	Appliances	18
Washer, clothes	75	3 m	Household	Appliances	24
Washer, clothes	78		Household	Appliances	2
Washer, clothes	78		Household	Appliances	16
Washer, clothes	80		Household	Appliances	6
Washer, clothes	45-80		Household	Appliances	8
Washer, clothes	47-78		Household	Appliances	10
Washer, clothes	54-74	150 cm	Household	Appliances	18
Washer, clothes	65-70		Household	Appliances	27
Washing car	72		Household		61
Watch ticking	20		Household	Yard & Garden	6
Watch, mechanical, wrist (near ear)	22		Household		1
Water closet / Toilet	62		Household		18
Water from bathroom centerset faucet with aearator	68	at ear	Household	Appliances	1
Water heater, gas (wall mounted)	59-66		Household	Appliances	18
Waterfall	45		Nature		6
Weed cutter	69	1.8 m	Household	Yard & Garden	24
Weed whacker	94-96		Household		27
Whisper	10		Personal		3
Whisper	15		Personal		6
Whisper	25	150 cm	Personal		20
Whisper	30		Personal		4
Whisper	30		Personal		5
Whisper	30		Personal		7
Whisper	30	150 cm	Personal		14
Whisper	30	5 m	Personal		17
Whisper	40		Personal		1
Whisper	40		Personal		1
Whisper	30	4.5 m	Personal		6
Whisper	30	150 cm	Personal		15
Whisper, audible	30		Personal		16
Whisper, faint	20		Personal		16
Whisper, soft	30	150 cm	Personal		22
Whistle	55		Personal		6
Whistle, safety	76	15.2 m	Warning		13
Wilderness ambient	35		Nature		99
Wind up drummer	88	30 cm	Toys		12
Wind, blowing through trees	48		Nature		13
Wind, breeze through trees	62		Nature		13
Wind, gusty with rustling tree foliage	55		Nature		13
Wind, rustling grass and brush	30		Nature		13
Wind, rustling leaves	20		Nature		6
Wind, rustling leaves	20		Nature		14
Woods	18		Nature		11
Wrench, impact	103		Power Tools		5
Yard work	97		Household	Yard & Garden	61
Yelling, person	78	15.2 m	Personal		13

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #

Sound Levels

Notes

Measures in 3 facilities in Gifu, Japan, at 80 cm from instructor during peak exercise periods
EPA 1972

details not specified

EPA 1974

Unweighted peak SPL - see Weapons Sheet for details and for other airbag measurements; this is an explosive device

Price et.al. 1989
Level shown is mean of at least 5 repetitions / Max 98 dBA

Tests per EPA F-76a, see reference for data on each model as well as SAE J-1287 test results

EPA 1974

top cruising speed in 4th gear
Mic used with wind screen, measurements avg'd over 1 min each, tests in 7 different models, value shown is mean, range was 86-90
on concrete surface
on concrete surface

Peterson and Gross, 1972

EPA 1974

Level shown is mean of at least 5 repetitions / Max 88 dBA
Level shown is mean of at least 5 repetitions / Max 74 dBA
Level shown is mean of at least 5 repetitions / Max 91 dBA
Level shown is mean of at least 5 repetitions / Max 76 dBA

World Series, 2002
World Series, 2002
1 hr 45 min. (partial game) Leq; regular season game at Cincinnati stadium, sellout crowd
1 hr 12 min. (partial game) Leq; regular seasion game at Victory field, about 50% attendance, lower level off first base
World Series, 2002

Sound Levels

Notes

World Series, 1987, 3 hr 24 min Leq
no mechancial equipment
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

during the changing of the guard 12 gongs sound

Harrison 1974 peak value

U.S. EPA 1971 peak values
Ohson, 1976 L_{50} values

Ohson, 1976 L_{50} values

EPA 1972

EPA 1974

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
Average sound level from dosimetry measurement
Kilmer 1980

From *Physics,* Tipler, 1976
water flowing under bridge, Olympic National Park near One Square Inch
measured with KEMAR and adjusted to equivalent free field; also reported 90 dBA at 25 cm and 113 dBAin close proximity to ear
Bray 1974
Average of 16 Leq measurements
Average of 14 Leq measurements

EPA 1972

data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service
avg. of 28 measurements; range from 88 - 98 dBA; Stryker cast saw with hand-held vacuum attachment
EPA 1972
Myles, Hirvonen, Embleton, and Toole 1971 L_{50}

Sound Levels

Notes

EPA 1974

Husqvama 272, new; one of three entries in this table for idling, running, cutting
Husqvama 272, new; one of three entries in this table for idling, running, cutting
Husqvama 272, new; one of three entries in this table for idling, running, cutting

measured using Radio Shack SLM; did not specify SLOW or FAST response; avg. of 24 children ages 1 to 12
avg. of 14 measures, SD = 1, see 5 related studies in this datebase
avg. of 53 measures, SD = 4, see 5 related studies in this datebase
avg. of 68 measures, SD = 10, see 5 related studies in this database
avg. of 46 measures, SD = 4, see 5 related studies in this datebase
avg. of 49 measures, SD = 3, see 5 related studies in this datebase
avg. of 49 measures, SD = 3, see 5 related studies in this datebase

Daily and Redman 1975 peak values
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Mean of 96 classrooms throughout the US (std. dev. = 6.5 dB) from 7 studies by various authors as compiled by Lou Sutherland
Daily and Redmond 1975 peak values
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
EPA 1972

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Leq measured nearest to operational spkr. that audience was allowed; Lpeak= 139 dB; Leq=100 at sound mixer console
135 dB peak
110-115 dBC, audience applause/screaming at 102 dBA
value shown is 2 hr 45 min Leq with 3-dB trade
124 dB peak
132 dB peak
EPA 1972
Average sound levels in 32nd row, center, on the field = 103 dBA.

Dosimetry Leq measurements across 22 listeners
From *Physics,* Tipler, 1976
126 dB peak
133 dB peak
110 dBC, levels about 10-dB lower in back half of pavillion, and 95 dBA out on the lawn

Levels were 102 dBA with applause/screaming; 2 hr 40 min Leq=92 dBA

Sound Levels

Notes

129 dB peak
140 dB peak
Leq values during classical performances in two Gothenburg concert halls on mulitiple occasions.
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

U.S. EPA 1971 peak values
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

12" bowl tuned to D or about 288 Hz
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

EPA 1972

avg. over 14 measurements on high- and low-speed handpieces with diamon and with tungsten carbide tips

avg. over 2 new and 6 used high-speed micromotor , and 2 new and 10 used high-speed air-turbine hand pieces
avg. over 2 new and 6 used high-speed micromotor , and 2 new and 10 used high-speed air-turbine hand pieces with max water spray and air pressure
avg. over 18 surgeries using air-bearing drills
avg. over 35 surgeries using ball-bearing drills
avg. of 9 scalers
avg. of measurements on 10 procedures

EPA 1972

Jackson and Leventhall, 1975, - British homes

measured with KEMAR and adjusted to equivalent free field; also reported 76 dBA at 25 cm and 98 dBA in close proximity to ear

U.S. EPA 1971 peak values
U.S. EPA 1971 peak values

Leq during 7-1/2 hr was 92 dBA, with >115 dBA for 3-1/2 min.; SPLs in Top Fuel Pit area were 119 - 136 dBA

Peterson and Gross, 1972

Sound Levels

Notes

EPA 1972

EPA 1974

Jackson and Leventhall, 1975, - British homes

EPA 1972

sound level at ear while in use
sound level at ear while in use
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Measured in typical public restroom with hands in airstream; with no hands levels = 87 dBA; dry time ~ 10 s.
Measured in typical public restroom with hands in airstream at 3"; at 12" = 95 dBA and with no hands levels = 87 dBA; dry time ~ 12 s.
Measured in typical public restroom with one hand in airstream at 3" using iPhone 5 app (calibrated).
Measured in typical public restroom; levels same with or without hands in airstream; dry time ~ 27 s.
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Variation due to tip size of suction device and suction pressure; peak SPLs over 140 dB, however no transfer function correction was applied
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
EPA 1972
EPA 1972
Olympic National Park near One Square Inch
Kilmer 1980

Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes

Jackson and Leventhall, 1975, - British homes
EPA 1972

EPA 1972
EPA 1972

EPA 1972

Average of 2 Leq measurements
Average of 2 Leq measurements
value shown is 30 min Leq with 3-dB trade
quick flap of fish both breaking and reentering water in one sound event (no aerials)
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

LAeq averaged over entire 4-hr event; loudest 3.75-min block was 109 dBA; seated 20 rows from top of stadium not in proximity to speakers

Sound Levels

Notes

2hr 55 min Leq with 3-dB trade
LA8hn (3-dB trade) across 15 samples in 3 stadiums; mean SPL = 94 dB
3 hr 11 min Leq with 3-dB trade
LA8hn (3-dB trade) for one fan in the stadium during a 3-hr exposure; max SPL = 110 dB
30-sec LAeq, max 1-sec LAeq=97, max LCpeak=110, during highest sustained plateau of screaming, Colts in Patriot's red zone.
25-sec LAeq, max 1-sec LAeq=105, max LCpeak=118, near coach&players during hightest sustained plateau of screaming, OSU inside PS's 20-yr line.
Value= LAeq over entire game; LAmax=110, Laeq,1sec > 100 dBA 15% of time, measurements on sidelines at 50-yrd line 5 ft behind bench using LD831
LAeq averaged for 10 spectators dosimeter measures, converts to equivalent daily 8-hr. exposures used 3-dB trade of 94 dBA

Moving between lower stands and upper stands across from pits; 2-1/4 hr Leq=101 dBA; max level = 121 dBA
Upper stands main straightaway across from pits; 1-1/4 hr Leq = 111 dBA, max level = 126 dBA
EPA 1972
Level shown is mean of at least 5 repetitions / Max 88 dBA

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Jackson and Leventhall, 1975, - British homes

EPA 1972

EPA 1974

Jackson and Leventhall, 1975, - British homes

Jackson and Leventhall, 1975, - British homes
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Zoo was ordered to keep gibbons indoors 3 nights / wk. so as not to disturb neighbors; asbo = antisocial behavior order

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
no roads, birds, wind

U.S. EPA 1971 peak values

Daily and Redmond 1975 peak values

Level shown is mean of at least 5 repetitions / Max 97 peak dBC

Peterson and Gross, 1972

8-minute average Leq area sound level
Daily and Redmond 1975 peak values

measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 4 types of music
measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 5 types of music
measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 4 types of music
measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 7 types of music
measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 3 types of music

Sound Levels

Notes

measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 6 types of music
measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 4 types of music
measured with KEMAR and adjusted to equivalent free field; avg of 10-sec rms levels measured across 7 types of music
EPA 1972

EPA 1972

3 hr 30 min Leq
Average Leq of dosimetry on one person at 3 games; max levels routinely equalled or exceeded 115 dBA.
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Seacord (1940).

Kilmer 1980
Avg. over 11 different types of surgeries; for neurosurgery and orthopedic surgery peak levels exceeded 100 dBA over 40% of the time
43 data points each value representing average over 5 min.; values ranged from 49 - 63 dBA
various positions throughout four floors covering childrens' and oncology services, all at a height of 1.4 m; value reported is Leq
Data avg. over older and newer (5-dB quieter units); data from a private and county hospital in Houston, TX
various positions throughout the room at height of 1.4 m; value reported is Leq

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
EPA 1972

VIP box in straightaway as cars passed by
High up in 3rd turns as cars passed by; 4-hr Leq = 96 dBA
8-minute average Leq area sound level
Ohson, 1976 L_{50} values
Bray 1974
RION NA-61 SLM measurement
value shown is 1 hr 16 min Leq with 3-dB trade
value shown is 1 hr 56 min Leq with 3-dB trade
value shown is 1 hr 26 min Leq with 3-dB trade
Measured in 3rd balcony, applause 85-95 dBA
data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service
data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service

Noise levels measured in 10 commercial karaoke facilities
Noise levels measured in 10 commercial karaoke facilities
measured with KEMAR and adjusted to equivalent free field; also reported 97 dBA at 25 cm and 105 dBA in close proximity to ear
Jackson and Leventhall, 1975, - British homes
EPA 1972

data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
75-80 at 25 feet
EPA 1972

Sound Levels

Notes

EPA 1974

59-62 at 25 feet
56 at 25 feet
EPA 1972
B&K Type 2215 SLM measurements made at operator's ear
60 at 25 feet

72-82 at 25 feet

54-60 at 25 feet

EPA 1972

Olympic National Park near One Square Inch

From *Physics,* Tipler, 1976
value shown is 2 hr 10 min Leq with 3-dB trade
value shown is 1 hr 39 min Leq with 3-dB trade
value shown is 1 hr 53 min Leq with 3-dB trade

EPA 1974
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
highest peak SPL for unit wth 1.5 Tesla field strength; also reported max. SPLs over 5-ms time frames as 115 dBA
highest peak SPL for unit wth 3.0 Tesla field strength; also reported max. SPLs over 5-ms time frames as 131 dBA
averaging time not specified
at entrance to bore of unit
peak SPL for unit with 1.5 Tesla field strength
peak SPL for unit with 3.0 Tesla field strength
Time-avg. equiv. levels shown; peak levels from 122-131 dB; GE Medical Systems 1.5-T high-speed scanner
Leq during actual scanning, 16 kilogauss field
Olympic National Park near One Square Inch

Daily and Redmond 1975 peak values
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

EPA 1972

Jackson and Leventhall, 1975, - British homes

Sound Levels

Notes

Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes

EPA 1972

Measures on 0.19 - 0.46 cc engines as reported by Bess, F. H. and Powell, R. L. (1972), Clin Pediatr., 11, 621-624.
Measures on 3 engines (0.327 cc, 0.819 cc, and 2.47 cc) mounted on plywood measured in anechoic chamber
Measures on 0.49 - 0.60 cc engines as reported by Neuman, N. (1975), R/C Sportsman 3, p. 19.
Measures on 3 engines (0.327 cc, 0.819 cc, and 2.47 cc) mounted on plywood measured in anechoic chamber
NIOSH 1972
Avg. sound level over 2-hr event; during hard acceleration continuous noise exceeded 122 dBA.
Value listed is 1 hr 20 min Leq, maximum levels to 118 dB
data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service
data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service

Campbell 1972
EPA 1974

EPA 1974

Tests per EPA F-76a, see reference for data on each model as well as SAE J-1287 test results

Range; mean Leq 78 dBA
measured with mic in concha; data from 1 helmet
measured with 1/2" probe mic at ear entrance; data from 5 different models of helmets
measured with mic in concha; data from 1 helmet

measured with mic near ear; data from 1 helmet
measured with 1/2" probe mic at ear entrance; data from 5 different models of helmets
measured with mic in concha; data from 1 helmet
measured with mic near ear; data from 1 helmet

measured with mic near ear; data from 1 helmet
measured with 1/2" probe mic at ear entrance; data from 5 different models of helmets
measured with mic in concha; data from 1 helmet

measured with mic near ear; data from 1 helmet
measured with mic near ear; data from 1 helmet

measured with 1/2" probe mic at ear entrance; data from 13 different standard helmets
measured with 1/2' mic behind the ear; data from 4 different standard helmets
measured with 1/2" probe mic at ear entrance; data from 13 different standard helmets
measured with 1/2' mic behind the ear; data from 4 different standard helmets
measured with 1/2" probe mic at ear entrance; data from 13 different standard helmets
measured at the ear; data averaged over 5 full-face and 5 open-face helmets for one rider and one bike
measured at the ear; data averaged over 5 full-face and 5 open-face helmets for one rider and one bike

Sound Levels

Notes

8-minute average Leq area sound level

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

avg. of 29 movies from 2001 - 2009; value shown is Leq with 3-dB trade over duration of film; peak value up to 130 dB
avg. of Leq over duration of film; 4 different popular filmes; no value exceeded 79 dBA
measured with KEMAR and adjusted to equivalent free field; also reported 117 dBA at 25 cm and 137 dBA in close proximity to ear; avg of 9 samples
Level shown is mean of at least 5 repetitions / Max 76 dBA
Level shown is mean of at least 5 repetitions / Max 78 dBA
Highest $Leq_{,8}$ for live performance in 30 venues surveyed in 1996
Highest Leq,8 for live performance in 15 venues surveyed in 1998
Highest $Leq_{,8}$ for live concerts in 30 venues surveyed in 1996
Highest $Leq_{,8}$ for pre-recorded music in 30 venues surveyed in 1996
Highest Leq,8 for pre-recorded music in 15 venues surveyed in 1998

U.S. EPA 1971 peak values

Value is Leq for entire show, Lmax=108 dBA, venue = Indianapolis, Murat Theater
approximately 150 visitors, few speaking
Avg. of 20 sites near sacred Cheyenne mountain site; min. value = 20 dBA
From *Physics,* Tipler, 1976

Avg. SPL measures in 5 clubs, as reported by T. C. Tan at al. (1990). "Noise surveys in discotheques in Hong Kong," Ind. Health (Japan) 28(1), 37-40.
Avg. SPL of measures in 4 clubs on 3-4 occasions each, as reported by S. Fox (1992). "Occupational noise exposure in nightclubs, MSc, Univ. of Newcastle.

1 of 6 entries in this table; noise levels increase from 10 pm to 1 am
1 of 6 entries in this table; noise levels increase from 10 pm to 1 am
1 of 6 entries in this table; noise levels increase from 10 pm to 1 am
1 of 6 entries in this table; noise levels increase from 10 pm to 1 am
1 of 6 entries in this table; noise levels increase from 10 pm to 1 am
1 of 6 entries in this table; noise levels increase from 10 pm to 1 am
median value reported; lower quartile = 90 dBA and upper quartile = 98 dBA
Sound level measurements; 8 hr. Leqs computed to average 93 dBA
median value reported

Sharper Image Model S1546

; average of measures on Panasonic models KP-2A and KP-350.

Combined lab and field data sets; 25% of group >90 dBA and 5% > 100 dBA sound level; 5% exceed 90 dBA Laeq
Performed in schools and on streets of Lucerne; males avg'd 4-dBA louder than females; avg use 3-4 h/wk; computed avg. exposure = 72 dBA
Range from 61 - 104 dB, avg listening time 11 h/wk, estimated weekly exposure was 75 dB with 95% of values below 85 dB.
In lab asked to set level as loud as they normally listen; males listened 7 dBA louder than females
Preferred levels based on interviews and measurements; mean listening time 1 h/wk with no more than 5% listening >7 h/wk
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

NIOSH 1972

Sound Levels

Notes

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Daily and Redman 1975 peak values

Homelite brand 179 cc, 2600 PSI power washer used to clean a brick wall surrounding a courtyard

Jackson and Leventhall, 1975, - British homes
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

8-minute average Leq area sound level

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

EPA 1972

EPA 1974

Peterson and Gross, 1972

Peterson and Gross, 1972

Maximum dBA reached 110 and dB Peak reached 145; 1 of 5 related measurements in this table; average of 1-hr. time blocks on three days
Maximum dBA reached 103 and dB Peak reached 125; 1 of 5 related measurements in this table; average of 1-hr. time blocks on three days

Maximum dBA reached 85 and dB Peak reached 105; 1 of 5 related measurements in this table; average of 1-hr. time blocks on three days
Maximum dBA reached 94 and dB Peak reached 128; 1 of 5 related measurements in this table; average of 1-hr. time blocks on three days

Maximum dBA reached 105 and dB Peak reached 142; 1 of 5 related measurements in this table; average of 1-hr. time blocks on three days

8-minute average Leq area sound level
8-minute average Leq area sound level
Short time in 8th row and them most of concert near mixing console; max levels in front over 110 dBA, typical at console 92 - 102 dBA
RION NA-61 SLM measurement

Clark 1991

Sound Levels

Notes
as measured by dosimeter during concert
NIOSH 1972
see urban, suburban, and wilderness by same author for a comparison From *Physics,* Tipler, 1976
measured with KEMAR and adjusted to equivalent free field; also reported 83 dBA at 25 cm and 107 dBA in close proximity to ear data in article provided measured by Harris Miller Miller and Hanson, Inc. and obtained through National Park Service NIOSH 1972
O'Neil 1986
131 dB peak
Peterson and Gross, 1972
NIOSH 1972
NIOSH 1972
Teenagers (age 16), max possible level avg'd over 5-secs. Three male and 3 females participants. Values ranged from 103 - 114 dB. EPA 1972
NIOSH 1972
EPA 1972

Sound Levels

Notes

EPA 1972

measured at ear while shaving; 3-dB louder when clipper popped up and engaged
Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
Dornier system GmbH Lithotriptor; value report is peak SPL

average long-time RMS

Daily and Redmond 1975 peak values

Peterson and Gross, 1972

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
EPA 1972

EPA 1974
Curtis & Sauer 1973
Bombardier Nordic Safari 503R 78bDA wide open throttle
GenRad SLM measurements at operator's ear
GenRad SLM measurements at operator's ear

Equivalent diffuse field acoustical output from headphones - median level across 405 students - 1-min Leq. TFOE adjustment not reported

From *Physics,* Tipler, 1976

Peterson and Gross, 1972

Sound Levels

Notes
average long-time RMS
Daily and Redmond 1975 peak values
Seacord (1940)
Level shown is mean of at least 5 repetitions / Max 84 dBA
Level shown is mean of at least 5 repetitions / Max 100 dBA
Level shown is mean of at least 5 repetitions / Max 98 dBA
Level shown is mean of at least 5 repetitions / Max 92 dBA
U.S. EPA 1971 peak values
Clark 1991
Avg. value shown; range was 97-119, with Lmax of 111-123. See Occup Tab for data on driver levels.
Avg. value shown; range was 96-104, with Lmax of 106-114. See Occup Tab for data on driver levels.
Upper stands entrance to turn 2; 3-1/2 hr Leq = 106 dBA, max level = 117 dBA
Lmax was 107.
Avg. value shown; range was 90-94, with Lmax of 107-112
Avg. value shown; range was 90-108, with Lmax of 115-121
Avg. value shown; range was 93-95, with Lmax of 107-120
Leq for spectators
Peterson and Gross, 1972
Peterson and Gross, 1972
Peterson and Gross, 1972
see urban, rural, and wilderness by same author for a comparison
From *Physics,* Tipler, 1976
Peterson and Gross, 1972
EPA 1974
Average of 86 Leq measurements
Average of 60 Leq measurements
Average of 8 Leq measurements
Average of 4 Leq measurements
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Sound Levels

Notes

measured with KEMAR and adjusted to equivalent free field; also reported 79 dBA at 25 cm and 96 dBA in close proximity to ear

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

One pair of thunder-sticks (60 cm long by 5 cm diameter) hit together
dBA fast, standing under overhang of building with large pillars, Washington DC, about 8 or 9 total thunder claps
EPA 1972

Jackson and Leventhall, 1975, - British homes
Jackson and Leventhall, 1975, - British homes
measured with KEMAR and adjusted to equivalent free field; also reported 120 dBA in close proximity to ear; avg of 4 samples
Jackson and Leventhall, 1975, - British homes
EPA 1972

Conair Interplak

EPA 1972

From *Physics,* Tipler, 1976

Peterson and Gross, 1972

Peterson and Gross, 1972

EPA 1974

Peterson and Gross, 1972

Average of 12 Leq measurements
Average of 6 Leq measurements
Average of 7 Leq measurements

Sound Levels

Notes
Average of 4 Leq measurements
Single Leq measurement
Average of 2 Leq measurements
Average of 2 Leq measurements
Average of 2 Leq measurements
Level shown is mean of at least 5 repetitions / Max 99 dBA
NIOSH 1972
NIOSH 1972
NIOSH 1972
EPA 1974
From *Physics,* Tipler, 1976
Reported value is DNL, a 24-hr. energy equivalent level with a 10-dB penalty for sounds occurring at night
highest dBA slow value sustained for 30 secs. or more during recording period; levels decreased to 63-86 dBA at 1 m
see suburban, rural, and wilderness by same author for a comparison
EPA 1972
EPA 1974
Jackson and Leventhall, 1975, - British homes
Peterson and Gross, 1972
Average of 5-second area Leq SLM measurement
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
dBA fast, readings at ear of player = 113 and at horn opening 131 (127 was value cited in the press).

Sound Levels

Notes

measured with KEMAR and adjusted to equivalent free field; also reported 96 dBA at 25 cm and 116 dBA in close proximity to ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
EPA 1972

EPA 1974
Jackson and Leventhall, 1975, - British homes

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

EPA 1972
set for maximum flow with equal mix of hot and cold water
Jackson and Leventhall, 1975, - British homes

From *Physics,* Tipler, 1976

Peterson and Gross, 1972

Daily and Redmond 1975 peak values
see urban, suburban, and rural by same author for a comparison
Level shown is mean of at least 5 repetitions / Max 91 dBA

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Daily and Redmond 1975 peak values

Sound Levels

Notes

Sound Levels

Nonoccupational and Community/Environmental A-weighted sound levels with data averaged for type of source

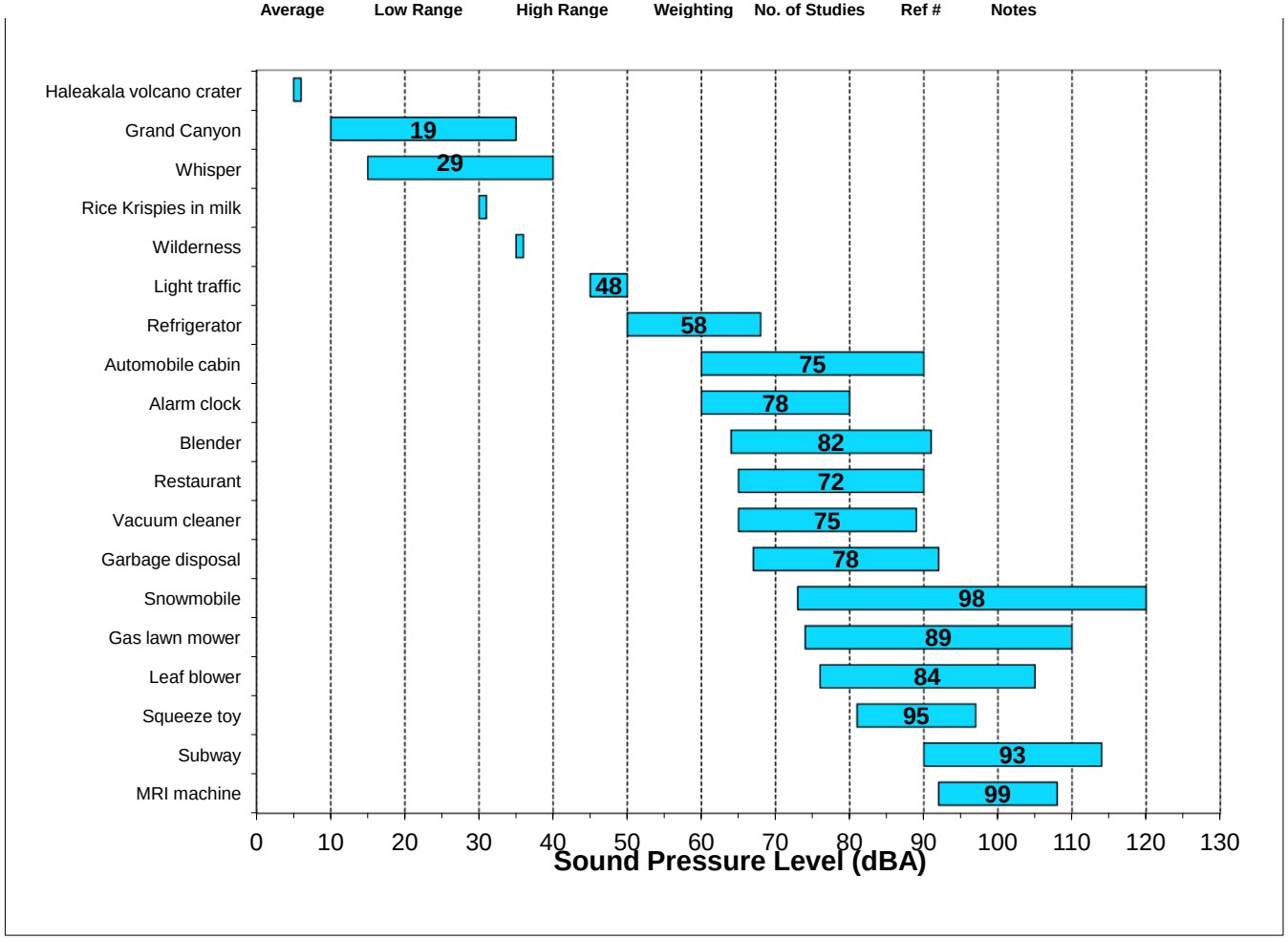
Source	dBA Average	dBA Low Range	dBA High Range	Weighting	No. of Studies	Ref #	Notes
Chopping wood	61	50	71	A	3	13	
Dishwasher	68	60	75	A	7	4,6,16,18,24,27	
Motorcycle (rider with helmet)	98	63	111	A	24	46, 87, 88, 89, 90, 91	
Air conditioner	66	55	80	A	8	3,6, 8,10, 18, 20, 24, 42	
Blender	82	64	91	A	8	2, 6, 7, 8, 9, 16, 18, 24	
Alarm clock	78	60	80	A	4	4,6,14,27	
Clother dryer	63	45	80	A	7	6,8,10,18,24,27	
Hair dryer	75	50	95	A	7	6,7,18,24,26	
Garbage disposal	78	67	92	A	10	2, 6, 8, 10, 16, 18, 20, 24, 27	
Refrigerator	58	50	68	A	7	6, 8, 10, 18, 20, 24, 27	
Vacuum cleaner	75	65	89	A	17	1, 4, 6, 6, 7, 8, 10, 14, 15, 16, 18, 20, 22, 24, 27	
Clothes washer	70	45	80	A	9	2,6,8,10,16,18,24,27	
Lawn mower, gas-powered	89	74	100	A	16	1, 3, 4, 5 ,6, 8, 10, 16, 18, 20, 24, 27, 28	
Lawn mower, electric	81	68	103	A	5	18,28,38	
Leaf blower	84	76	105	A	3	18,24,27	
Snow blower	87	84	92	A	3	8,18,24	
MRI machine	99	92	108	A	3	100,104,107	
Birds	46	30	62	A	9	3,6,13	
Grand Canyon	19	10	35	A	4	13,27,94	
Rustling leaves	27	20	40	A	3	3,17,20	
Speech	62	55	70	A	22	1, 2, 3, 4 ,5, 6, 7, 9, 11, 13, 14, 15, 16, 17, 20, 22, 23, 27	
Whisper	29	15	40	A	15	1, 3, 4, 5, 6, 7, 14, 15, 16, 17, 20, 22	
Chainsaw	104	93	2118	A	15	1, 4, 5, 6, 7, 8, 10, 13, 16, 18, 24, 118	
Drill, handheld	98	92	114	A	8	1, 5, 19, 24, 27	
Planer	103	101	106	A	3	10, 21, 24	
Router	97	78	108	A	6	8, 10, 21, 24	
Radial arm saw	103	98	110		4	10, 21, 24	
Circular saw	106	100	113	A	3	19, 24, 27	
Belt sander	97	93	102	A	3	5, 10, 24	
Cut-off saw	107	105	112	A	3	10, 15, 22	
Restaurant	72	65	90	A	8	117, 121	
Heavy traffic	82	70	100	A	6	4, 6, 7, 14, 17, 20	
Light traffic	48	45	50	A	5	2,15,16,22	
Model airplanes	103	84	117	A	5	8, 84	
Snowmobile	98	73	120	A	10	3, 4, 7, 8, 10, 13, 16	
Baby rattle	81	73	89	A	4	12	
Squeeze toy	90	81	97		4	12	
Automobile (inside)	75	60	90	A	7	8, 9, 15, 16, 22, 27	
Diesel truck	89	84	114	A	5	2, 3, 16, 20	
Subway	93	90	114	A	7	3, 7, 10, 15, 16, 17, 22	
Train	85	75	102	A	10	8, 10, 15, 16, 20, 22, 42, 99	
Air raid siren	135	130	140	A	3	4, 6, 16	
Electric Mixer	71	60	91	A	10	6, 18, 24, 27	
Haleakala volcano, in crater, no wind	5	na	na	A	1	94	
Rice Krispies, fresh in cereal bowl just after milk is poured	30	na	na	A	1	1	

NOTE: The averages and ranges in the table were computed from the reported mean values provided by the designated references, or from the midpoint of the reported values when ranges were included.

Figure 2 - Mean and Range for Sound Levels of Recreational and Natural Noise Sources

Sound Levels

Source	dBA Average	dBA Low Range	dBA High Range	Weighting	No. of Studies	Ref #	Notes



Sound Levels

Source	dBA Average	dBA Low Range	dBA High Range	Weighting	No. of Studies	Ref #	Notes

Sound Levels

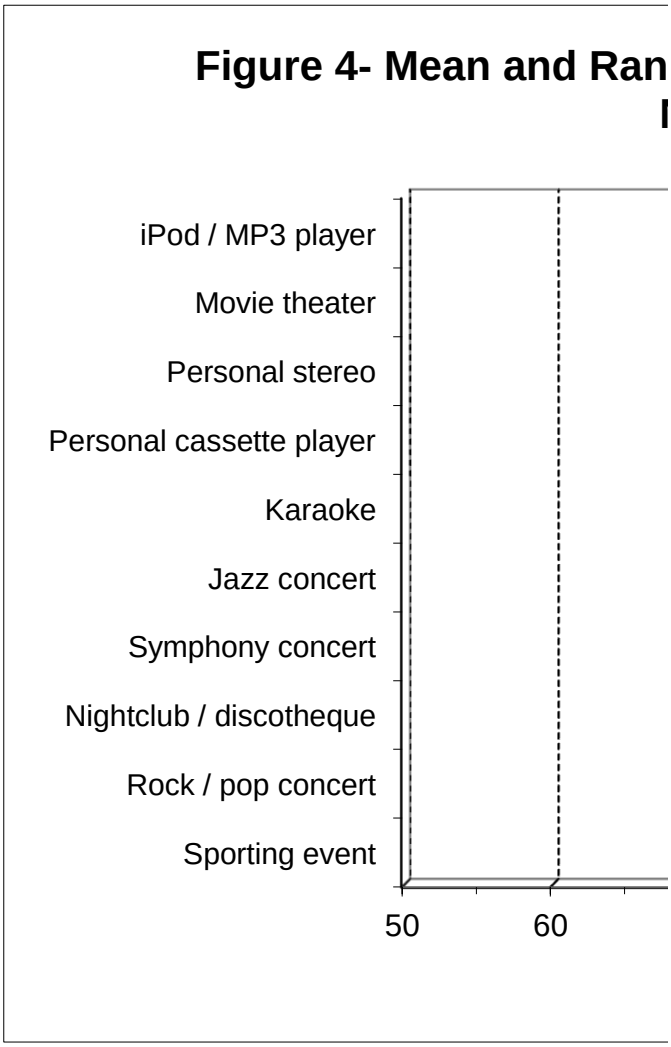
Sound Levels

Sound Levels

Entertainment-Related A-weighted sound levels with data averaged for type of source

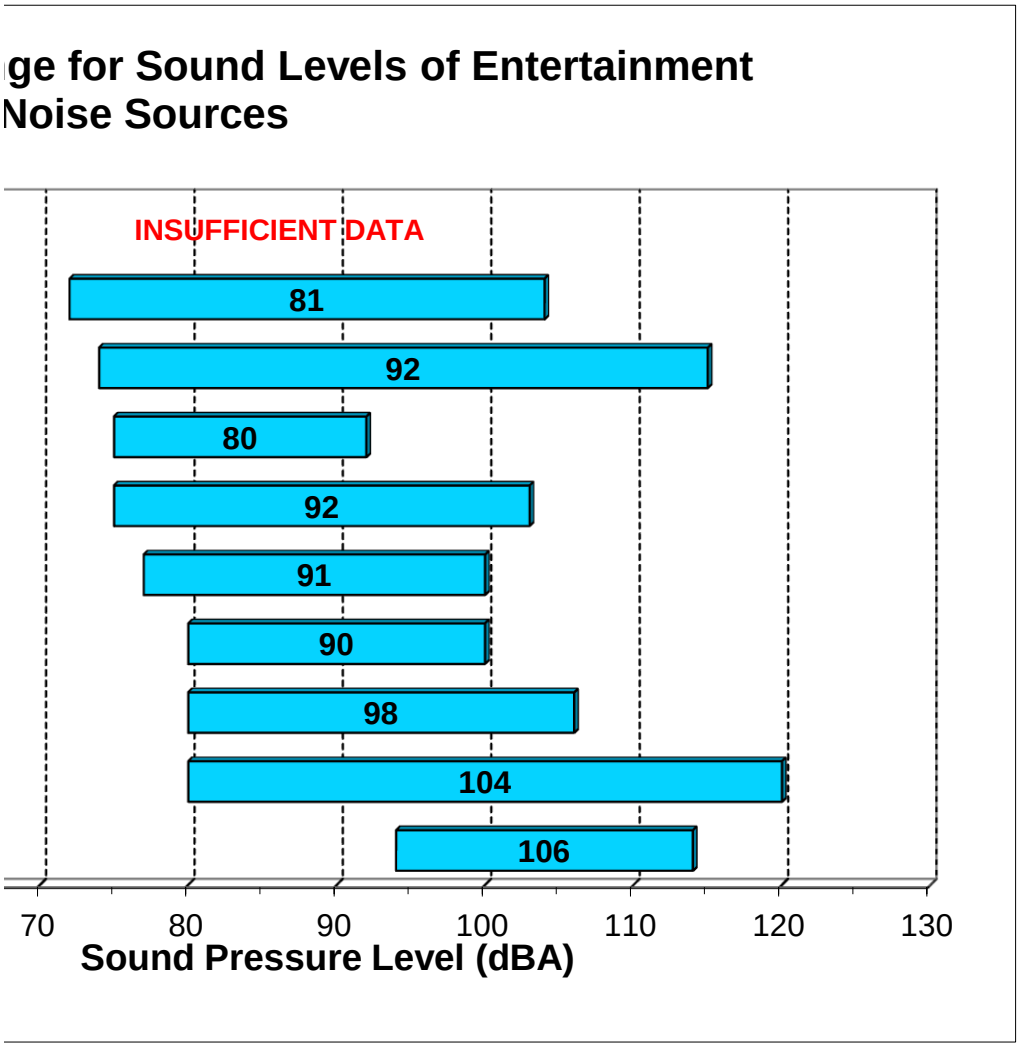
Source	dBA Average	dBA Low Range	dBA High Range
iPod	*INSUFFICIENT DATA - MORE STUDIES NEEDED*		
Nightclub / discotheque	98	80	106
Personal cassette player	80	75	92
Rock / pop concert	104	80	120
Jazz concert	91	77	100
Symphony concert	90	80	100
Personal stereo	92	74	115
Karaoke	92	75	103
Movie theater	81	72	104
Live shows	85	85	85
Sporting event	106	94	114

NOTE: The averages and ranges in the table were computed from the reported mean values provided b



Weighting	No. of Studies	Ref #	Notes
A			
A	8	1, 72, 79, 81, 119	
A	5	55, 66, 68, 69, 70	
A	24	1, 2, 3, 4, 6, 8, 10, 11, 17, 20, 25, 57, 75	
A	3	1	
A	4	6, 8, 9, 71	
A	5	8, 10, 16, 61	
A	3	40, 56	
A	4	1, 23, 61, 120	
A	3	1	
A	3	1, 3, 83	

by the designated references, or from the midpoint of the reported values when ranges were included.



Sound Levels

Occupational A-weighted sound levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Aerial spraying support personnel, aircraft loader	69		Farm	Aircraft	125
Aerial spraying, support personnel, helicopter loader	91		Farm	Aircraft	125
Air chisel on auto body metal	112	Operator	Automotive		141
Air grinder	100-105		Construction		33
Air gun	108		Construction		157
Air hammer	99	Operator	Industrial		141
Air track drill	113		Construction		51
Air traffic ctrl tower, Boeing Field, Seattle, WA, during jet takeoff	98	operator	Transportation	Aircraft	142
Air traffic ctrl tower, Boeing Field, Seattle, WA, during propeller takeoff	85	operator	Transportation		142
Air, compressed, blowing air through nozzle	95	1 m	Automotive		142
Air, compressed, blowing out street cuts	104		Construction		52
Air, compressed, filling tires	83	1 m	Automotive		141
Air-carbon acrcgouging	112	operator	Welding		97
Aluminum can production, cupping press	98		Industrial		114
Aluminum can production, DI press	96		Industrial		114
Aluminum can production, printer	98-102		Industrial		114
Ambulance, inside with siren on	97	driver	Warning		142
Ambulance, inside with siren on, driver's windows down	100	driver	Warning		166
Ambulance, inside with siren on, windows up	96	driver	Warning		166
Animal shelter, dogs and cats barking	92		Public		142
Asphalt grinder	111-116	7 m	Construction		36
Automobile forge press	104-105		Industrial		58
Backhoe	85	26 m	Construction		37
Backhoe	89		Construction		62
Backhoe	87		Construction		134
Bag and handle former (paper products)	89		Industrial		10
Bar bender	104		Construction		134
Bar staff in university entertainment venue	90		Entertainment		60
Bedding chopper	93		Farm		126
Bedding choppers, Ostego, County, NY, dairy farm	94-102	operator	Farm		123
Bells, Salvation Army	91	75 cm			1
Belt sander	93-104		Construction		33
Belt sander, loaded	84	operator	Power Tools		142
Belt sander, unloaded	95	operator	Construction	Hand Tools	122
Binder (printing and publishing)	86		Industrial		10
Blacksmith shop	81		Industrial	Machinery	135
Blower room, refractory production department	82		Industrial	Machinery	135
Boiler room	90		Industrial		15
Boiler room	90		Industrial		22
Bottling plant	100		Industrial		9
Brick mason drilling and chipping brick, concrete, plaster	91		Construction		53
Bricklayers - break, rest, lunch, cleanup	85		Construction		62
Bricklayers - bricking, blocking, tiling	92		Construction		62
Bricklayers - grouting and mortaring	93		Construction		62
Bricklayers - manual material handling	89		Construction		62
Bricklayers - operating work vehicle	98		Construction		62
Bricklayers - pointing, cleaning, caulking	95		Construction		62
Bulldozer	110		Construction		10
Bulldozer	102		Construction		34
Bulldozer	87	21 m	Construction		37
Bulldozer	100		Construction		62
Bulldozer	94		Construction		134
Bulldozer	88		Logging		32
Bulldozer	95-105		Mining	Surface	39

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Bulldozer	105		Construction		5
Bus, urban (in Brazil) bi-articulated	78	at operator	Transportation		154
Bus, urban (in Brazil), Feeder bus	82	at operator	Transportation		154
Bus, urban (in Brazil), Speedy bus	75	at operator	Transportation		154
Can fillling machine	100		Industrial		10
Can making body operation	95		Industrial		10
Can seaming (petroleum refining)	96		Industrial		10
Canning punch press	97		Industrial		10
Carpenter	90		Construction		51
Carpenter constructing wood frams and concrete forms	87-98		Construction		53
Carpenters - break, rest, lunch, cleanup	88		Construction		62
Carpenters - building forms	93		Construction		62
Carpenters - interior finish work	89		Construction		62
Carpenters - layout work	91		Construction		62
Carpenters - manual material handling	89		Construction		62
Carpenters - operating work vehicle	80		Construction		62
Carpenters - shop work	89		Construction		62
Carpenters - stripping forms	95		Construction		62
Carpenters - welding	95		Construction		62
Carpenters - wood framing	91		Construction		62
Carwash, blower at exit end	100	in blower area		Automotive	160
Casting shakeout area	112		Industrial		15
Casting shakeout area	112		Industrial		22
Catcher/processor, engine deck	102		Marine	Fishing	137
Catcher/processor, factory deck	89		Marine	Fishing	137
Catcher/processor, fish meal deck	92		Marine	Fishing	137
Catcher/processor, fishing deck	83		Marine	Fishing	137
Catcher/processor, quarters deck	66		Marine	Fishing	137
Cement masons - break, rest, lunch, cleanup	83		Construction		62
Cement masons - finishing concrete	84		Construction		62
Cement masons - floor leveling	70		Construction		62
Cement masons - grinding	95		Construction		62
Cement masons - manual material handling	87		Construction		62
Cement masons - patching concrete	93		Construction		62
Cement masons - placing concrete	88		Construction		62
Cement masons - repairing concrete	89		Construction		62
Cement masons - setting forms	87		Construction		62
Chain conveyors	97-100		Mining		65
Chipper, wood	99	1 m	Machinery		142
Chipping gun, pneumatic	100		Construction		11
Chipping gun, pneumatic	120	150 cm	Construction		20
Chipping gun, pneumatic	103		Construction		62
Chipping gun, pneumatic, chipping concrete and plaster	105-112		Construction		53
Chipping hammer	98-104		Construction		33
Chisel, pneumatic (metal products)	101		Industrial		10
Chopping firewood	78		Logging		32
Circular saw cutting laminated countertop	108		Construction		52
Classical music, brass	92-94	at ear	Music/Recording	Music	73
Classical music, City of Birmingham Symphony Orchestra	90	on stage	Music/Recording	Concert	74
Classical music, harp	87	at ear	Music/Recording	Music	73
Classical music, percussion	95	at ear	Music/Recording	Music	73
Classical music, strings	83-87	at ear	Music/Recording	Music	73
Classical music, woodwinds	89-95	at ear	Music/Recording	Music	73
Classical musicians; string, orchestral, and symphonic works	90	Musician's ear	Music/Recording	Concert	144
Coal auger	90-100		Mining	Underground	39
Combines	105		Farm		124

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Combines	97		Farm		124
Combines	86-98		Farm		124
Combines	87-93		Farm		124
Compactor	108		Construction		51
Compactor, vibratory	92		Construction		35
Compressed air blowdown	114	Operator	Industrial		141
Compressed air gun	93	operator	Construction		134
Compressor , air	94	6 m	Industrial		2
Compressor, air	90		Construction		134
Compressor, air	97		Construction		134
Compressor, air	94		Industrial		16
Compressor, air	92	3 m	Industrial		24
Compressor, air	90-93		Industrial		27
Compressor, air, bleeding air	89	1 m	Automotive		141
Compressor, air, portable	81	17 m	Construction		37
Compressor, air, portable	94	6 m	Construction		42
Compressor, air, running	87	1 m	Automotive		141
Compressor, gas lift (offshore platforms)	105-110		Industrial		10
Concrete breaker	102	operator	Construction		134
Concrete form finisher	93		Construction		51
Concrete form vibrator	89	operator	Industrial		141
Concrete mixer	94		Construction		134
Concrete mixing truck	85	18 m	Construction		37
Concrete pump	99		Construction		134
Concrete saw	98		Construction		157
Concrete vibrator	90		Construction		157
Concrete vibrator	105		Construction		134
Conference room, carpeted	51		Office		117
Construction noise	110	3 m	Construction		17
Continuous miners	97-103		Mining		65
Conveyor belt	93		Mining	Underground	10
Conveyor, pneumatic	100		Farm		10
Core drill drilling brick, concrete, steel	90		Construction		53
Corn grinding	97	near	Farm		124
Cotton spinning (textile mill)	83		Industrial		10
Crane	99		Construction		34
Crane	90	Operator	Construction		134
Crane, mobile	86		Construction		35
Crane, mobile	88		Construction		62
Crane, tower	87		Construction		62
Crusher	96		Mining	Open pit	10
Curb machine	93		Construction		34
Cutter, paper	96		Industrial		10
Cutting concrete	103-113		Construction		23
Cutting machines	85-93		Mining		65
Cutting torch	80	operator	Industrial		141
Cutting wood	85-116		Construction		23
Demolition (removing plaster and metal ductwork)	93-103		Construction		53
Dental work, pediatric, child crying during procedure	88	dentist's ear	Medical		181
Disc jockey in nightclub	103		Entertainment		54
Disc jockey in nightclub	95-107		Entertainment		54
Double scraper	92		Construction		10
Dragline, diesel powered	85-98		Mining	Surface	39
Drill, electric	102		Construction		51
Drill, jumbo	107		Mining	Open pit	10
Drill, percussion, machine-mounted (hydraulic)	100-114		Mining	Surface	39

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Drill, percussion, machine-mounted (pneumatic)	116-118		Mining	Surface	39
Drill, rock	92	30 m	Construction		2
Drill, rock	98	25 m	Construction		37
Drill, rotary	93		Mining	Open pit	10
Drill, rotary diesel-powered	85-100		Mining	Surface	39
Drill, rotary, electrically-powered	75-95		Mining	Surface	39
Drill, stoper	115		Mining	Underground	10
Drill, unloaded	82-89	operator	Construction	Hand Tools	122
Drilling rebar holes in brick, concrete, steel	92-98		Construction		53
Drywall installer	90		Construction		51
Edging sidewalks	97	operator	Industrial	Yard & Garden	142
Electric furnace area	100		Industrial		15
Electric furnace area	100		Industrial		22
Electric shovel	72-89		Mining	Surface	39
Electricians - break, rest, lunch, cleanup	87		Construction		62
Electricians - installing cable tray	92		Construction		62
Electricians - installing slab conduit	91		Construction		62
Electricians - installing trench conduit	96		Construction		62
Electricians - installing wall conduit	91		Construction		62
Electricians - manual material handling	87		Construction		62
Electricians - operating work vehicle	79		Construction		62
Electricians - panel wiring, installing fixtures	87		Construction		62
Electricians - pulling wire	96		Construction		62
Electricians - sheet metal work	82		Construction		62
Elevator installer	96		Construction		51
Emergency generator, diesel	110	1 m	Industrial		142
Excavation equipment breaking up and moving concrete	93-99		Construction		53
Excavator	80		Construction		35
Excavator	101-102	2 m	Construction		36
Excavator	90		Construction		62
Excavator	91		Construction		134
Excavator	86		Logging		32
Factory lunchroom, noon	60				117
Factory, average	80		Industrial		17
Factory, average	75		Industrial		20
Factory, boiler	105		Industrial		20
Factory, noisy	100		Industrial		14
Factory, noisy	95		Industrial		20
Fan, axial vane	107		Mining	Underground	10
Fan, centrifugal ventilating	105		Industrial		22
Fan, vaneaxial ventilating	90		Industrial		22
Fans	90-110		Mining		65
Feed carts, Ostego, County, NY, dairy farm	85-92	operator	Farm		123
Feed unloading area	90		Farm		126
Fencing mill board trimmer	95	operator	Industrial		144
Fencing mill wood chipper	106	operator	Industrial		143
Fishing purse-seiner, back deck	79		Marine	Fishing	140
Fishing purse-seiner, bridge	79		Marine	Fishing	140
Fishing purse-seiner, captain's quarters	72		Marine	Fishing	140
Fishing purse-seiner, crew's quarters	80		Marine	Fishing	140
Fishing purse-seiner, engine room	104		Marine	Fishing	140
Fishing purse-seiner, galley	74		Marine	Fishing	140
Fishing purse-seiner, helm	71		Marine	Fishing	140
Fishing purse-seiner, main engine exhaust	86		Marine	Fishing	140
Fishing purse-seiner, skiff	103		Marine	Fishing	140
Fishing trawler, engine room	104		Marine	Fishing	139

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Fishing trawler, living quarters	58		Marine	Fishing	139
Fishing trawler, mess	58		Marine	Fishing	139
Fishing trawler, navigation bridge	60		Marine	Fishing	139
Fishing trawler, processing plant	88		Marine	Fishing	139
Fishing trawler, trawl deck	58		Marine	Fishing	139
Fixed wing aircraft, Agcat, aerial spraying	98-110	cockpit	Farm	Aircraft	125
Fixed wing aircraft, Eagle, aerial spraying	103	cockpit	Farm	Aircraft	125
Fixed wing aircraft, Weatherly, aerial spaying	106	cockpit	Farm	Aircraft	125
Fixed wing aircraft, Weatherly, flyovers	94-110	9 - 30 m	Farm	Aircraft	125
Fixed wing aircraft, Weatherly, idle	79	15 m	Farm	Aircraft	125
Fixed wing aircraft, Weatherly, takeoff, loaded	116	15 m	Farm	Aircraft	125
Fixed wing aricraft, Weatherly, takeoff, unloaded	108	15 m	Farm	Aircraft	125
Floor lift, pneumatic, raising vehicle	89	2m	Transportation	Automotive	142
Folding machines (printing and publishing)	85		Industrial		10
Football game, avg. of med & large college stadiums	88	various	Recreation	Sporting Event	172
Forklift	93		Construction		35
Forklift	89		Construction		62
Foundry	72		Industrial	Machinery	135
Framing saw	82		Construction		157
Front end loader	90		Construction		34
Front end loader	90		Construction		35
Front end loader	93		Construction		62
Front end loader	93	Operator	Construction		134
Front end loader	82		Logging		32
Front end loader	95-102		Mining	Surface	39
Fruit vegetable utility room	83		Farm		126
Fruit/vegetable processing area	83		Farm		126
Furnace heating distilling columns (petroleum refining)	100		Industrial		10
Furnace high speed rotating equipment (petroleum refining)	100		Industrial		10
Furnace pumps (petroleum refining)	103		Industrial		10
Furnace, basic oxygen (steel products)	91		Industrial		10
Furnace, blast (steel products)	100		Industrial		10
Furnace, electric 150 tons (steel products)	112		Industrial		10
Gas-metal arc welding	89	operator	Welding		97
Gas-tungsten arc welding	58-72	operator	Welding		97
Generator	98		Construction		134
Generator	71		Industrial		18
Generator, diesel	58	50 m	Industrial		13
Generator, diesel (offshore platforms)	110-120		Industrial		10
Generator, portable	76	23 m	Construction		37
Generator, turbine	120		Industrial		16
Glass burner, blast - 1 mm nozzle	88-103		Industrial		41
Glass burner, blast - 2 mm nozzle	100-110		Industrial		41
Glass burner, blast - 3 mm nozzle	102-116		Industrial		41
Glass burner, multijet	94-109		Industrial		41
Glass burner, ring	88		Industrial		41
Glass Torch, hand	70-93		Industrial		41
Grader	95		Construction		10
Grader	86		Construction		62
Grader	87	Operator	Construction		134
Grader	84		Logging		32
Grader	85-98		Mining	Surface	39
Grain dryers	85-94		Farm		124
Grain dryers	99	3 m	Farm		124
Grain dryers	98-101	6 m	Farm		124
Grain roller mill	85		Farm		10

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Grinder, electric	100		Construction		33
Grinder, hand 4" (metal products)	85		Industrial		10
Grinder, unloaded	84-99	operator	Construction	Hand Tools	122
Grinding	102	operator	Power Tools		97
Hammer drill drilling into concrete	95		Construction		52
Hammer drill, loaded	97-110	operator	Construction	Hand Tools	122
Hammer operator (drop forging)	108		Industrial		10
Hammer, air	110		Construction		7
Hammer, forge drop (metal products)	105		Industrial		10
Hand shovel cleaning street cuts	87		Construction		52
Haul truck	85-110		Mining	Surface	39
Haulage truck	90-100		Mining		65
Helicopter takeoff	108	7.6 m	Farm	Aircraft	125
Helicopter, Bell G2, aerial spraying	98	cockpit	Farm	Aircraft	125
Helicopter, Bell Tomcat, aerial spraying	90-100	cockpit	Farm	Aircraft	125
Helicopter, idle	90	7.6 m	Farm	Aircraft	125
High pressure exhaust	158		Industrial		23
Hilti Gun	103		Construction		62
Hoist operator	100		Construction		51
Hovercraft, Griffon 2000TD, maximum speed	97	6.5 m	Transportation	Boat	32
Ice cream machine	75	3 m	Industrial		24
Impact wrench, loaded	102	operator	Construction	Hand Tools	122
Impact wrench, removing lug nut	104	operator	Transportation	Automotive	142
Inflation of containers (glass products)	106		Industrial		10
Installing tire with wheel machine	88	operator	Transportation	Automotive	141
Insulation workers - applying insulation by hand	83		Construction		62
Insulation workers - break, rest, lunch, cleanup	83		Construction		62
Insulation workers - sheet metal work	78		Construction		62
Ironworkers - bolt up	94		Construction		62
Ironworkers - break, rest, lunch, cleanup	96		Construction		62
Ironworkers - erecting Iron	92		Construction		62
Ironworkers - grinding	92		Construction		62
Ironworkers - laying metal deck	100		Construction		62
Ironworkers - manual material handling	94		Construction		62
Ironworkers - operating forklift	87		Construction		62
Ironworkers - operating work vehicle	89		Construction		62
Ironworkers - rigging	94		Construction		62
Ironworkers - setting forms	88		Construction		62
Ironworkers - tying and placing rebar	96		Construction		62
Ironworkers - welding and burning	98		Construction		62
Jackhammer	130		Construction		4
Jackhammer	88	19 m	Construction		37
Jackhammer, drill	113		Mining	Underground	10
Jackhammer, large	108	Operator	Construction		134
Jackhammer, pneumatic	120		Construction		3
Jackhammer, small	98	operator	Construction		142
Jail doors, electric lock release buzzer	85	1 m	Machinery		142
Jazz musicians during typical rehearsal	96	in gnrl. area	Music/Recording	Music	80
Jazz musicians during typical rehearsal	98	in gnrl. area	Music/Recording	Music	80
Jazz musicians during typical rehearsal	98	in gnrl. area	Music/Recording	Music	80
Keyboard mono-type (printing and publishing)	84		Industrial		10
Laborer - concrete pour	97		Construction		51
Laborer - formwork	88		Construction		51
Laborer - installing drains and roughing concrete	100		Construction		51
Laborer - road construction	86		Construction		51
Laborer stripping concrete forms	81		Construction		53

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Laborers - break, rest, lunch, cleanup	92		Construction		62
Laborers - building forms	92		Construction		62
Laborers - chipping concrete	103		Construction		62
Laborers - demolition	99		Construction		62
Laborers - finishing concrete	85		Construction		62
Laborers - floor leveling	88		Construction		62
Laborers - grouting	86		Construction		62
Laborers - interior finish	85		Construction		62
Laborers - layout	80		Construction		62
Laborers - manual material handling	83		Construction		62
Laborers - operating forklift	85		Construction		62
Laborers - placing concrete	92		Construction		62
Laborers - rigging	93		Construction		62
Laborers - stripping forms	92		Construction		62
Laborers - wood framing	87		Construction		62
Large Power Tool	102		Construction		62
Lathe	81		Industrial		42
Lathe, turret (metal products)	90		Industrial		10
Lawnmower, EMR 91, cutting grass	88	1 m	Industrial	Yard & Garden	142
Lawnmower, EMR 96, cutting grass	91	1 m	Industrial	Yard & Garden	142
Lawnmower, EMR 99, cutting grass	99	1 m	Industrial	Yard & Garden	142
Loader (gathering arm)	96		Mining	Underground	10
Loader-dumper	97-102		Mining		65
Loaders	95-100		Mining		65
Locomotive	85		Mining	Open pit	10
Locomotives (electrical)	85-95		Mining		65
Log handling	89		Logging		32
Log loader	80-95		Logging		31
Log processing	85		Logging		32
Log sorting and loading	89		Logging		32
Log truck	71-85		Logging		31
Log truck	84		Logging		32
Log yarding and landing	90		Logging		32
Logging road construction	92		Logging		32
Long-wall shearers	96-101		Mining		65
Loom	100	120 cm	Industrial		22
Loom (textile mill)	106		Industrial		10
Manlift	98		Construction		62
Manual material handling	85		Construction		62
Masonry restoration workers - break, rest, lunch, cleanup	85		Construction		62
Masonry restoration workers - bricking, blocking, tiling	87		Construction		62
Masonry restoration workers - grinding	99		Construction		62
Masonry restoration workers - manual material handling	85		Construction		62
Masonry restoration workers - pointing, cleaning, caulking	77		Construction		62
Milk area	76		Farm		126
Milk cooling compressor	84		Farm		126
Milk house	82		Farm		126
Milkhouse, Ostego, County, NY, dairy farm	72-94	operator	Farm		123
Mill, 160" (steel products)	98		Industrial		10
Mill, steel bar and rod	67	Inside	Industrial	Machinery	135
Mill, steel plate roll	96	Inside	Industrial	Machinery	135
Mill, steel roll	89	Inside	Industrial	Machinery	135
Mill, steel sheet	98	Inside	Industrial	Machinery	135
Milling machine (metal products)	90		Industrial		10
Millling machine	85	120 cm	Industrial		20
Miner, continuous	108		Mining	Underground	5

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Miner, continuous	99		Mining	Underground	10
Mono-casting (printing and publishing)	91		Industrial		10
Motor test chamber	140		Industrial		20
Needle gun inside gear housing	132		Industrial		23
Night club, bar staff, UK	96		Music/Recording	Music	81
Night club, door staff, UK	92		Music/Recording	Music	81
Night club, floor staff, UK	102		Music/Recording	Music	81
Night clubs, avg. of bar and floor staff, UK	89-103		Music/Recording	Music	81
Night clubs, bar staff	90		Music/Recording	Music	81
Night Clubs, bar staff employees in 19 facilities in the UK	94	in gnrl. area	Music/Recording	Disco/Club	77
Night clubs, bar staff, Hong Kong	94		Music/Recording	Music	81
Night clubs, bar staff, UK	75-105		Music/Recording	Music	81
Night clubs, bar staff, UK	87-100		Music/Recording	Music	81
Night clubs, bar staff, UK	84-97		Music/Recording	Music	81
Night clubs, bar staff, UK	78-104		Music/Recording	Music	81
Night clubs, bar staff, UK	96		Music/Recording	Music	81
Night clubs, DJ	103		Music/Recording	Music	81
Night clubs, DJs, Hong Kong	94		Music/Recording	Music	81
Night clubs, DJs, UK	91-107		Music/Recording	Music	81
Night clubs, entrance, Hong Kong	73		Music/Recording	Music	81
Night clubs, floor staff	90		Music/Recording	Music	81
Night clubs, manager	98		Music/Recording	Music	81
Night clubs, security	84		Music/Recording	Music	81
Night Clubs, security, cashiers, bar staff in 5 facilities in Singapore	90	on the collar	Music/Recording	Disco/Club	78
Night Clubs, waiters and disc jockets in 5 facilities in Singapore	94	on the collar	Music/Recording	Disco/Club	78
Notching stumps	83		Logging		32
Oceangoing dredge, crew mess	64		Marine		138
Oceangoing dredge, crew recreation room	64		Marine		138
Oceangoing dredge, deck crew quarters	55		Marine		138
Oceangoing dredge, engine crew quarters	59		Marine		138
Oceangoing dredge, engine room	95		Marine	Fishing	138
Oceangoing dredge, gym	63		Marine		138
Oceangoing dredge, officers' mess	57		Marine		138
Oceangoing dredge, officers' stateroom	59		Marine		138
Oceangoing dredge, pump rooms	94		Marine		138
Office	53		Office		1
Office	50		Office		9
Office, 12' x 14', carpeted	50		Office		117
Office, accounting	55		Office		15
Office, accounting	55		Office		22
Office, average	50		Office		16
Office, average	50		Office		20
Office, business	65		Office		11
Office, noisy with machines	80		Office		17
Office, private business	52		Office		15
Office, private business	52		Office		22
Office, quiet	40		Office		16
Office, quiet	50		Office		17
Office, quiet	40		Office		20
Opera musicians avg'd over 14 performances by Australian Opera Cc	77-92	< 1 m	Music/Recording	Concert	76
Operating engineers - grade checking	90		Construction		62
Operating engineers - layout	89		Construction		62
Operating engineers - rigging	87		Construction		62
Operating engineers - welding	91		Construction		62
Operating engineers - break, rest, lunch, cleanup	86		Construction		62
Orbital sander, loaded	65-84	operator	Construction	Hand Tools	122

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Orchard sprayer	106		Farm		124
Other Hand Power Tool	95		Construction		62
Oven, coke (steel products)	83		Industrial		10
Oxyfuel welding and cutting	80-89	operator	Welding		97
Paper collating machine	81	1 m	Industrial		142
Paper folding machine	92	1 m	Industrial		142
Pavement breaker	120		Construction		1
Pavement breaker, hydraulic	98	Operator	Construction		134
Pavement breaker, pneumatic	108	Operator	Construction		134
Paving machine	90		Construction		34
Paving machine	89	22 m	Construction		37
Paving machine	110		Construction		134
Penumatic chipper (diesel)	109		Construction		51
Personal radio headset/earcanal insert	83		Industrial		63
Picker, two-row corn	106		Farm		10
Pig squeals, feeding	103		Farm		124
Pig squeals, feeding breeders	85-105		Farm		124
Pig squeals, feeding weaners	90-107		Farm		124
Pig squeals, sows	102		Farm		124
Pigs, during feeding	95-104	in feed alleys	Farm		98
Pigs, high-pressure water cleaning of feed areas	98-105	50 cm	Farm		98
Pile driver	101	24 m	Construction		37
Piledriver - bored using auger	81	15 m	Construction		38
Piledriver - diesel hammer on concrete pile	95	15 m	Construction		38
Piledriver - diesel hammer on steel pile	99	15 m	Construction		38
Piledriver - drop hammer on concrete pile	83	15 m	Construction		38
Piledriver - drop hammer on steel pile	93	15 m	Construction		38
Piledriver - vibratory on steel pile	85	15 m	Construction		38
Pipe noise (offshore platforms)	95-105		Industrial		10
Pipe threader	92-97		Construction		33
Plasma arc cutting machine	95-100		Construction		33
Plasma cutter	92	operator	Industrial		141
Plasma-arc welding	101	operator	Welding		97
Plumber	90		Construction		51
Pneumatic hammer chipping concrete	109		Construction		52
Pneumatic percussion tools	114-120		Mining		65
Poker vibrator	98		Construction		134
Police boat at 10 mph, stern	86		Transportation	Boat	142
Police boat at 3 mph, stern	72		Transportation	Boat	142
Police boat at 35 mph inside cabin with air horn	98		Transportation	Boat	142
Police boat at 35 mph, bow with siren	124		Warning	Boat	142
Police boat at 35 mph, cabin	91		Transportation	Boat	142
Police boat at 35 mph, inside cabin with siren	95		Warning	Boat	142
Police boat at 35 mph, stern	99		Transportation	Boat	142
Police boat, rigid hull at 35 mph, stern	94	operator	Transportation	Boat	142
Police motorcycle, Kawasaki 1000, 5000 rpm	95	1 m	Transportation		142
Police motorcycle, Kawasaki 1000, siren on	110	1 m	Warning		142
Police siren, mounted on car grill, at front of car	114	1.5 m	Warning		142
Police siren, mounted on car grill, inside car	97	operator	Warning		142
Pool, public, indoor with 150+ spectators shouting	74		Public	Recreation	142
Portable air compressor	77-85	7 m	Construction		38
Power house air blower	83		Industrial	Machinery	135
Power house turbine generator	96		Industrial	Machinery	135
Power sander, loaded	79	operator	Power Tools		142
Press operator (drop forging)	99		Industrial		10
Press, newspaper	95		Industrial		20

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Press, newspaper (printing and publishing)	97		Industrial		10
Press, offset (printing and publishing)	88		Industrial		10
Press, postcard (publishing and printing)	91		Industrial		10
Press, print, loaded	86	1 m	Industrial		142
Press, print, unloaded	83	1 m	Industrial		142
Press, printing	80		Industrial		20
Press, small offset (publishing and printing)	82		Industrial		10
Printing press plant	85		Industrial		15
Printing press plant	85		Industrial		22
Processor	84		Logging		32
Puller, one-row beet	94		Farm		10
Pulling and setting equipment rigging	78		Logging		32
Pump	96		Construction		134
Pump (offshore platforms)	100-115		Industrial		10
Punch press	105		Industrial		20
Punch press, automatic (metal products)	95		Industrial		10
Radio announcers, under headphones	79			Earphones	95
Rattle Gun	98		Construction		62
Rebar worker	95		Construction		51
Reciprocating saw, unloaded	89-95	operator	Construction	Hand Tools	122
Relay assembly test room circa 1928, Western Electric	88-92		Industrial		163
Riveter	115		Industrial		14
Riveter	110		Industrial		16
Riveter	110		Industrial		20
Riveter, pneumatic	130		Industrial		17
Riveting machine	112		Industrial		15
Riveting machine	112		Industrial		22
Riveting machine	110		Industrial		42
Riveting machine (metal products)	110		Industrial		10
Rock drill	102-108		Logging		31
Roller	98		Construction		34
Roller/compactor	88		Construction		62
Roller/compactor	97		Construction		134
Roof bolter	103		Mining	Underground	10
Roofer cutting and installing roof decking	90-100		Construction		53
Rotohammer	98		Construction		62
Router	102		Construction		33
Router cutting holes in drywall	96		Construction		52
Saw, band	89		Construction		33
Saw, chain	113	Operator	Farm		124
Saw, chain	95	7.6 m	Farm		124
Saw, chain	98-104		Logging		31
Saw, chain	91		Logging		32
Saw, chain idling	77-93		Farm		124
Saw, chain, cutting	110		Logging		136
Saw, chain, idling	94		Logging		136
Saw, chain, Ostego, County, NY, dairy farm	105-115	operator	Farm		123
Saw, chain, revving	113		Logging		136
Saw, chop	98		Construction		62
Saw, chop, cutting 20 gauge steel stud	109		Construction		52
Saw, chop, cutting steel furrings	101		Construction		52
Saw, circular	102-104		Construction		33
Saw, corrugated bandsaw (glass products)	99		Power Tools	Industrial	10
Saw, cutoff (gas)	94-97		Construction		33
Saw, cutoff (gas)	109	2 m	Construction		36
Saw, jig unloaded	84-92	operator	Construction	Hand Tools	122

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Saw, jig, cutting laminated countertop	96		Construction		52
Saw, miter loaded	92-96	operator	Construction	Hand Tools	122
Saw, power hack	77		Construction		33
Saw, radial arm	96-100		Construction		33
Saw, table	100		Construction		33
Sawmill board edger	96	operator	Industrial		144
Sawmill board trimmer	93	operator	Industrial		144
Sawmill wood chipper	93	operator	Industrial		142
Saws, circular, unloaded	83-103	operator	Construction	Hand Tools	122
Scarfing, metal	112	operator	Industrial		142
Scraper, earth	117		Construction		10
Scraper, earth	90		Construction		34
Scraper, earth	107-111	3 m	Construction		36
Scraper, earth	88	20 m	Construction		37
Scraper, earth	99		Construction		62
Scraper, earth	100		Construction		134
Scraper, earth	85-100		Mining	Surface	39
Screw driver, unloaded	90-93	operator	Construction	Hand Tools	122
Screw gun attaching drywall to steel studs	97		Construction		52
Screw Gun, Drill	98		Construction		62
Security staff in university entertainment venue	94		Entertainment		60
Sheet metal workers - fabricating metal products	88		Construction		62
Sheet metal workers - installing metal products	88		Construction		62
Sheet metal workers - maintaining metal products	86		Construction		62
Sheet metal workers - manual material handling	90		Construction		62
Sheet metal workers - operating work vehicle	83		Construction		62
Sheet metal workers - break, rest, lunch, cleanup	81		Construction		62
Shielded-metal arc welding	79	operator	Welding		97
Shipyard arc welding shop	87		Industrial		56
Shipyard boilermaking shop	94		Industrial		56
Shipyard gas welding and cutting shop	86		Industrial		56
Shipyard upper deck of ship	80		Industrial		56
Shovel	86		Logging		32
Shovel logging	88		Logging		32
Skilsaw	97		Construction		62
Stacker	84		Logging		32
Stamping press, large	110		Industrial		1
Steam cleaning	86	1 m	Industrial	Yard & Garden	142
Steam let down (petroleum refining)	130		Industrial		10
Steam roller	84	1.2 m	Construction		52
Steel melting shop furnace	78		Industrial	Machinery	135
Steel stud installer	96		Construction		51
Stenographic room	72		Office		20
Stock car racing, drivers	114	in auto	Recreation	Racing	151
Stormwater pump, diesel	114	2 m	Industrial		142
Stormwater pump, electric	90	2 m	Industrial		142
Stud welder	101		Construction		157
Table saw, loaded	92	operator	Industrial		142
Tabulating room	80		Industrial		15
Tabulating room	80		Industrial		22
Tamper	97-98	0.3 m	Construction		36
Tamper, mechanical	90		Construction		157
Tar kettle	89	0.3 m	Construction		36
Telephone headset - call center operator	77		Office		50
Textile loom	105		Industrial		20
Textile loom	106		Industrial		42

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Textile weaving plant	95		Industrial		15
Textile weaving plant	95		Industrial		22
Tilesetter	92		Construction		51
Tilesetters - break, rest, lunch, cleanup	85		Construction		62
Tilesetters - bricking, blocking, tiling	93		Construction		62
Tilesetters - grinding	100		Construction		62
Tilesetters - grouting and mortaring	87		Construction		62
Tilesetters - manual material handling	91		Construction		62
Tilesetters - pointing, cleaning, caulking	84		Construction		62
Tire removing machine, removing tire bead	100	1 m	Transportation	Automotive	142
Torch, oxygen	121		Industrial		42
Torches, oxygen	120		Mining	Open pit	10
Tractor	96		Farm		5
Tractor	90-108		Logging		31
Tractor, farm type	100		Farm		3
Tractor, farm type	98		Farm		10
Tractor, farm type	78-103		Farm		47
Tractor, full throttle, no cab, dairy farm, Ostego, County, NY, dairy far	82-103	operator	Farm		123
Tractor, full throttle, with cab, Ostego, County, NY, dairy farm	76-87	operator	Farm		123
Tractors	93-103		Farm		124
Tractors	91		Farm		126
Tractors, cultivating	76-96		Farm		124
Tractors, farm type	97-114 (linear)		Farm		10
Tractors, full load	92-102		Farm		124
Tractors, haying	74-91		Farm		124
Tractors, ploughing	86-102		Farm		124
Transformer, large	53	60 m	Industrial		2
Transformer, large	50	60 m	Industrial		15
Transformer, large	53		Industrial		16
Tree felling	98		Logging		32
Truck	81		Construction		134
Truck tire, large, air release at full pressure	102	operator	Transportation	Automotive	142
Truck tire, large, air release at half pressure	92	operator	Transportation	Automotive	142
Truck tire, large, air release at low pressure	72	operator	Transportation	Automotive	142
Truck, dump	84		Construction		35
Truck, dump	88	16 m	Construction		37
Truck, new condition on tarred roads in South Africa	85	operator	Industrial	Transportation	115
Turbine, gas (offshore platforms)	100-112		Industrial		10
Unbelling log chokers	92		Logging		32
Vacuum pump	92		Farm		126
Valves (offshore platforms)	104-120		Industrial		10
Weed trimmer	89		Farm		124
Weed trimmer	93	operator	Power Tools	Yard & Garden	142
Welding	77	operator	Industrial		141
Welding arc	84-92		Welding		10
Welding arc, CO_2	91-95		Welding		10
Welding, Cutting Equipment	95		Construction		62
Welding, cutting equipment	91		Construction		62
Welding, inert gas - metal arc	95-102		Welding		10
Welding, plasma cutting	98-110		Welding		10
Welding, slag chipping	92-105		Welding		10
Welding, tungsten inert gas	65-74		Welding		10
Wellhead room (offshore platform)	90-95		Industrial		10
Wet saw (7" circular saw) for cutting slate	105	operator	Construction		1
Wheeled skidder	90-99		Logging		31

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Whistle, for use by sports officials	110-122	at ear	Recreation	Sporting Event	186
Wood planer	107		Construction		33
Wrench, impact	102		Construction		33
Wrench, impact, fitting lug nuts	100	1 m	Transportation	Automotive	141
Wrench, impact, removing lug nuts	93	1 m	Transportation	Automotive	141
Yarder	86-92		Logging		31
Yarder	85		Logging		32
Zamboni, turf	88	operator	Industrial	Yard & Garden	142

Sound Levels

Notes

Leq over 1 loading
Leq averaged over 3 loadings
Measurements made with Casella CEL-593 Type I sound level meter
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
noise level will probably exceed stated value
Measurements made with Casella CEL-593 Type I sound level meter
Leq level at operator's ear
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Dosimetry Leq level
Measurements made with Casella CEL-593 Type I sound level meter
18 samples
production plant in Japan
production plant in Japan
production plant in Japan
Measurements made with Quest 210 Type II sound level meter
Avg. of four vehicles, range from 97-103
Avg. of four vehicles, range from 93-100
Measurements made with Quest 210 Type II sound level meter
Quest 2800 SLM measurements made at various distances and calculated at source
30-minute Leq area SLM measurement

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

NIOSH 1972

Dosimetry Leq
average of 2 measurements
1 of 6 entries in this table
bell ringers at Christmas time in front of Indianapolis, IN area grocery store
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
Measurements made with Quest 210 Type II sound level meter
1 of 13 entries in this table; Porter Cable 352VS
NIOSH 1972
measurements made in a steel works with a Type I sound level meter
measurements made in a steel works with a Type I sound level meter
Peterson and Gross, 1972

Dosimetry Leq level
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
Short-term dosimeter measurements

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Sound level at operator's ear

Sound Levels

Notes

Lex,8hr; buses manufactured 1995-2000, avg of 10 measures
Lex,8hr; buses manufacturer 1992-1999, avg. of 10 measures
Lex,8hr; buses manufacturer 1999-2001, avg. of 10 measures
NIOSH 1972
NIOSH 1972
NIOSH 1972
NIOSH 1972
Leq level at operator's ear
Dosimetry Leq level
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
representative levels in the blower area
Peterson and Gross, 1972

Average of 63 measurements made with Type I Svantek sound level meter
Average of 135 measurements made with Type I Svantek sound level meter
Average of 42 measurements made with Type I Svantek sound level meter
Average of 27 measurements made with Type I Svantek sound level meter
Average of 69 measurements made with Type I Svantek sound level meter
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
Measurements made with Quest 210 Type II sound level meter

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Dosimetry Leq level
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
NIOSH 1972
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Dosimetry Leq level
value is 8-hr Leq across 68 musicians total (data entered in 5 rows in this file); includes performance, rehearsal, and training
Leq during performances of Messiaen, Turangalila and Mahler's 9th Symphony, durations 107 and 72 min respectively
value is 8-hr Leq across 68 musicians total (data entered in 5 rows in this file); includes performance, rehearsal, and training
value is 8-hr Leq across 68 musicians total (data entered in 5 rows in this file); includes performance, rehearsal, and training
value is 8-hr Leq across 68 musicians total (data entered in 5 rows in this file); includes performance, rehearsal, and training
value is 8-hr Leq across 68 musicians total (data entered in 5 rows in this file); includes performance, rehearsal, and training
Avg. of 68 dosimetry measures; range 79 - 99; avg. peak SPL across the measures was 125 dB
Sound level at operator's ear
cited Cain (1970) in Doane's Agricultureal Rept.

Sound Levels

Notes
cited Cox (1964) in J. Proc. Intl. Agr. Eng.
cited Matthews (1968 and 1969) in J. Agr. Eng. Res. and Proceeding Agr. Eng. Symposium
cited Zander (1972) Ergoomics in Machine Design
Leq level at operator's ear
SLM measurements made at operator's ear
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
Pelton 1974
Leq level at operator's ear
Measurements made with Casella CEL-593 Type I sound level meter
noise level will probably exceed stated value
noise level will probably exceed stated value
at typical employee location
From *Physics,* Tipler, 1976
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
NIOSH 1972
NIOSH 1972
Dosimetry Leq level
NIOSH 1972
Short-term dosimeter measurements
SLM measurements made at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
Short-term dosimeter measurements
NIOSH 1972
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
Measurements made with Casella CEL-593 Type I sound level meter
Dosimetry Leq level
Avg. dBA for lap exams, papoose board treat., and unsuccessful sedations; avg. max level = 99; 3-dB TWA = 75
Dosimetry Leq
Dosimetry Leq
NIOSH 1972
Sound level at operator's ear
Leq level at operator's ear
NIOSH 1972
Sound level at operator's ear

Sound Levels

Notes

Sound level at operator's ear

NIOSH 1972
Sound level at operator's ear
Sound level at operator's ear
NIOSH 1972
1 of 13 entries in this table; based on measurements on 14 different models
Dosimetry Leq level
Leq level at operator's ear
Measurements made with Quest 210 Type II sound level meter
Peterson and Gross, 1972

Sound level at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Leq level at operator's ear
Measurements made with Quest 210 Type II sound level meter
Dosimetry Leq level
SLM measurements made at operator's ear
Quest 2800 SLM measurements made at various distances and calculated at source
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
at typical employee location
From *Physics,* Tipler, 1976

NIOSH 1972

from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
1 of 6 entries in this table
average of 5 measurements, range 85-94
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising
Measurements made with B&K 2204 Type I sound level meter, vessel cruising

Sound Levels

Notes
Leq measured on 2 flights
Leq averaged over 4 flights
Leq averaged over 4 flights
measured during 4 flyovers
measurements averaged over 2 takeoffs
Measurements made with Quest 210 Type II sound level meter
NIOSH 1972
value is LA8hn (3-dB trade) across 28 samples fans in 2 stadiums; mean SPL = 91 dB
SLM measurements made at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
measurements made in a steel works with a Type I sound level meter
noise level will probably exceed stated value
Short-term dosimeter measurements
SLM measurements made at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Sound level at operator's ear
average of 2 measurements
average of 2 measurements
NIOSH 1972
NIOSH 1972
NIOSH 1972
NIOSH 1972
NIOSH 1972
NIOSH 1972
30 samples
8 samples
EPA 1972
Pelton 1974
DAWE 1400G SLM measurement
DAWE 1400G SLM measurement
DAWE 1400G SLM measurement
DAWE 1400G SLM measurement
DAWE 1400G SLM measurement
DAWE 1400G SLM measurement
NIOSH 1972
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Sound level at operator's ear
cited Matthews (1968 and 1969) in J. Agr. Eng. Res. and Proceeding Agr. Eng. Symposium
NIOSH 1972

Sound Levels

Notes
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
NIOSH 1972
1 of 13 entries in this table; based on measurements on 19 different models
33 samples
Dosimetry Leq level
1 of 13 entries in this table; based on measurements on 12 different models
Taylor et.al. 1984
NIOSH 1972
Dosimetry Leq level
Sound level at operator's ear
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
averaged over 6 takeoffs
Leq measured on 1 flight
Leq measured on 2 flights
100 dB Max. RMS Level, (90) equivalent level over sampling period
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Leq level at operator's ear
20 passenger craft; value was 102 dBL at 6.5 m dropping to 93 dBL at 25 m
1 of 13 entries in this table; DeWalt DW290
Measurements made with Quest 210 Type II sound level meter
NIOSH 1972
Measurements made with Casella CEL-593 Type I sound level meter
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Avg for string bass, drums, and lead trumpet, trombone, and alto sax measured during a 50-min rehearsal of college musicians
Avg for guitar, 3rd trombone, lead trombone, 2nd trombone, and bass trombone measured during a 50-min rehearsal of college musicians
Avg for 1st tenor sax, 2nd alto sax, lead alto sax, 2nd tenor sax, and baritone sax measured during a 50-min rehearsal of college musicians
NIOSH 1972
Leq level at operator's ear
Leq level at operator's ear
Leq level at operator's ear
Leq level at operator's ear
Dosimetry Leq level

Sound Levels

Notes
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
NIOSH 1972
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
NIOSH 1972
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
GenRad 1933 SLM measurements at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
GenRad 1933 SLM measurements at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
NIOSH 1972
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
average of 39 measurements, range from 54-93
average of 31 measurements, range from 50-100
average of 25 measurements, range from 50-99
1 of 6 entries in this table
NIOSH 1972
measurements made in a steel works with a Type I sound level meter
measurements made in a steel works with a Type I sound level meter
measurements made in a steel works with a Type I sound level meter
measurements made in a steel works with a Type I sound level meter
NIOSH 1972

Sound Levels

Notes
NIOSH 1972
NIOSH 1972
Avg. SPL of a number of measures in 1 club as reported by K. Gatland (1999). "An assessment of the occupational noise exposure of employe
Avg. SPL of a number of measures in 1 club as reported by K. Gatland (1999). "An assessment of the occupational noise exposure of employe
Avg. SPL of a number of measures in 1 club as reported by K. Gatland (1999). "An assessment of the occupational noise exposure of employe
Avg. SPL of measures in 4 clubs as reported by E. L. Lane (1999). "A survey of sound levels from jusical entertainment in clubs," MSc, Univ. of
Avg. SPL measures in 12 clubs, as reported by K. Dibble (1988). "The 1988 BEDA discotheque survey project, in Proc. Reproduced Sound 4th
Average of 19 samples in 19 clubs, each sample being a full-shift Leq
Avg. SPL measures in 5 clubs, as reported by T. C. Tan at al. (1990). "Noise surveys in discotheques in Hong Kong," Ind. Health (Japan) 28(1
Avg. SPL of measures in 4 clubs, as reported by Edelson (1998). "An investigation into occupational noise exposure in relation to places of pul
Avg. SPL of measures in 12 clubs, as reported by Clarke (1997). "An investigation into noise exposure of DJs and bar staff in nightclubs and d
SPL as reported by E. Gunderson et al. (1997). "Risk of developing noise-induced hearing loss in employees of Urban Music Clubs," Am. J. In
Avg. of SPL measures in 7 clubs, as reported by L. J. Howley ((1996). "An investigation into occupational noise exposure of night-club workers
Avg. SPL measures in 5 clubs, as reported by D. A. Lavendar (1993). "An evaluaton of the risk of damage to hearing of employees exposed to
Avg. SPL measures in 12 clubs, as reported by K. Dibble (1988). "The 1988 BEDA discotheque survey project, in Proc. Reproduced Sound 4th
Avg. SPL measures in 5 clubs, as reported by T. C. Tan at al. (1990). "Noise surveys in discotheques in Hong Kong," Ind. Health (Japan) 28(1
Avg. SPL of measures in 12 clubs, as reported by Clarke (1997). "An investigation into noise exposure of DJs and bar staff in nightclubs and d
Avg. SPL measures in 5 clubs, as reported by T. C. Tan at al. (1990). "Noise surveys in discotheques in Hong Kong," Ind. Health (Japan) 28(1
Avg. SPL measures in 12 clubs, as reported by K. Dibble (1988). "The 1988 BEDA discotheque survey project, in Proc. Reproduced Sound 4th
Avg. SPL measures in 12 clubs, as reported by K. Dibble (1988). "The 1988 BEDA discotheque survey project, in Proc. Reproduced Sound 4th
Avg. SPL measures in 12 clubs, as reported by K. Dibble (1988). "The 1988 BEDA discotheque survey project, in Proc. Reproduced Sound 4th
Average of 23 measurements in 5 venues; values are Leq over workshift
Average of 17 measurements in 5 venues; values are Leq over workshift
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Measured with GenRad Type I sound level meter
Measured with GenRad Type I sound level meter
Midpoint of report range of SPLs; measured with GenRad Type I sound level meter
Midpoint of report range of SPLs; measured with GenRad Type I sound level meter
Measured with GenRad Type I sound level meter
Measured with GenRad Type I sound level meter
Measured with GenRad Type I sound level meter
Midpoint of report range of SPLs; measured with GenRad Type I sound level meter
Measured with GenRad Type I sound level meter
at typical employee location
Peterson and Gross, 1972
From *Physics,* Tipler, 1976
Peterson and Gross, 1972
From *Physics,* Tipler, 1976
Leq for complete performances of 14 operas, for 6 different instruments including conductor, measured between 0.1 and 1 m from musician's e
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
1 of 13 entries in this table; based on measurements on 6 different models

Sound Levels

Notes
cited Cox (1964) in J. Proc. Intl. Agr. Eng.
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
6 samples
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Short-term dosimeter measurements
Leq level at operator's ear
Mean equivalent diffuse field output level measured on KEMAR, TFOE adjusted
NIOSH 1972
cited Matthews (1968 and 1969) in J. Agr. Eng. Res. and Proceeding Agr. Eng. Symposium
in a building housing 1100 pigs in 33 sties
in a building housing 1100 pigs in 33 sties
Leq level
Leq level
Leq level
Leq level
Leq level
Leq level
Pelton 1974
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
Measurements made with Casella CEL-593 Type I sound level meter
6 samples
Leq level at operator's ear
Dosimetry Leq level
from Table 1 of the paper attributed to U. S. Bur. Mines Rpt. I28.16/2:M66/8 by Barthomolae and Parker (1987).
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Leq level
measurements made in a steel works with a Type I sound level meter
measurements made in a steel works with a Type I sound level meter
Measurements made with Quest 210 Type II sound level meter
Taylor et.al. 1984

Sound Levels

Notes

NIOSH 1972
NIOSH 1972
NIOSH 1972
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter

NIOSH 1972
Peterson and Gross, 1972

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
NIOSH 1972
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Pelton 1974

NIOSH 1972
Avg. Leq,T for 12 announcers over the duration of their shows; across announcers values ranged from 62 - 95 Laeq.
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Leq level at operator's ear
1 of 13 entries in this table; based on measurements on 17 different models
From plant in orig studies of Hawthorne Effect; orig. values were 0.85 mm column of water; also new measures on rebuilt equip.

From *Physics,* Tipler, 1976
Peterson and Gross, 1972

NIOSH 1972
GenRad 1933 SLM measurements at operator's ear
Short-term dosimeter measurements
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

NIOSH 1972
Dosimetry Leq level
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
Dosimetry Leq level
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
cited Cox (1964) in J. Proc. Intl. Agr. Eng.

GenRad 1933 SLM measurements at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Average of 9 measurements made with Type I B&K 2203 sound level meter 6-8" from operator's ear
Average of 9 measurements made with Type I B&K 2203 sound level meter 6-8" from operator's ear
1 of 6 entries in this table
Average of 9 measurements made with Type I B&K 2203 sound level meter 6-8" from operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Dosimetry Leq level
Dosimetry Leq level
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
NIOSH 1972
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
Quest 2800 SLM measurements made at various distances and calculated at source
1 of 13 entries in this table; based on measurements on 5 different models

Sound Levels

Notes

Dosimetry Leq level
1 of 13 entries in this table; based on measurements on 19 different models
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
1 of 13 entries in this table; based on measurements on 28 different models
Measurements made with Casella CEL-593 Type I sound level meter
NIOSH 1972
Short-term dosimeter measurements
Quest 2800 SLM measurements made at various distances and calculated at source

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Sound level at operator's ear
1 of 13 entries in this table; based on measurements on 4 different models
Dosimetry Leq level
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Dosimetry Leq
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
19 samples
RION NA-61 SLM measurement
RION NA-61 SLM measurement
RION NA-61 SLM measurement
RION NA-61 SLM measurement
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Measurements made with Quest 210 Type II sound level meter
NIOSH 1972
Dosimetry Leq level
measurements made in a steel works with a Type I sound level meter
Leq level at operator's ear

Leq for drivers
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
noise level will probably exceed stated value
Measurements made with Quest 210 Type II sound level meter
Peterson and Gross, 1972

Quest 2800 SLM measurements made at various distances and calculated at source
noise level will probably exceed stated value
Quest 2800 SLM measurements made at various distances and calculated at source
Mean equivalent diffuse field output level measured on KEMAR. TFOE adjustment not reported

Sound Levels

Notes

Peterson and Gross, 1972

Leq level at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Measurements made with Quest 210 Type II sound level meter

NIOSH 1972

GenRad 1933 SLM measurements at operator's ear

NIOSH 1972

1 of 6 entries in this table
1 of 6 entries in this table
cited Cox (1964) in J. Proc. Intl. Agr. Eng.
average of 71 measurements, range from 75-102

Simpson & Deshayes 1969
cited Brown (1973) in J. Agriculture
cited Matthews (1969) in Proceedings Agr. Eng. Symposium

Peterson and Gross, 1972

Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity

Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
Measurements made with Quest 210 Type II sound level meter
SLM measurements made at operator's ear

avg. of sixteen 7 - 9 hr Leq measurements on two different models of trucks; no radios or communication;
Pelton 1974
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
average of 47 measurements, range from 70-105
Pelton 1974

Measurements made with Quest 210 Type II sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
Hermanns 1982
Hermanns 1982
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Hermanns 1982
Hermanns 1982
Hermanns 1982
Hermanns 1982
Pelton 1974
Saw running outdoors cutting 1/4" slate
GenRad 1933 SLM measurements at operator's ear

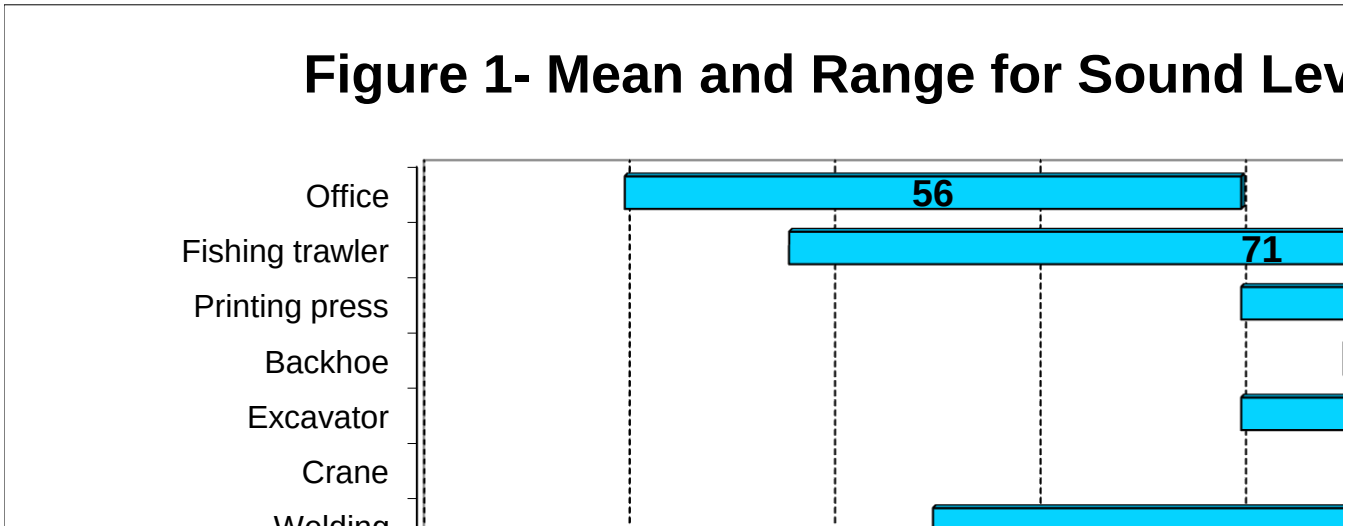
Sound Levels

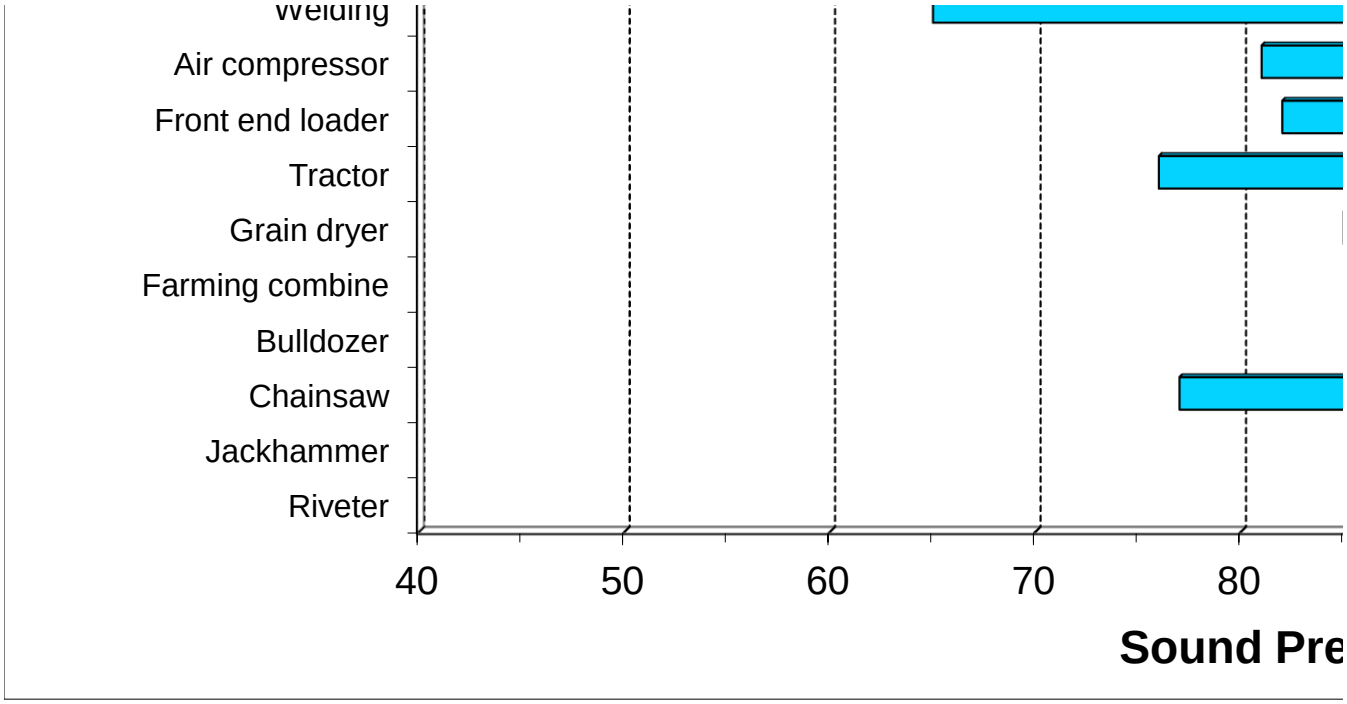
Notes
Tests of 13 whistles in empty gym referred to free field equivalent values; blasts are ~ 250 msec which yields SEL=104-116 dBA
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
B&K Type 2215 and 2204 SLM measurements taken at operator's ear
Measurements made with Casella CEL-593 Type I sound level meter
Measurements made with Casella CEL-593 Type I sound level meter
GenRad 1933 SLM measurements at operator's ear
Average of 1-minute Leq measurements from combination of datalogging personal dosimetry and self-reported activity
Measurements made with Quest 210 Type II sound level meter

Occupational A-weighted sound levels with data averaged for type of source

Source	dBA Average	dBA Low Range	dBA High Range	Weighting
Compressed air	94	83	104	A
Backhoe	87	85	89	A
Bulldozer	98	87	110	A
Chipping gun	108	100	120	A
Excavator	90	80	102	A
Front end loader	91	82	102	A
Jackhammer	109	88	130	A
Earth scraper	100	85	117	A
Chainsaw	102	77	115	A
Pig squeals	100	85	107	A
Tractor	93	76	108	A
Lawnmower	93	88	99	A
Glass burner	100	88	116	A
Riveter	114	110	130	A
Transformer, large	52	50	53	A
Catcher/processor (fishing vessel)	87	66	102	A
Purse-seiner (fishing vessel)	83	71	104	A
Trawler (fishing vessel)	71	58	104	A
Oceangoing dredge	66	47	94	A
Night club (staff)	93	73	107	A
Office	56	50	80	A
Welding	91	65	110	
Crane	90	86	99	A
Paving machine	96	89	110	A
Farming combines	96	86	105	A
Grain dryer	96	85	101	A
Air compressor	91	81	97	A
Printing press	87	80	97	A
Generator	76	58	98	A
Earth grader	89	84	98	A

NOTE: The averages and ranges in the table were computed from the reported mean values provided by t



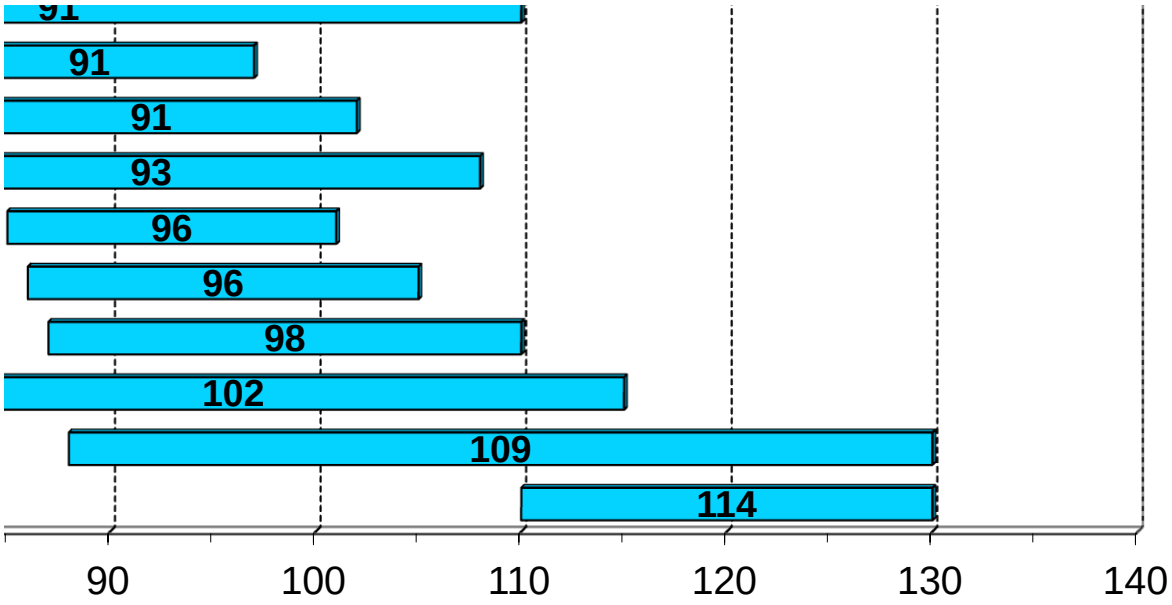

Welding
Air compressor
Front end loader
Tractor
Grain dryer
Farming combine
Bulldozer
Chainsaw
Jackhammer
Riveter
40
50
60
70
80
Sound Pre

No. of Studies	Ref #	Notes
3	52, 141, 142	
3	37, 62, 134	
8	5, 10, 32, 34, 37, 39, 62, 134	
4	11, 20, 53, 62	
5	32, 35, 36, 62, 134	
6	32, 34, 35, 39, 62, 134	
5	3, 4, 37, 134, 142	
7	10, 34, 36, 37, 39, 62, 134	
9	31, 32, 123, 124, 136	
5	98, 124	
13	3, 5, 10, 31, 47, 123, 124, 126	
3	142	
5	41	
8	10, 14, 15, 17, 20, 22, 42	
3	2, 15, 16	
5	137	
9	140	
6	139	
10	138	
21	77, 78, 81	
11	1, 9, 11, 15, 16, 17, 20, 22, 117	
9	10, 62, 141	
5	34, 35, 62, 134	
3	34, 37, 134	
4	124	
3	124	
9	2, 16, 24, 27, 37, 42, 134, 141	
10	10, 15, 20, 22, 142	
4	13, 18, 37, 134	
4	10, 32, 39, 134	

he designated references, or from the midpoint of the reported values when ranges were included.

---

vels of Occupational Noise Sources



essure Level (dBA)

Sound Levels

Weapons and Explosives peak sound pressure levels in dB

Source	dB Peak	Weighting	Distance from Source	Category 1	Category 2	Ref #	Notes
Airbag discharge in automobile	169	Linear	driver's ear	Transportation	Automotive	128	dual front airbag discharge; windows shut; doors taped closed
Airbag discharge in mid-sized pickup	170	Linear	animal's ear	Transportation	Automotive	129	average of windows open, closed, and sealed; all values within 3 dB
Airbag discharge in standard size pickup	169	Linear	driver's ear	Transportation	Automotive	130	driver's side airbag
Antitank missle, Javelin	160		open position	Firearms and Explosives	Military	64	
Antitank weapon, light, Model M72A3	182		gunner	Firearms and Explosives	Military	64	
Antitank, missle, Javelin	172		fighting position	Firearms and Explosives	Military	64	
Balloon pop	117 - 137	Linear	1 m	Recreation	Toys	1	12 pops with various inflation, typical office setting; E•A•R Tech Rept. 10-04/HP
Balloon pop of 18-40 cm balloons	133	Linear	1 m	Recreation	Toys	177	Avg of 110 balloon of various sizes; data converted from PWL to SPL in typical room
Cap Gun	143-152		50 cm	Firearms and Explosives	Toys	10	Axelsson & Jenson 1985
Cap Gun	156	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 106 dBA
Cap Gun	150	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 100 dBA
Cap Gun	152	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 103 dBA
Cap Gun (exploder)	153	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 99 dBA
Cap Gun (rifle)	154	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 99 dBA
Cap Pistol	163			Firearms and Explosives	Toys	16	
Firearms	140			Firearms and Explosives	Recreation	4	
Firecrackers on ground, Black Cat	162	Linear	1 m	Firearms and Explosives	Recreation	168	dBA = 158; at 4 m values dropped to 146 and 143 respectively
Firecrackers on ground, Country Cracker	162	Linear	1 m	Firearms and Explosives	Recreation	168	dBA = 159; at 4 m values dropped to 149 and 147 respectively
Firecrackers on ground, M70	158	Linear	2m	Firearms and Explosives	Recreation	168	dBA = 155; at 8 m values dropped to 143 and 141 respectively
Firecracker, pull apart	153	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 101 dBA
Firecracker, throwing	140	C	20 cm	Firearms and Explosives	Toys	12	mean Leq = 140 dBA
Firecrackers	150		3 m	Firearms and Explosives	Toys	10	Gupta & Vishwakarma 1989
Firecrackers	125-156		3 m	Firearms and Explosives	Toys	10	Axelsson & Jenson 1985
Firecrackers (China Special 0.8g)	162	C	1 m	Firearms and Explosives	Toys	12	mean Leq = 122 dBA
Firecrackers (Lilleput 0.06g)	143	C	1 m	Firearms and Explosives	Toys	12	mean Leq = 103 dBA
Firecrackers (mini China 0.5g)	146	C	1 m	Firearms and Explosives	Toys	12	mean Leq = 107 dBA
Firecrackers exploding	140			Firearms and Explosives	Toys	3	
Grenade	164		15 m	Firearms and Explosives	Military	64	
Golf club, thicker-faced stainless steel driver	118	Linear	1.7 m	Firearms and Explosives	Recreation	185	Reported as "peak emitted soud level (dB);" avg of 6 diff. clubs, 3 balls each
Golf club, thin-faced titanium driver	125	Linear	1.7 m	Firearms and Explosives	Recreation	185	Reported as "peak emitted soud level (dB);" avg of 6 diff. clubs, 3 balls each
Guns, Toy	145-160		25 cm	Firearms and Explosives	Toys	10	Hodge & McCommons 1966
Howitzer 105 mm	164		5 m	Firearms and Explosives	Military	10	Price 1983
Howitzer, 105 mm, towed, Model 119	183		gunner	Firearms and Explosives	Military	64	at charge 8
Howitzer, 155 mm, towed, Model 198	178		gunner	Firearms and Explosives	Military	64	firing M203 propellant
M16	155		4.5 m	Firearms and Explosives	Military	10	Price 1983
Machine gun, 0.50 caliber, Model M2	153		gunner	Firearms and Explosives	Military	64	fired from high-mobility multipurpose wheeled vehicle
Machine gun, 7.62 mm, Model M60	155		gunner	Firearms and Explosives	Military	64	fired from high-mobility multipurpose wheeled vehicle
Pistol, .22 L.R.	152	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .22 magnum	157	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .25 ACP	155	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .32 ACP	154	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .32 long	152	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .38, 125 to 158 gr. Loads (158 gr. was 1-dB lower level)	163	Linear	shooter's ear	Firearms and Explosives	Recreation	170	measured w/ 1/4" pressure mic, 195-kHz/24-bit digital analysis; peak dBA = 160 to 15
Pistol, .380 auto	158	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .45 ACP	157	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, .45 Colt	155	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, 9mm, 95 to 115 gr. loads	163	Linear	shooter's ear	Firearms and Explosives	Recreation	170	measured w/ 1/4" pressure mic, 195-kHz/24-bit digital analysis; peak dBA = 158
Pistol, .9 mm	160	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Pistol, 9 mm, Model M9	157		shooter's ear	Firearms and Explosives	Military	64	
Pistol, cap	105-120			Firearms and Explosives	Toys	8	
Recoilless rifle, Model M3	190		gunner	Firearms and Explosives	Military	64	
Revolver, .357 magnum	164	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Revolver, .38 special	158	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Revolver, .41 magnum	163	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Revolver, .44 magnum	164	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Revolver, .44 special	156	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .22 both high and std. velocity	141	Linear	shooter's ear	Firearms and Explosives	Recreation	170	measured w/ 1/4" pressure mic, 195-kHz/24-bit digital analysis; peak dBA = 133 to 13
Rifle, .22 caliber	140			Firearms and Explosives	Recreation	16	
Rifle, .22 L.R., rimfire	134	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .223	155	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .243	156	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .25-06	159	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .30-06,with 150 gr. or 180 gr. load	163	Linear	shooter's ear	Firearms and Explosives	Recreation	170	measured w/ 1/4" pressure mic, 195-kHz/24-bit digital analysis; peak dBA = 159
Rifle, .30-06	159	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .30-06, w/muzzle brake	169	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .30-30	156	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .308	156	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .375 H&H Magnum	160	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, .375 H&H Magnum, w/muzzle brake	171	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, 22 caliber	140			Firearms and Explosives	Recreation	7	
Rifle, 22 caliber	143-158			Firearms and Explosives	Recreation	10	Odess 1972
Rifle, 30 caliber	168-172			Firearms and Explosives	Recreation	10	Odess 1972
Rifle, 5.56 mm, Model M16A2	157		shooter's ear	Firearms and Explosives	Military	64	
Rifle, 7-mm Magnum	160	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, 7-mm Magnum, w/muzzle brake	170	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, 7-mm Mauser	159	Linear	shooter's ear	Firearms and Explosives	Recreation	30	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Rifle, M-1	161			Firearms and Explosives	Military	16	
Shooting	120			Firearms and Explosives	Recreation	8	
Shotgun	158			Firearms and Explosives	Recreation	16	
Shotgun blast	140			Firearms and Explosives	Recreation	3	
Shotgun, .410 bore	150	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Shotgun, 12 g	165			Firearms and Explosives	Recreation	5	
Shotgun, 12 g	163-173			Firearms and Explosives	Recreation	10	Odess 1972
Shotgun 12 ga., target and hunting (target was 2 dB lower level)	161	Linear	shooter's ear	Firearms and Explosives	Recreation	170	measured w/ 1/4" pressure mic, 195-kHz/24-bit digital analysis; peak dBA = 156
Shotgun, 12 gauge	156	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Shotgun, 16 g	166-169			Firearms and Explosives	Recreation	10	Odess 1972
Shotgun, 20 g	166-168			Firearms and Explosives	Recreation	10	Odess 1972
Shotgun, 20 gauge	153	Linear	shooter's ear	Firearms and Explosives	Recreation	29	measured with B&K 1/4" mic and B&K 2209 impulse SLM
Shotgun, 410 g	164-169			Firearms and Explosives	Recreation	10	Odess 1972
Tools, explosive actuated	150-160			Firearms and Explosives	Construction	10	Smith 1971

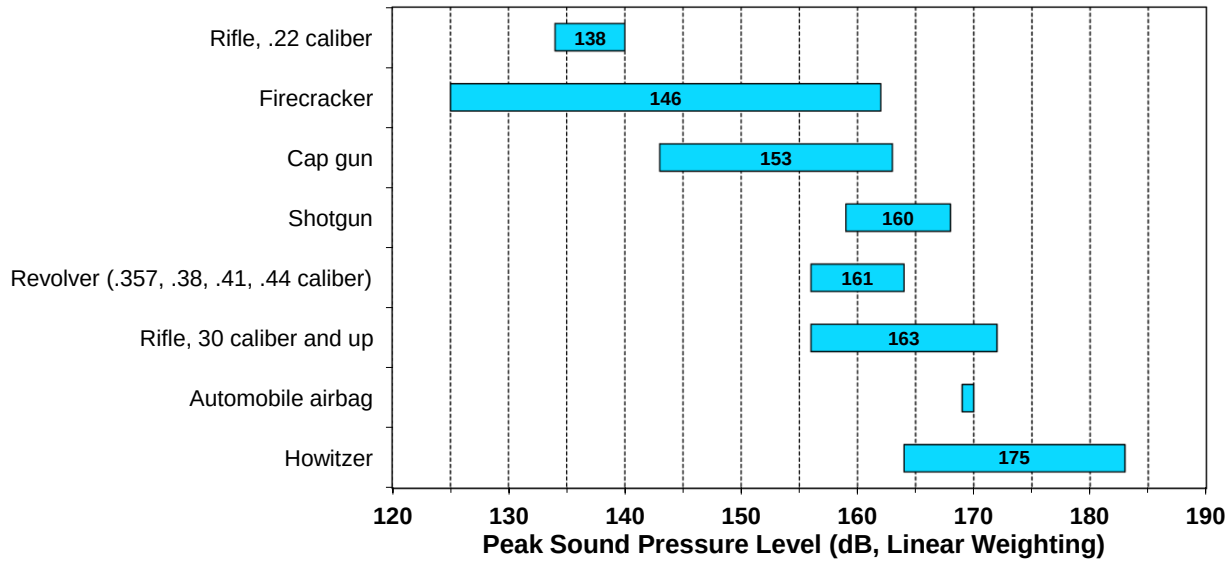
Sound Levels

Weapons and Explosives peak sound pressure levels in dB

Source	dB Peak (avg.)	dB Peak Low Range	dB Peak High Range	Weighting	Distance from Source	No. of Studies	Ref #	Notes
Revolver (.357, .38, .41, .44 caliber)	161	156	164	Linear	shooter's ear	1	29	
Rifle, .22 caliber	138	134	140		shooter's ear	3	7, 16, 29	ignored ref 9 as outlier
Shotgun	160	159	168	Linear	shooter's ear	4	5, 10, 16, 29	ignored ref 2 as outlier
Cap gun	153	143	163	C or unspecified	20 - 50 cm	3	10, 12, 16	
Firecracker	146	125	162	C or unspecified	20 - 100 cm	3	3, 10, 12	
Rifle, 30 caliber and up	163	156	172	Linear	shooter's ear	3	10, 29, 30	
Howitzer	175	164	183	unspecified	5 m or at gunner	2	10, 64	
Automobile airbag	169	169	170	Linear	at ear	3	128, 129, 130	

NOTE: The averages and ranges in the table were computed from the reported mean values provided by the designated references, or from the midpoint of the reported values when ranges were included.

Figure 3- Mean and Range for Sound Levels of Common Weapons and Explosive Devices



Sound Levels

Military, Aircraft, and Rockets, A-weighted sound levels (for guns and howitzers, etc. see Weapons)

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Abrams tank	93	inside	Transportation	Military	64
Abrams tank	108	inside	Transportation	Military	64
Abrams tank	117	inside	Transportation	Military	64
Aerial spraying and/or crop spraying - see Occupational					
AH-1T Cobra helicopter	91	cockpit	Transportation	Aircraft	116
Aircraft cabin (747 or DC-10)	72-86		Transportation	Aircraft	8
Aircraft cabin (Airbus A321)	75-80	in-cabin	Transportation	Aircraft	153
Aircraft cabin (Airbus A321)	80-85	in-cabin	Transportation	Aircraft	153
Aircraft cockpit (Airbus A320)	74	cockpit	Transportation	Aircraft	49
Aircraft cockpit (Boeing 737)	77	cockpit	Transportation	Aircraft	49
Aircraft cockpit (Boeing 747)	79	cockpit	Transportation	Aircraft	49
Aircraft cockpit (Boeing 757)	72	cockpit	Transportation	Aircraft	49
Aircraft cockpit (Boeing 767)	72	cockpit	Transportation	Aircraft	49
Aircraft cockpit (Concorde)	77	cockpit	Transportation	Aircraft	49
Aircraft cockpit (McDonnell Douglas DC-10)	76	cockpit	Transportation	Aircraft	49
Aircraft flyover	92-102	300 m	Transportation	Aircraft	8
Aircraft, commercial	76-92	cabin	Transportation	Aircraft	10
Aircraft, sightseeing Grand Canyon	70		Transportation	Aircraft	13
Aircraft, single engine cabin	88-90	cabin	Transportation	Aircraft	10
Aircraft, single engine cabin	87-96	cabin	Transportation	Aircraft	10
Aircraft, small	74	100 m	Transportation	Aircraft	13
Aircraft, small	>70	300-400 m	Transportation	Aircraft	13
Aircraft, small at high altitude	43		Transportation	Aircraft	13
Aircraft, small, engine	125		Transportation	Aircraft	22
Airliner, 4 propeller	145		Transportation	Aircraft	22
Airliner, jet	140	30 m	Transportation	Aircraft	14
Airplane motor	125	6 m	Transportation	Aircraft	20
Airplane, light - cockpit	90	cockpit	Transportation	Aircraft	16
Airplane, prop flyover	88	300 m	Transportation	Aircraft	16
Anti-Tank Air Defence System M113A2 (tracked), Canadian	95	driver	Transportation	Military	158
Anti-Tank Air Defence System M113A2 (tracked), Canadian	103	driver	Transportation	Military	158
Anti-Tank Air Defence System M113A2 (tracked), Canadian	115	driver	Transportation	Military	158
Apollo lift off (close)	188		Rocket		16
Armored personnel carrier, A3 version	85-92	inside	Transportation		64
Armored personnel carrier, A3 version	109	inside	Transportation		64
Armored personnel carrier, A3 version	118	inside	Transportation		64
Armoured track vehicle, M113, Canadian	97	driver	Transportation	Military	183
Armoured track vehicle, M113, Canadian	96	driver	Transportation	Military	183
Astra G100 small corporate jet	84	cockpit	Transportation	Aircraft	145
Astra G100 small corporate jet	82	cabin	Transportation	Aircraft	145
B-17C Flying Fortress, quadruple reciprocating engine aircraft	130	cockpit	Transportation	Aircraft	116
B-25B Mitchell, dual reciprocating engine aircraft	108	cockpit	Transportation	Aircraft	116
B-29B Superfortress, quadruple reciprocating engine aircraft	89	cockpit	Transportation	Aircraft	116
B-52H Stratofortress, external turbojet aircraft	94	cockpit	Transportation	Aircraft	116
Beech 99 TurboAirliner, turboprop aircraft	104	cockpit	Transportation	Aircraft	116
Beech Muskateer23, single reciprocating engine aircraft	89	cockpit	Transportation	Aircraft	116
Bell OH-58A helicopter during cruise	94	cabin	Transportation	Aircraft	142
Bison (wheeled vehicle), Canadian	89	driver	Transportation	Military	158
Bison (wheeled vehicle), Canadian	102	driver	Transportation	Military	158
Bison (wheeled vehicle), Canadian	102	driver	Transportation	Military	158
Boat, Canadian Coast Guard vessel	87	interior	Transportation	Boat	183
Boat, Canadian Coast Guard vessel	95	interior	Transportation	Boat	183
Boeing 727 jet, cabin, taxiing	69	cockpit	Transportation	Aircraft	117
Boeing 727, external turbojet aircraft	79	cockpit	Transportation	Aircraft	116

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Boeing 727, jet, cabin, descent	70	cockpit	Transportation	Aircraft	117
Boeing 737, external turbojet aircraft	78	cockpit	Transportation	Aircraft	116
Boeing 737-700 commercial jet	73	cockpit	Transportation	Aircraft	145
Boeing 747-400 commercial jet	67	cabin	Transportation	Aircraft	145
Bombardier CRJ-700 70-seat regional jet during cruise	82	cabin	Transportation	Aircraft	131
Bombardier CRJ-700 70-seat regional jet during landing	77	cabin	Transportation	Aircraft	131
Bombardier CRJ-700 70-seat regional jet during take-off	80	cabin	Transportation	Aircraft	131
Bombardier Q200 37-seat turboprop during cruise	81	cabin	Transportation	Aircraft	131
Bombardier Q200 37-seat turboprop during landing	78	cabin	Transportation	Aircraft	131
Bombardier Q200 37-seat turboprop during take-off	81	cabin	Transportation	Aircraft	131
Bombardier Q400 70-seat turboprop during cruise	83	cabin	Transportation	Aircraft	131
Bombardier Q400 70-seat turboprop during landing	77	cabin	Transportation	Aircraft	131
Bombardier Q400 70-seat turboprop during take-off	82	cabin	Transportation	Aircraft	131
C-130A Hercules, quadruple turboprop aircraft	104	cockpit	Transportation	Aircraft	116
C-130B Hercules, quadruple turboprop aircraft	93	cockpit	Transportation	Aircraft	116
Cessna 172 Skyhawk, single reciprocating engine aircraft	92	cockpit	Transportation	Aircraft	116
Cessna 411, dual reciprocating engine aircraft	107	cockpit	Transportation	Aircraft	116
Cessna T-37B, internal turbojet aircraft	104	cockpit	Transportation	Aircraft	116
CH-47A Chinook helicopter	109	cockpit	Transportation	Aircraft	116
CH-53C Sea Stallion helicopter	103	cockpit	Transportation	Aircraft	116
Challenger 601 medium-size corporate jet	69	cockpit	Transportation	Aircraft	145
Challenger 601 medium-size corporate jet	74	cabin	Transportation	Aircraft	145
Commander 690B twin-engine prop	83	cockpit	Transportation	Aircraft	145
Commander 690B twin-engine prop	85	cabin	Transportation	Aircraft	145
Commercial jet at high-altitude cruise	85	300 m	Transportation	Aircraft	99
Commercial jet at takeoff	85	300 m	Transportation	Aircraft	99
Convair 340, dual reciprocating engine aircraft	92	cockpit	Transportation	Aircraft	116
Corporate jet at takeoff	85	300 m	Transportation	Aircraft	99
DC-6, quadruple reciprocating engine aircraft	80	cockpit	Transportation	Aircraft	116
F-105F Thunderchief, internal turbojet aircraft	100	cockpit	Transportation	Aircraft	116
F-16 jet, launch noise on carrier deck	145-150	15 m		Aircraft	93
F-18 jet, launch noise on carrier deck	138	near aircraft		Aircraft	92
F-22 jet , launch noise on carrier deck	146-150	15 m		Aircraft	93
F-4B Phantom II, internal turbojet aircraft	111	cockpit	Transportation	Aircraft	116
F4F Wildact, single reciprocating engine aircraft	113	cockpit	Transportation	Aircraft	116
F4U-1 Corsair, single reciprocating engine aircraft	103	cockpit	Transportation	Aircraft	116
Helicopter	100		Transportation	Aircraft	6
Helicopter	93-112		Transportation	Aircraft	10
Helicopter	68	150 m	Transportation	Aircraft	13
Helicopter at cruise	70	300 m	Transportation	Aircraft	99
Helicopter, Apache YAH-64	104/101	pilot/co-pilot	Transportation	Aircraft	64
Helicopter, Blackhawk UH-60A	106	pilot/co-pilot	Transportation	Aircraft	64
Helicopter, ca	45-56	3 km	Transportation	Aircraft	13
Helicopter, Chinook CH-47D	103	cockpit	Transportation	Aircraft	64
Helicopter, Griffon, Canadian	96	interior	Transportation	Aircraft	183
Hercules, fixed-wing transport, Canadian	99	flight engineer	Transportation	Aircraft	183
International Space Station, cargo block	56-60		Rocket	Aircraft	127
International Space Station, service module	69		Rocket	Aircraft	127
International Space Station, while exercising on treadmillI	77		Rocket	Aircraft	127
International Space Station, sleep quarters	42-50	in quarters	Rocket	Aircraft	171
Jet	140	3 m	Transportation	Aircraft	16
Jet aircraft	120		Transportation	Aircraft	7
Jet airliner	80-105		Transportation	Aircraft	8
Jet engine	140	25 m	Transportation	Aircraft	11
Jet flyover	103	300 m	Transportation	Aircraft	2
Jet flyover	103	300 m	Transportation	Aircraft	16

Sound Levels

Source	dBA	Distance from Source	Category 1	Category 2	Ref #
Jet plane at take off	140		Transportation	Aircraft	3
Jet plane at take off (nearby)	140		Transportation	Aircraft	6
Jet plane flyby	110		Transportation	Aircraft	6
Jet plane take off	120		Transportation	Aircraft	4
Jet takeoff	120	60 m	Transportation	Aircraft	17
Jet takeoff	125	60 m	Transportation	Aircraft	15
Jet takeoff	125	60 m	Transportation	Aircraft	22
Jet takeoff	130		Transportation	Aircraft	1
Jet takeoff (nearby)	130		Transportation	Aircraft	1
Jet takeoff, nearby	150		Transportation	Aircraft	17
Jet, nearby	150		Transportation	Aircraft	16
Jet, takeoff	140		Transportation	Aircraft	5
Jet, takeoff	125	100 m	Transportation	Aircraft	11
Joint Strike Fighter jet, launch noise on carrier deck	148-152	15 m		Aircraft	93
KC-135A, external turbojet aircraft	85	cockpit	Transportation	Aircraft	116
Light armoured (wheeled) vehicle (LAV) III, Canadian	84	driver	Transportation	Military	158
Light armoured (wheeled) vehicle (LAV) III, Canadian	91	driver	Transportation	Military	158
Light armoured (wheeled) vehicle (LAV) III, Canadian	97	driver	Transportation	Military	158
Light armoured troop carrier (LAV III), Canadian	95	driver	Transportation	Military	183
Light armoured troop carrier (Bison), Canadian	90	driver	Transportation	Military	183
McDonnell Douglas F-18 hornets, 4-ship takeoff by Blue Angels, 08/97	124	50 m	Transportation	Aircraft	142
P-3 Orior (RAAF), quadruple turboprop aircraft	82	cockpit	Transportation	Aircraft	116
Piper Commanche PA-30, dual reciprocating engine aircraft	85	cockpit	Transportation	Aircraft	116
Piper J3 Cub, single reciprocating engine aircraft	94	cockpit	Transportation	Aircraft	116
Propeller aircraft at takeoff	70-80	300 m	Transportation	Aircraft	99
Ram Jet	168		Rocket		22
Rocket engine, large - nearby	180		Rocket		17
Rocket launch	180		Rocket		5
Saturn V rocket launch	155	300 m	Rocket	Aircraft	180
Sikorsky HH-5SA helicopter	95	cockpit	Transportation	Aircraft	116
Sonic boom	110		Transportation	Aircraft	6
Space Shuttle, NASA, launch sequence	98-108	cockpit	Rocket	Aircraft	171
Space Shuttle, NASA, in orbit	68	interior	Rocket	Aircraft	171
Space Shuttle launch Feb 2008 of Atlantis	99	4500 m	Rocket	Aircraft	178
Space Shuttle launch at pad (estimated)	194	at pad	Rocket	Aircraft	179
Turbo-jet engine with afterburner	165		Rocket		22
Turbo-jet engine, 7000 lb thrust	160		Rocket		22
UH-25A Army Mule helicopter	111	cockpit	Transportation	Aircraft	116
VC-11A Gulfstream II, turboprop aircraft	80	cockpit	Transportation	Aircraft	116
Vickers Viscount, quadruple turboprop aircraft	86	cockpit	Transportation	Aircraft	116
XB-52A Stratofortress, external turbojet aircraft	100	cockpit	Transportation	Aircraft	116

Sound Levels

Notes

at idle
16 km/hr (10 mph)
63 km/hr (40 mph)

normal cruise; 1 of 31 entries in this file selected from 805 in report

during cruise, level flight on 1000 km trip
during takeoff on 1000 km trip
Average Leq level across entire flight, captain's position
Average Leq level across entire flight, captain's position
Average Leq level across entire flight, captain's position
Average Leq level across entire flight, captain's position
Average Leq level across entire flight, captain's position
Average Leq level across entire flight, captain's position
Average Leq level across entire flight, captain's position

Bray 1974
U.S. EPA 1971 peak values
Hughes & Koonce 1986
Harling 1987

Ohson, 1976 L_{50} values

idling, 99 dBL
32 km/hr (20 mph), hatches open, 111 dBL
32 km/hr (20 mph), hatches closed, 123 dBL

at idle
32 km/hr (20 mph)
63 km/hr (40 mph)
9-min. LAeq, driver and operator positions moving at 5 mph
9-min. LAeq, driver and operator positions at idle
cruise at 27,000 ft., Mach 0.76
cruise at 27,000 ft., Mach 0.76
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
Measured with Quest 210 Type II sound level meter
idling, 95 dBL
rough terrain, 107 dBL
highway 80 km/h, 114 dBL
215-min. LAeq, shaft room, steering compartment, lower propulsion room, machine rooms and workshops
29-min. LAeq, engine room

normal cruise; 1 of 31 entries in this file selected from 805 in report

Sound Levels

Notes
normal cruise; 1 of 31 entries in this file selected from 805 in report
cruise at 39,000 ft., Mach 0.78
cruise at 37,000 ft., Mach 0.85, aft upper deck crew rest area
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
avg. front, middle, and back locations; back generally highest
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
cruise at 39,999 ft., Mach 0.78
cruise at 39,999 ft., Mach 0.78
cruise at 18,000 ft., 185 knots
cruise at 18,000 ft., 185 knots
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
low value for military power and high value for afterburner power
exposure of launch crews on the aircraft carrier, JFK
low value for military power and high value for afterburner power
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
House 1975
5-min. LAeq, low-hover doors open, several landings
5-min. LAeq, flight engineer position during takeoff and climb
measured while in orbit
measured while in orbit
measured while in orbit
values are Leq8, quarters redesigned (circa 2009) and protocols (re: keeping the door closes) improved reducing Leqs from prior values in high 60’s

Sound Levels

Notes

From *Physics,* Tipler, 1976
Peterson and Gross, 1972

From *Physics,* Tipler, 1976

low value for military power and high value for afterburner power
normal cruise; 1 of 31 entries in this file selected from 805 in report
idling, 99 dBL
rough terrain, 103 dBL
highway 80 km/h, 110 dBL
13-min. LAeq, driver and crew commander positions over rough terrain and highway
8-min. LAeq, driver and crew commander positions at idle
Measured with Quest 210 Type II sound level meter
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report

From *Physics,* Tipler, 1976

Computed from OB power level data.
normal cruise; 1 of 31 entries in this file selected from 805 in report

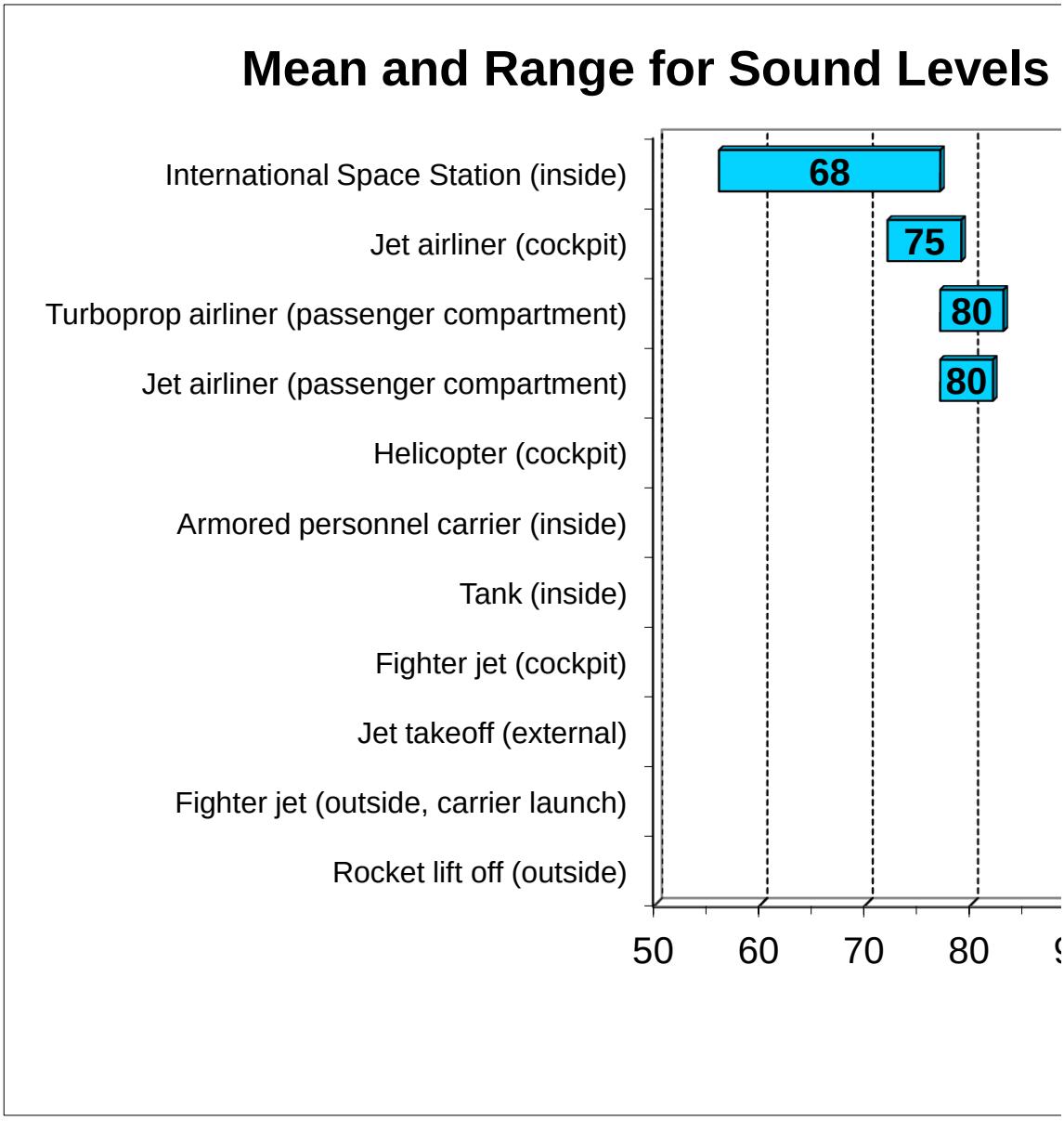
Launch Sequence: engine & solid rocket booster ignition, throttle down, throttle up, separation, less than 3 minutes
Shuttle mid-deck noise levels (vehicle + payload)
This is about closest people get to the pad; 119 dBC.
Estimated based on 115 dB at 3.5 miles.

normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report
normal cruise; 1 of 31 entries in this file selected from 805 in report

Military + Aircraft A-weighted sound levels with data averaged for type of source

Source	dB Average	dB Low Range	Mi
Helicopter (cockpit)	102	94	111
Helicopter (external)	63	50	70
Jet takeoff (external)	133	120	150
Jet airliner (cockpit)	75	72	79
Armored personnel carrier (inside)	105	89	118
Tank (inside)	106	93	117
International Space Station (inside)	68	56	77
Jet airliner (passenger compartment)	80	77	82
Turboprop airliner (passenger compartment)	80	77	83

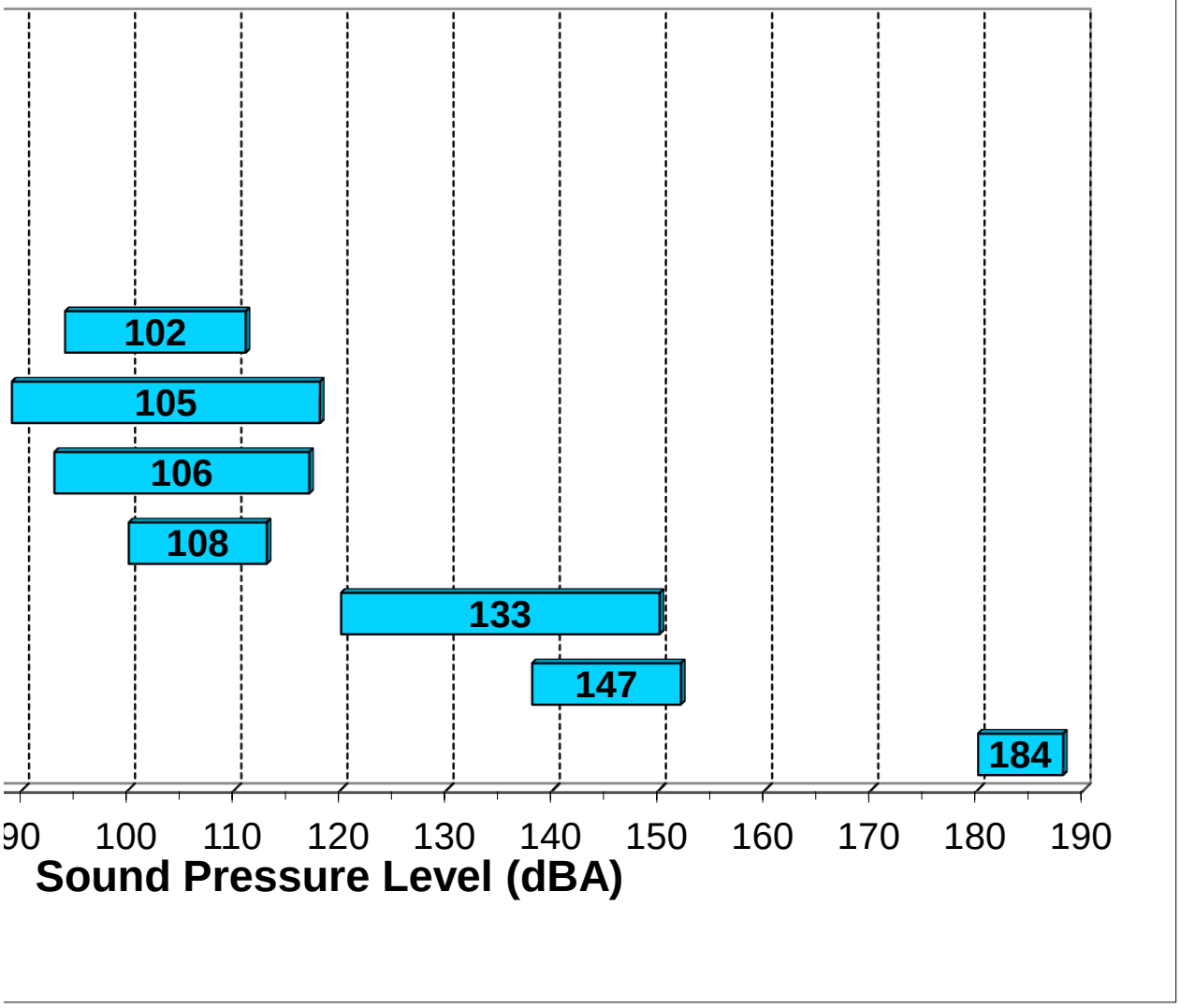
NOTE: The averages and ranges in the table were computed from the reported mean values provic



Weighting	No. of Studies	Ref #	Notes
A	8	6, 10, 64, 99, 116, 142	
A	3	13, 99	
A	12	1, 3, 4, 5, 6, 11, 15, 16, 17, 22	
A	7	49	
A	3	64	
A	3	64	
A	3	127	
A	3	131	
A	6	131	

ded by the designated references, or from the midpoint of the reported values when ranges were includ

of Military Equipment and Aircraft



ed.

Internally prepared charts and/or data acquired by first author
Anon. "You and Your Avoidable Noise Induced Hearing Loss," Deafness Foundation (Victoria), Australia.
Canada.
Rockville, MD.
OHHS(NIOSH) 2000-141, Cincinnati, OH.
Bureau of Stds., Washington, DC.
Bragdon, C. R. (1971). *Noise Pollution, the Unquiet Crisis* , Univ. of Pennsylvania Press, Phila., PA.
Clark, W. and Bohne, B. (1984). "The Effects of Noise on Hearing and the Ear," Medical Times, December.
Cunniff, P. F. (1977). *Environmental Noise Pollution* , John Wiley & Sons, New York, NY.
Dobie, R. A. (1993). *"Medical - Legal Evaluation of Hearing Loss,* Van Nostrand Reinhold, New York, NY, 341-346.
Hassall, J. R. and Zaveri, K. (1979). *Acoustic Noise Measurements* , Bruel & Kjaer.
and Teenagers," Br. J. Audiology 26(5), 267-270.
Kariel, H. G. (1991). "Noise in Rural Recreational Environments," Canadian Acoustics 19(5), 3-10.
Jones, C., Gadler, S. J., and Engstrom, P. H. (1975). *Pollution: The Noise We Hear* , Lerner Pub. Co., Minneapolis, MN.
Lipscomb, D. M. (1978). *Noise and Audiology* , Univ. Park Press, Baltimore, MD.
Lipscomb, D. M. (1988). "Unsound Sound," High Fidelity 38(5), 43-48.
New York, NY.
May, D. N. (1978). *Handbook of Noise Assessment* , Van Nostrand Reinhold, New York, NY.
Laryngol. and Otol. 103, 1140-1141.
Olishifski, J. B. and Harford, E. R. (1975). *Industrial Noise and Hearing Conservation* , National Safety Council, Chicago, IL.
O'Neal, J. (1986). "Workshop Noise, Are Machines Damaging Your Hearing?," Fine Woodworking 59(5), 62-65.
Peterson, A. P. G. (1980). *Handbook of Noise Measurement* , GenRad, Concord MA.
Related Litigation," Am. Ind. Hyg. Conf. and Exposition Prof. Dev. Course 610, Dallas, TX.
Washington, DC.
Axelsson,A. (1996). “Recreational Exposure to Noise and Its Effects,” Noise Control Eng. J. 44(3), p. 129.
Royster, L.H. (2004) Personal communication
Noise Pollution Clearing House. (2005). "Typical Noise Levels," http://www.nonoise.org/library/household/index.htm.
Noise Pollution Clearing House. (2004). "Does Quieter Lawn Equipment Really Make a Difference?" The Quiet Zone, Summe
Kramer, W. L. (1990). "Gunfire noise exposure and its effect on hearing," Hearing Inst. 41(10), 26-28.
Kramer, W. L. (1995). "Gunfire noise and hearing conservation: realities and responsibilities," in Proc. Hearing Cons. Conf. III
Cant, S. M. (1977). "Noise dose assessment of the logging industry," Am. Ind. Hyg. Assoc. J. 38(12), 726-729.
Neitzel, R. and Yost, M. (2002). "Task-based assessment of occupational vibration and noise exposures in forestry workers," A
Dranitsaris, P. (1982). "Noise dose assessment of the construction industry," Univ. of Toronto, Ontario. Masters thesis compl
Sinclair, J.D. and Haflidson, W.O. (1995). "Construction noise in Ontario," Appl. Occup. Environ. Hyg.10(5), 457-60.
Utley, W. and Miller, L. (1985). "Occupational noise exposure on construction sites," Appl. Acoust.18, 293-303.
Greenspan, C. A., Moure-Eraso, R., Wegman, D., Oliver, L. C. (1995). "Occupational hygiene characterization of a highway cc
Alfredson, R. and May, D.(1978). "Construction Site Noise," in *Handbook of Noise Assessment, ed. by D. May,* Litton Educati
Hong Kong: Environmental Protection Department Noise Policy Group (1989), "A Practical Guide for the Reduction of Noise fr
Bartholomae, R. and Parker, R. (1983). "Mining Machinery Noise Control Guidelines: A Bureau of Mines Handbook," U. S. De
Park, M-Y. (2003). "Assessment of potential noise-induced hearing loss with commercial 'Karaoke' noise," Ind. Ergonomics 31
Ambasankaran, M., Brahmachari, D., Chadda, V. K., Phadnis, M. G, Raju, A., Ramamurthy, A., et al. (1981). "Occupational nc
Cohen, A., Anticaglia, J., Jones, H. (1970) "'Sociocusis:' - hearing loss from non-occupational noise exposure," Sound. Vib. 12
Bess, F.H. and Poynor, R.E. (1972). "Snowmobile engine noise and hearing," Arch. Otolaryngol. 95(2),164-168.
Bess, F. and Poyner, R. (1974). "Noise-induced hearing loss and snowmobiles," Arch. Otolaryngol. 99, 45-51.
Johnson, D. L., and Farina, E. R. (1977). "Description of the measurement of an individual's continuous sound exposure durin
Ross, B. (1989). "Noise exposure of motorcyclists," Ann. Occup. Hyg., 33(1),123-127.
Holt, J. J., Broste, S.K., and Hansen, D. (1993). "Noise exposure in the rural setting," Laryngoscope 103(3), 258-262.
Bisio, G. (1996) "Case history: noise level survey in a middle-size town and remarks on traffic history," Noise Control Eng. J. 4

Bagshaw, M., and Lower, M. (2002). "Hearing loss on the flight deck - origin and remedy," Aeronaut. J. 277-289.
Patel, J., and Broughton, K. (2002). "Assessment of the noise exposure of call centre operators." Ann. Occup. Hyg. 46(8), 653
Eaton, S. (2000). "Construction noise," Workers' Comp. Bd. of British Columbia, Engineering Section, Report 7.11-99284, Var
Kerr, M., Brosseau, L., and Johnson, C.S. (2002). "Noise levels of selected construction tasks," Am. Ind. Hyg. Assoc. J. 63, 3
Tharr, D. (2002). "Occupational exposures in seismic retrofitting operations," Appl. Occup. Environ. Hyg. 17(2), 75-81.
Bray, A., Szymanski, M., Mills, R., and Phil, M. (2004). "Noise induced hearing loss in dance music disc jockeys and an exami
Passchier-Vermeer, W. (1999). "Pop music through headphones and hearing loss." Noise Control Eng. J. 47 (5), 182-186.
Mori, T. (1985). "Effects of record music on hearing loss among young workers in a shipyard," Int. Arch. Occup. Environ. Healt
Yassi, A., Pollock, N., Tran, N., and Cheang, M. (1993). "Risks to hearing from a rock concert," Can. Fam. Phys. 39, 1045-105
Suvorov, G., Denisov, E., Anitipin, V., Kharitonov, V., Starck, J., Pyykko, I., and Toppila, E. (2001). "Effects of peak levels and
Mirbod. S, Inaba R., Yoshida H, Nagata C, Komura and H Iwata (1992). "Noise exposure level while operating electronic arca
Sadhra, S., Jackson, C., Ryder, T. and Brown, M. (2002). "Noise exposure and hearing loss among student employees workin
Neitzel R., Seixas N., Olson J., Daniell W. and Goldman, B. (2004). "Nonoccupational noise: exposures associated with routin
Seixas, N. and Neitzel, R. (2004) "Noise exposure and hearing protection device use among construction workers in Washingt
Skrainar, S., Royster, L., Berger, E.H., and Pearson, R. (1987). "The contribution of personal radios to the noise exposure of e
Humes, L. E., Joellenbeck, L. M., and Durch, J. S. (2005). "Noise and Military Service, Implications for Hearing Loss and Tinn
McBride, D. I. (2004). "Noise-induced hearing loss and hearing conservation in mining," Occup. Med. 54(5), 290-296.
Hellstrom, P. A. and Axelsson, A. (1988). "Sound Levels, Hearing Habits and Hazards of Using Portable Cassette Players," J.
Rice, C. G., Breslin, M. and Roper, R. G. (1987). Sound levels from personal cassette players," Br. J. Audiology, 21, 273-278.
Airo, E, Pekkarinen, J, and Olkinuora, P. (1996). "Listening to Music with Earphones: An Assessment of Noise Exposure," Acu
Passchier,Vermeer, W, Vos, H. and Steenbekkers, J. H. M. (1998). "Popmusic through headphones and hearing loss," TNO F
Felchlin, I, Hohmann, B. W., and Matefi, L. (1998). "Personal Cassette Players: A Hazard to Hearing?," in *Advances in Noise I*
Axelsson, A, Lindgren, F. and Sander, A. (1981). "Hearing in Classical Musicians," Acta Oto-Laryn. Supplement 377.
Chew, T. T., Cheung, T. H. and Louisa, W. T. L. (1990). "Noise Surveys in Discotheques I Hong Kong," Ind. Health, 28, 37-40
Toppila, E. Laitinen, H. and Kuisma, K. (2004). "Hearing loss among classical music players," Am. Ind. Hyg. Conf. and Exposi
McBride, D., Gill, F., Proops, D, Harrington, M. Gardiner, K, and Attwell, C. (1992). "Noise and the Classical Musician," Br. Me
Griffiths, J. E. T. (1991). "A Survey of Sound Levels at Pop Concerts," HSE Contract Res. Rept. 35/1991, UK.
Mikl, K. (1995). "Orchestral Music: An Assessment of Risk," Acoust. Australia 23(2), 51-55.
Whitfield, A. (1998). "An Assessment of Occupational Noise Exposure Amongst Bar Staff Employees Working in Night-Clubs,
Lee, L. T. (1999). "A Study of the Noise Hazard to Employees in Local Discotheques," Singapore Med. J. 40(9), 571-574.
Groothoff, B, Young, C. and Thomson, V. (1998). "Music Levels in the Entertainment Industry, Revelations of an Ongoing Stu
Henoch, M. A. and Chesky, K. (2000). "Sound Exposure Levels Experienced by a College Jazz Band Ensemble: Comparison
Smeatham, D. (2002). "Noise Levels and Noise Exposure of Workers in Pubs and Clubs - A Review of the Literature," Health
Braslau, D. (2005). "Evaluation of Small Arms Noise in a Natural Soundscape - Bear Butte, SD," J. Acoust. Soc. Am., 118(3),
Hoglin, S. L. (2003). "Thunder-sticks are Fun, but …," J. Am. Acad. Audiol., 14(1), p. 56.
Pearlman, R. C. and Miller, M. Jr. (1985). "Noise Exposure Levels from Model Airplane Engines," J. Aud. Res. 25, 27-30.
Casali, J. C. (1990). "Listening Closely to the Noise of Monster Trucks," Roanoke Times and World News, p. A11.
Coleman, S. B. (1991). "The Sound os Speed …," The Voice (Canada), June/July, 31-33.
Harrison, R. (1973). "The Effectiveness of Motorcycle Helmets as Hearing Protectors," U. S. Dept. Agriculture, Forest Service
van Moorhem, W. K., Shepherd, K. P., Magleby, T. D., and Torian, G. E. (1981). "The Effects of Motorcycle Helmets on Heari
Ross, B. C. (1989). "Noise Exposure of Motorcyclists," Ann. Occup. Hyg. 33(1), 123-127.
Binnington, J. D., McCombe, A. W., and Harris, M. (1993). "Warning Sgnal Detection and the Acoustic Environment of the Mc
Aldman, B, Gustafsson, H, Nygren, A, and Wersall, J. (1983). "Hearing and Motorcycle Helmets," J. Traffic Med. 11, 42-45.
Hall, J. A. (2004). Personal communication.
McKinley, R., Kordik, A, and Dancer, A. (2005). "Loudness Matching in Bone/Tissue Conducted Noise," Inter-Noise 2005, Bra
Miller, N. P. (2002). "Transportation Noise and Recreational Lands," in proceedings of Inter-Noise 2002.
Williams, W. and Presbury, J. (2003). "Observations of Noise Exposure Through the use of Headphones by Radio Announcer
Clark, W. (1998). "Noisy Toy Sound Level Measurements for the League of the Hard of Hearing and 20/20 News Program," C

Olkinuora, P., Pekkarinen, J. and Stark, J. (1986). "Noise of Welding Shops," Welding in the World, 21 (9/10), 232-236.
Kristensen, S and Gimsing, S. (1988). "Occupational Hearing Impairmentin Pig Breeders," Scandinavian Audiology 17(3), 191
Miller, N. P. (2005). "Housing and the Sound Environment," NAHB Land Development Magazine, summer issue, 28-33.
Berger, E. H. (1984). "Memorandum describing noise measurements at northeastern medical college."
Lusk, R. P. and Tyler, R. S. (1987). "Hazardous Sound Levels Produced by Extracorporeal Shock Wave Lithotripsy," 136(6), 1
Teigland, C. M., Clayman, R. V., Winfield, H. N. and Roeser, R. J. (1986). "Ultrasonic Lithotripsy: The Risk of Hearing Loss," J
O'Brien, R. P., Usaitis, R. J., and Solomon, R. A. (1993). "The Noise Hazard of Treating Children in the ED," Am. J. Emerg. M
McJury, M. J. (1995). "Acoustic Noise Levels Generated During High Field MR Imaging," Clin. Radiology 50(5), 331-334.
Wiggins, C. E. and Brown, K. D. (1996). "Hearing Protection and Cast Saw Noise," J. Southern Orthopaedic Assoc. 5(1), 1-4.
Akhtar,S., Weigle, C. G. M., Cheng, E. Y., Toohill, R. l., and Berens, R. J. (2000). "Use of Active Noise Cancellation Devices i
Ravicz, M. E., Melcher, J. R., Talavage, T. M., Benson, R. R., Rosen, B. R., and Kiang, N. Y. S. (1997). "Characterization and
Ravicz, M. E., Melcher, J. R., and Kiang, N. Y. S. (2000). "Acoustic Noise During Functional Magnetic Resonance Imaging," J
Goldman, A. M., Grossman, W. E., and Friedlander, P. C. (1989). "Reduction of Sound Levels with Antinoise in MR imaging,"
Sorainen, E. and Rytkonen, E. (2002). "High-Frequency Noise in Dentistry," Am. Ind. Hyg. J. 63(2), 231-233.
Coles, R. R. A. and Hoare, N. W. (1985). "Noise-Induced Hearing Loss and the Dentist," British Dental J. 159, 209-218.
Wilson, C. E., Vaidyanathn, T. K. Cinott, W. R., Cohen, S. M., and Wang, S. J. (1990). "Hearing-Damage Risk and Communic
Blomberg, L. (2004). "Why Diesel Trucks are Quieter Than Boats," Lakeline 24(2), 27-32.
Mirbod, S. M., Tambara, K., Fujita, S., Yoshida, H., Nagata, C., Komura, Y., Inaba, R., and Iwata, H. (1993). "A Survey on Nois
Heever, D. J. van den and Roets, F. J. (1996). "Noise Exposure of Truck Drivers: A Comparative Study," Am. Ind. Hyg. Assoc
Gasaway, D. C. (1999). "A-Weighted Noise Levels in Cockpits of 805 Different Models of Fixed- and Rotary-Wing Aircraft Dur
Teder, H. (1990). "Noise and Speech Levels in Noisy Environments," Hearing Instr. 41(4), 32-33.
Casali, J. C. (1995). Personal communication.
Smith, P. A., Davis, A., Ferguson, M., and Lutman, M. E. (2000). "The Prevalence and Type of Social Noise Exposure in Your
Ferguson, M. A., Davis, A. C., and Lovell, E. A. (2000). "Cinemas - Do They Pose a Risk to Hearing?," Noise & Health 8, 55-5
Seweetow, R and tate, L. (2002). "I'll Have a Side Order of Earplugs, Please," Tinnitus Today 27(1), 18-19.
Hayden II, C.S., Zechmann, E., Verma, R., and Leonard, S. (2005). "Powered Hand Tools Searchable Web-site Database," ht
Marvel, M. E., Pratt, D. S., Marvel, L. H., Regan, M., and May, J. J. (1991). "Occupational Hearing Lossin New York Dairy Far
Lankford, J. E. and Zurales, S. M. (1995). "Hearing Conservation for the Agricultural Community," Proc. Hearing Conservatior
Lankford, J. E., Meinke, D., and Hotopp, M. (1999). "Need for Hearing Loss Prevention for Agricultural Aerial Application Serv
Beckett, W. S., Chamberlain, D., Hallman, E., May, J., Hwang, S., Gomez, M., Eberly, S., Cox, C., and Stark, A. (2000). "Hea
Clark, J. B. (2001). "Acoustic Issues in Human Spaceflight," in Noise Induced Hearing Loss: Basic Mechanisms, Prevention a
McKinley, R. L. and Nixon, C. W. (1998). "Human Auditory Response to an Air Bag Inflation Noise: Has it Been 30 Years?," J
Price, G. R. and Kalb, J. T. (1999). "Auditory Hazard from Airbag Noise Exposure," J. Acoust. Soc. Am. 106(5), 2629-2637.
Rouhana, S. W., Webb, S. R., and Dunn, V. C. (1998). "Investigation into the Noise Assoiated with Airbag Deployment: Part I
Tubbs, R. L. (2004). "NIOSH Health Hazard Evaluation Report: HETA #2002-0354-2931, Horizon Air, Seattle, WA," NIOSH, C
Blackwell, S. B. and Greene, C. R. Jr. (2005). "Underwater and In-Air Sounds from a Small Hovercraft," J. Acoust. Soc. Am. 1
Busch-Vishniac, J., West, J. E., Barnhill, C., Hunter, T., Orellana, D. and Chivukula, R. (2005). "Noise Levels in Johns Hopkin
Burgess, M. and Lai, J. (October 1999). "Noise Management for the Building Industry: Current Practices and Strategies for Im
Pandya, G.H. and Dharmadhikari, D.M. (2002). "A comprehensive investigation of noise exposure in and around an integrated
Schmidek, M. and Carpenter, P. (1974). "Intermittent Noise Exposure and Associated Damage Risk to Hearing of Chain Saw
Berna, B. (2005). "Occupational Noise Exposures Aboard Catcher/Processors in the Pacific Ocean and Bering Sea," Masters
Bowes, S. III and Corn, M. (1990). "Noise Exposure Reduction Aboard an Oceangoing Hopper Dredge," Am. Ind. Hyg. Assoc.
Szczeppanski, C. and Weclawik, Z. (1991). "Exposure of the Crew of a Fishing Factory-Trawler Ship to Noise," Bull. Inst. Mar.
Martinis, V. (1977). "The Noise Exposure Profile and Hearing Levels of Commercial Fishermen," Masters Thesis, University of
Neitzel, R. (2003). "Noise Measurements Made at a Tire Shop, a Concrete Vault Company, and a Sawmill," Univ. of Washing
Internally prepared charts and/or data acquired by second author
Fligor, B., and Cox, L .C. (2004) "Output Levels of Commercially Available Portable Compact Disc Players and the Potential R
Royster, J. D., Royster, L. H., and Killion, M. C. (1991). "Sound Exposures and Hearing Thresholds of Symphony Orchestra M

Lucas, M. (2006). Personal communication re noise measurements in the E-A-R Specialty Composites files, Indianapoli, IN.
EPA (1974). "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate
Hodgetts, W. E. and Liu, R. (2006). "Can Hockey Playoffs Harm Your Hearing?" Canadian Med. Assoc. J. 175(12), 1540-154
Williams, A. L., Drongelen, W. , and Lasky, R. E. (2007). "Noise in contemporary neonatal intensive care," J. Acoust. Soc. Am
Kracht, J. M. Busch-Vishniac, I. J. and West, J. E. (2007). "Noise in operating rooms of Johns Hopkins Hospital," J. Acoust. A
Ames, A, and Akbar-Khanzadeh, F. (2006). "Noise level assessment at certain indoor sport events," Am. Ind. Hgy. Conf. pape
Kardous, CA, Morata,T, and van Campen, LE. (2006). "Occupational and recreational noise exposures at stock car racing circ
Radomskij,P, Schmidt,MA, Heron, CW, and Prasher,D. (2002). "Effect of MRI noise on cochlear function," The Lancet 359, 14
Ozcan,HK and Nemolioglu,S. (2006). "In-cabin noise levels during commercial aircraft flights," Canad. Acoust. 34(4), 31-35.
Zannin, PHT. (2006). "Occupational noise in urban buses," Ind. Ergon. 36, 901-905.
Mirbod,SM, Lanphere,C, Fujita,S, Komura,Y, Inaba, R, and Iwata,H. "Noise in aerobic facilities," Ind. Health 32(1), 49-55.
Mendrygal, M and Roeser, RJ (2007). "Ear canal suctioning: A cautionary note for noise-induced hearing loss," Aud. Today 19
ANSI (2007). "Hearing loss prevention for construction and demolition workers," ANSI/ASSE A10.46-2007.
Nakashima, AM, Borland, MJ, Abel, SM (2007). "Measurement of noise and vibration in Canadian forces armoured vehicles,"
Sutherland, L. (2008). Personal communication based on his extensive work in developing the ANSI S12.60-2002 standard on
Berger, EH (1994). "Too much tunnel noise? Better listen up," Professional Carwashing & Detailing, 18(2), 39-44.
Anon. (2008). "Frisky gibbons served noise 'asbo' for loud sex sessions," ThaiIndian News Aug. 25th, <http://www.thaindian.c
Hempton, G and Grossman, J. (2009). "One square inch of silence: one man's search for natural silence in a noisy world," Fre
Wrege, CW (2008). Personal communication from Historian of the Acad. of Mgmt., re his research on Western Electric facility
Michael, P, Opie, N, and Smith, M (2009). "Noise exposure and convertible cars," paper at 2009 Am. Acad. Otolaryngol. Head
Neitzel, R, Gershon RR, Zeltser M, Canton, A, and Akram M. (2009). "Noise levels associated with New York City's mass tran
Johnson, DW and Perez, AE (1980). "Impact of siren noise on paramedics and on the environment," Nat. Assoc. Noise Contr
Swanepoel, DW, Hall JW III, Koekemoer, D. (2010). "Vuvuzela - good for your team, bad for your ears," S. Afr. Med. J. 100, 9
Flamme, GA, Liebe, K, Wong, A, (2009). "Estimates of the auditory risk from outdoor impulse noise I: Firecrackers," Noise & I
Martin, SA, Leung, A, Pallini, P. (2005). "California off-highway vehicle noise study," Wyle Labs., Inc., Rept. WR 04-31, El Se
Flamme, GA, Wong, A, Liebe, K, and Lynd, J. (2009). "Estimates of auditory risk from outdoor impulse noise II: Civilian firearr
Danielson, RW. (2010). Personal communication from Danielson as Mgr. Audiology and Hearing Conservation, Natl. Space B
Engard, DJ, Sandfort, DR, Gotshall, RW and Brazile, WJ (2010). "Noise exposure, characterization, and comparison of three
de Santis, EM and Gaudet, ML (2010). "Noise levels in pubs and nightclubs in Vancouver," Canad. Acoust. 38(3), 84-85.
Dobson, A and Gastmeier, WJ (2010). "Occupational noise exposure in nightclubs," Canad. Acoust. 38(3), 86-87.
Swanepoel, DW and Hall, JW III(2010). "Football match spectator sound exposure and effect on hearing: A pretest-post-test s

Version 1.1 (changes since 1.0)

1. A registered trademark symbol has now been added on the name, as in Noise Navigator®
2. Formula 1 racing data added
3. Hodgetts' hockey game data added
4. 5/18/07, added operating room and neonatal noise levels from JASA may 2007
5. 6/20/07, added Led Zeppelin concert, and Formula 1 racing re qualifications
6. 7/27/07, added Akbar's data on sporting events
7. 7/30/07, added Kardous' data on stock car racing
8. 8/7/07, added MRI noise and aircraft noise
9. 8/13/07, added general data on\ noise in urban buses
10. 9/5/07, added data on drag car races
11. 10/24/07, added Roeser's data on noise of earcanal suctioning
12. 10/25/07, added 6 new construction noises from ANSI A10.46
13. 11/30/07, added military vehicle noise from Abel paper

Version 1.2

1. two additional hair dryer/blow dryer measurements added wit ref 0
2. added Braun shaver measurement
3. added electric pencil sharpeners, Panasonic models
4. classroom, median background noise level
5. carwash noise levels

Version 1.3

1. deleted rows on references page so numbering was more intuitive

Version 1.35

1. updated all internal citations of references to match new numbers

Version 1.4

1. added gibbons making love
2. various entries from Gordon Hemtpon's book, ref 162, including bell at the Tomb of the Unk
3. references corrected on Weapons+Explosive page; had been shifted by one row

Version 1.5

1. changed company name to 3M
2. hawthone effect sound levels
3. NASCAR at Indy 2009
4. automobile, convertible at 60 mph
5. balloon pop peak SPLs
6. data from Neitzel et al. on subway, train, bus, tram, and ferry noise
7. ambulance driver exposure windows up and down
8. vuvuzela horns re soccer events
9. broadway-style musical, Jersey Boys
10. firecracker data from Flamme at al.
11. motorcycle and ATV results from Wyle rept.
12. gunfire data from Flamme et al. for .30-06, .22, .38, 9mm, and 12. gauge shotgun
13. wet saw for cutting stone
14. NASA info on Shuttle interior noise levels, and updated values on Int. Space Station sleep q
15. Print areas defined for each page
16. football games under both occup. and non-occup.
17. two recent surverys of night clubs in Toronto and Vancouver
18. corrected a few source names for better sorting
19. added data on 1994 Pink Floyd concert and renamed various concert entries for consistency
20. football (soccer) match avg'd over 10 spectators
21. balloon pop peak SPLs, new data added
22. Paul McCartney concert added
23. Space Shuttle and Saturn V launch noise levels

Version 1.6

1. **dental work on children (occupational)**
2. **stock car levels for spectators at three different trackes, ref 182**
3. **scream levels, max possible.**
4. **add 8 military noise spectra**
5. **Super Bowl 2012 noise levels**
6. **Indianapolis baseball game 2012**
7. **Golf club - hitting a driver 2008**
8. **changed tab from weapons+explosive to weapons+impulse**

Version 1.7

1. **added designation of cockpit or cabin to exisiting aircraft data**
2. **added sports officials whistles in occupational**
3. **added hand dryers in public restrooms**
4. **added power washing**
5. **added high-school football game**
6. **add KC chiefs Guiness recording setting football game**
7. **additional football game levels from Dan Gauger**

Version 1.8

1

Material yet to be added

warwick williams, IJA 2005 on PSPs
gasaway aircraft noise compendium, received pdf from theresa on 2/10/06

nown Soldier

uarters

y