

# Citizens for a Livable Boise

DNL<sub>mr</sub> accounts for the surprise effect of aircraft overflights by adding a penalty of 0 to 11 dB based on the onset rate.

- C-Weighted Day-Night Average Sound Level (CDNL) is a day-night average sound level computed for areas subject to impulsive noise such as sonic booms. Areas subjected to supersonic noise are typically also subjected to subsonic noise, which is assessed based on the DNL<sub>mr</sub> metric. Peak overpressure, measured in pounds per square foot, is used to characterize the strength of a single impulsive noise such as a sonic boom.
- Maximum Noise Level (L<sub>max</sub>) is the highest noise level reached during an event, such as an aircraft overflight. Table 3-1 shows maximum sound levels for several representative aircraft at several altitudes in takeoff and landing configuration.

Add 10<sub>as</sub> to include afterburner sound levels to figures shown.

Final June 2012 **Table 3-1. Representative Maximum Sound Levels**

Aircraft (engine type)	Power Setting	Power Unit	L <sub>max</sub> Values (in dBA) At Varying Distances (In Feet)				
			500	1,000	2,000	5,000	10,000
<b>Takeoff/Departure Operations (at 300 knots airspeed)</b>							
F-35A	100%	ETR	124	115.2	105.9	93.5	83.4
F-4C	100%	RPM	117.3	109.7	101.2	88.5	76.9
F-18 E/F	96%	NC	119.7	112.4	104.5	92.4	81.5
A-10A	6200	NF	99.9	91.7	82.2	68.2	57.8
B-1	97.5%	RPM	126.5	118.3	109.9	98.3	88.7
F-15 (P220)	90%	NC	111.4	104.3	96.6	85	74.7
F-16 (P229)	93%	NC	113.7	106.2	98.1	86.1	75.7
F-22	100%	ETR	119.7	112.4	104.6	93	82.9
<b>Landing/Arrival Operations (at 160 knots airspeed)</b>							
F-35A	40%	ETR	101.7	94.8	87.4	76.1	66.2
F-4C	87%	RPM	106.3	99.1	91.3	79.3	68.7
F-18 E/F	84%	NC	113.4	106.2	98.3	86	74.9
A-10A	5225	NF	97	88.9	78.8	60.2	46.4
B-1	90%	RPM	98.8	91.9	84.5	72.8	62
F-15 (P220)	75%	NC	88.5	81.6	74.3	63.2	53.4
F-16 (P229)	83.5%	NC	92.6	85.5	77.8	66.1	55.6
F-22	43%	ETR	111.3	103.9	95.9	83.9	73.1

**Key:** Engine Unit of Power: RPM=Revolutions Per Minute; ETR=Engine Thrust Request; NC=Engine Core RPM; and NF=Engine Fan RPM.

**Source:** SELCalc2 (Flyover Noise Calculator), Using NoiseMap 6/7 and Maximum Omega10 Result as the defaults.

- Sound Exposure Level (SEL) accounts for the maximum sound level and the length of time a sound lasts. SEL does not directly represent the sound level heard at any given time. Rather, it provides a measure of the total sound exposure for an entire event as if it were compressed into a single second. For many types of noise impacts, SEL provides a better measure of intrusiveness of the sound than simply stating the maximum noise level reached during an overflight event. Table 3-2 shows sound exposure levels for

# How to use Table 3.1 “Representative Maximum Sound Levels”

April 7<sup>th</sup>, 2017

## Definitions

Left hand column – Military Aircraft type i.e. A-10, F-15, F-16, F-35, etc.

Lmax – Maximum loudness at full engine throttle, without afterburner, of aircraft at varying distances from the listener. For example, during takeoff at 500 feet: A-10 = 99.9dB, F-15 = 111.4 dB, F-35 = 124dB.

dB – decibel is a unit of sound measurement. For example, 110 dB is the onset of ear pain, 150 dB is eardrum rupture. Every 6 to 10 dB increase doubles the sound level as perceived by the listener.

Engaging afterburner increases thrust by 50% and adds 10 dB to the Lmax loudness levels.

OSHA workplace safety regulations limit cumulative daily worker exposure to sound levels of 110 dB to 89 seconds to avoid permanent hearing damage.

## How to read this table

1. Choose the aircraft you are interested in.
2. Choose the distance you will be from the aircraft. The chart provides Lmax for 500 feet, 1,000 feet, 2,000 feet, 5,000 feet, and 10,000 feet.
3. Read the dB of the aircraft at that distance.
4. Compare to other aircraft at that distance using the 6-to-10 dB doubling rule.
5. Compare the dB number to the table of typical “Noise Sources and Their Effects”