NOISE AND SOUND MEASUREMENT GLOSSARY

APPLICATION NOTE QUEST-002 (US)

Term	Description
Average Sound Level (L_{AV}) or (L_{AVG})	The average sound pressure level over a period of time. If a threshold is used, all samples below the threshold are ignored in the averaging calculations. This may result in low L_{AVG} values in certain scenarios even though the sound level may have been loud during certain times of the sampling period. For example, if the threshold is 90 dB and all the sound sampled was between 75 dBA and 85 dBA, the resulting L_{AVG} will be 0 dBA. Another thing to note is the decibel scale is logarithmic and therefore the sound samples cannot be averaged by summing the samples and dividing by the number of samples.
C-A	It is the result of subtracting an A-weighted L_{AVG} from a simultaneously collected C-weighted L_{AVG}. This measurement is sometimes used in hearing protection selection calculations.
CNEL	Community Noise Equivalent Level. The average equivalent sound level measured over a 24-hour period. Samples taken between 7 p.m. and 10 p.m. are boosted by 5 dB and samples taken between 10 p.m. and 7 a.m. are boosted by 10 dB.
Criterion Curves	Criterion curves are a defined method for specifying the ambient noise in a room or environment as a single number using various bands of octave data. Below are examples of a few different types of criterion curve methods: **Balanced Noise Criterion Curves (NCB)** are one of the newer methods that indicates interference from rumble, rattle, and hiss. They are based on octave data from 16 to 8,000 Hz. **Noise Criterion Curves (NC)** are typically used for measurement of HVAC room or building acoustic comparisons and are based on octave data from 63 to 8,000 Hz. **Noise Rating Curves (NR)** are primarily used in Europe, Australia and other countries for room and building acoustic measurements, HVAC studies, machine noise evaluations and some community noise applications. Noise Rating curves are based on octave data from 31.5 to 8,000 Hz. **Preferred Noise Criterion Curves (PNC)** function similarly to NC curves but include lower frequencies and are based on octave data from 31.5 to 8,000 Hz. **Room Criterion Curves (RC)** calculate a numerical rating based on speech interference and indicate interference such as hissing, rumbling, or vibration. This method was introduced to determine noise in office/room acoustics and is based on octave data from 16 to 8,000 Hz.

Term	Description
Criterion Level	The criterion level is the maximum allowable exposure to accumulated noise. It gives the conditions that result in a 100% dose. The criterion level is typically set by a regulating agency, such as OSHA, and is not usually applicable for community noise monitoring. For example: OSHA mandates the criterion level (maximum allowable accumulated noise exposure) to be 90 dBA for 8 hours. For an 8-hour sample, an average level (L_{AVG}) of 90 dBA will result in 100% dose.
Criterion Time	At the criterion level, this is the time period over which the resulting dose is 100%. The criterion time is typically 8 hours.
Daily Personal Noise Exposure ($L_{EP,\,d}$ or $L_{EX,\,8h}$)	The average sound level measured with the following conditions applied: an assumed sampling time of 8 hours, a 3 dB exchange rate, no threshold, and an A-weighting. This is a term commonly used in Europe.
Datalogging	This is the saving of the measurement data that is collected. Datalogging instruments typically save data at fixed time intervals. The measurements can later be viewed on the instrument or in a software program.
Decibel (dB)	The decibel scale is used to describe the sound pressure level, i.e. how quiet or loud a sound is. 0 dB is considered the average threshold of hearing. A whisper is about 20 dB. A normal conversation is typically from 60 to 70 dB, and a noisy factory ranges from 90 to 100 dB.
Dose	Describes the worker's noise exposure as a percentage of the daily maximum allowable exposure. A daily maximum allowable exposure is equal to 100%.
Dynamic Range	The difference between the low end and high end measurement range of an instrument. For example, if an instrument has a measurement range of 50 to 140 dB the dynamic range would be 90 dB.
Equivalent Continuous Sound Level (L_{eq})	The average sound pressure level over a period of time with the following conditions applied: no threshold and an exchange rate of 3 dB.
Exceedance Level (Ln)	Exceedance levels represent the percent of the run time that was spent above a certain decibel level. For example, an L40 equal to 73 dB means that for 40% of the run time, the decibel level was higher than 73 dB.
Exchange Rate (Doubling Rate)	A value, typically 3 or 5 dB, that is sometimes referred to as the doubling rate. An increase in the average sound level by the exchange rate will result in a mandatory halving of the allowable exposure time. For example: Assume that the allowable exposure time is 8 hours when L_{AVG} = 90 dBA. If an exchange rate of 5 dB is used, the allowable exposure time will be 4 hours when L_{AVG} = 95 dBA.

Term	Description
Frequency Weighting (A, C, Z)	A noise dosimeter and sound level meter setting. The frequency weighting weights the sound levels differently depending on which frequency the sound is. **A-weighting** is the most commonly used RMS weighting for occupational noise exposure measurements. A-weighting approximates the response of the human ear to different frequencies at low sound pressure levels. It imitates how the human ear is less sensitive to lower and higher frequency sounds. **C-weighting** is sometimes used as a peak weighting for peak noise measurements. It approximates the ears response to sound at high sound pressure levels. **Z-weighting** is sometimes used as a peak weighting for peak noise measurements. It is nearly a 'flat' weighting - little to no weighting is applied to the measurements, depending on the frequency.
Hertz (Hz)	The SI unit for frequency. This is the unit used for sound frequency measurements. 1 Hertz is equal to one cycle per second.
L_{AVG}	See "Average Sound Level"
L_{eq}	See "Equivalent Continuous Sound Level"
L_{Mn}	The minimum sound pressure level. This is the lowest sound pressure level measured over a time interval when the frequency weighting and time response of the meter are utilized.
L_{Mx}	The maximum sound pressure level. This is the highest sound pressure level measured over a time interval when the frequency weighting and time response of the meter are utilized.
L_{Pk}	The peak sound pressure level. This is the highest sound pressure level value measured over a time interval. This measurement utilizes the frequency response setting of the meter but not the time response setting of the meter.
Level Day Night (LDN)	This measurement is a 24-hour average sound level where 10 dB is added to all of the readings that occur between 10 p.m. and 7 a.m. This is primarily used in community noise regulations where there is a 10 dB "penalty" for nighttime noise. Typically, LDN's are measured using an A-weighting, a 3 dB exchange rate, and no threshold.
Noise	Unwanted sound.
Octave Band Analysis	Octave band analysis is a process where the sound is broken down or filtered into specific frequency bands to help identify the frequency content of the sound. Octave band analyzers often present single (full) octaves and/or fractional (one-third) octave band results.
Octave Band	A 1/1 octave band is a frequency range where the highest frequency is twice that of the lowest frequency. A 1/3 octave band is a frequency range where the highest frequency is 1.26 times that of the lowest frequency.

Term	Description
Overload	A situation that occurs when an instrument is exposed to levels of sound higher than its measurement range. An overload indication (OL) will appear on the display when an overload has occurred. Many datalogging units also show the percentage of time that an overload occurred over the measurement period (OL %) in the downloaded data.
Pascal (Pa)	A unit of pressure equal to 1 Newton per square meter. Sound is a pressure wave and is measured in Pascals. Human hearing spans a wide range of sound pressure values. In order to make sound pressure level measurement values simpler to work with, a formula is used to convert Pascals to Decibels.
Reference Pressure	The sound pressure at the threshold of human hearing, as measured under standard conditions. The generally accepted magnitude of this pressure is 20 micropascals. 0 dB is equal to 20 micropascals.
Reverberation Time (RT60)	A measurement used to evaluate sound decay in a specified space, tailored to speech or music. RT60 reports the amount of time it takes the sound in each octave band to decay by 60 dB. For room acoustics RT60 results are used to ensure quality sound is evenly dispersed throughout the room.
Sound Exposure Level (SEL) or (L_{AE})	A sound level average with the integration period normalized to 1 second. For example, if a user measured the sound pressure levels over a 10-minute period, the SEL would average the data over 1 second. SEL is typically determined with the following settings applied: a 3 dB exchange rate, slow time response, and no threshold. An A-weighted SEL measurement is denoted as L_{AE}.
STIPA (Speech Transmission Index for Public Address)	This is a test used to help evaluate if people are likely to understand instructions or announcements given over a public address or alarm system. This method measures an artificial speech signal played over a public address system. The measured octave band data is quantified into a single value rating ranging from 0.0 to 1.0 with a description of either Bad, Poor, Fair, Good or Excellent.
Time Response: Slow (S), Fast (F), and Impulse (I)	A noise dosimeter and sound level meter setting that describes how quickly the instrument will respond to varying sound levels. The time constants for slow, fast, and impulse are 1 second, 0.125 seconds, and 35 milliseconds, respectively. Slow time response is typically used in occupational noise exposure measurements.
Threshold	The sound pressure level for which all values below it are assumed to have no sound energy. For example, if the threshold is 80 dB, samples below 80 dB will be ignored in certain exposure calculations. The following example explains how the threshold affects the L_{AVG} calculations. Assume an 8-hour noise study was run using a threshold of 80 dB and the sound pressure level was below the threshold for 3 hours. The sound energy from the samples below 80 dB will be ignored in the L_{AVG} calculations. Although the sound energy will be ignored for the 3 hours of samples below the threshold, the sound pressure level will be averaged over the 8-hour run time.

Term	Description
Time-Weighted Average (TWA) or (L_{TWA})	A sound pressure level average with an assumed run time of 8 hours. For example, if a user measured the sound pressure levels over a 10-hour period, the TWA would average the data over 8 hours. L_{AVG} and TWA are equal when the run time is 8 hours.
Upper Limit (UL)	The total time during a study that the sound pressure level equals or exceeds a user-set level (the Upper Limit value). For example, if the Upper Limit value is 115 dB and the sound pressure level equaled or exceeded 115 dB for a total of 1 minute and 2 seconds, the Edge would display UL_{115} = 00:01:02.
Windscreen	A covering for a microphone that reduces disturbances caused by wind and direct contact with other surfaces.

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