Publication NPC-101

Technical Definitions

1.   Technical Terminology and Standards
       The following terminology and standards shall be used for the purposes of any Noise Control By-Law enacted pursuant to The Environmental Protection Act and all Publications of the Noise Pollution Control Section of the Pollution Control Branch of the Ministry of the Environment. The definition of any technical word used in such By-Law or this or any such Publication and not herein defined shall be the definition appearing in the applicable Publication of the Canadian Standards Association (CSA), the American National Standards Institute (ANSI), the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the Society of Automotive Engineers (SAE), or the Machinery and Equipment Manufacturers Association of Canada (MEMAC):

       (1)   Acoustic Calibrator
               An "Acoustic Calibrator" is an electro-mechanical or mechanical device intended for the calibration of sound level meters and meeting the specifications of Publication NPC-102 - Instrumentation, for Acoustic Calibrators.

       (2)   A-Weighting
               "A-weighting" is the frequency weighting characteristic as specified in IEC 123 or IEC 179 and intended to approximate the relative sensitivity of the normal human ear to different frequencies (pitches) of sound.

       (3)   A-weighted Sound Pressure Level
               The "A-weighted sound pressure level" is the sound pressure level modified by application of the A-weighting. It is measured in decibels, A-weighted, and denoted dBA.

       (4)   Beating
               "Beating" is the characteristic of a sound which has an audible cyclically varying sound level, caused by the interaction of two sounds of almost the same frequency.

       (5)   Buzzing Sounds
               A "buzzing sound" is a sound which is characterized the presence of a large number of related discrete harmonics in its frequency spectrum. These harmonics together with the fundamental frequency produce a sound which subjectively is termed a "buzz". Examples are sounds from a buzzer or a chain saw.

(6)   Decibel
The "decibel" is a dimensionless measure of sound level or sound pressure level; see sound pressure level.

(7)   Effective Sound Pressure
The "effective sound pressure" at a point is the root-mean square value of the instantaneous sound pressure, over a time interval, at the point under consideration as detected with a sound level meter meeting the requirements of Publication NPC-102 - Instrumentation.

(8)   Equivalent Sound Level
The "equivalent sound level" sometimes denoted L_{eq}, is the value of the constant sound level which would result in exposure to the same total A-weighted energy as would the specified time-varying sound, if the constant sound level persisted over an equal time interval. It is measured in dBA.

The mathematical definition of equivalent sound level (L_{eq}) for an interval defined as occupying the period between two points in time t_1 and t_2 is:

$$L_{eq} = 10 \log_{10} \frac{1}{t_2 - t_1} \int_{t_1}^{t_2} \frac{p^2(t)}{p_r^2} \, dt$$

where p(t) is the time varying A-weighted sound pressure and P_r is the reference pressure of 20 µPa.

(9)   Fast Response
"Fast response" is a dynamic characteristic setting of a sound level meter meeting the applicable specifications of Publication NPC-102 - Instrumentation.

(10)   Frequency
The "frequency" of a periodic quantity is the number of times that the quantity repeats itself in a unit interval of time. The unit of measurement is hertz (Hz) which is the same as cycles per second.

(11)   General Purpose Sound Level Meter
A "General Purpose Sound Level Meter" is a sound level meter which meets the specifications of Publication NPC-102 - Instrumentation, for General Purpose Sound Level Meters.

(12)   Impulse Response
"Impulse response" is a dynamic characteristic setting of a sound level meter meeting the specifications of Publication NPC-102 - Instrumentation, for Impulse Sound Level Meters.

(13)   Impulsive Sound
An "impulsive sound" is a single pressure pulse or a single burst of pressure pulses, as defined by IEC I79A, First supplement to IEC 179, Sections 3.1 and 3.2.

(14)   Impulse Sound Level
The "impulse sound level" is the sound level of an impulsive sound as measured with an Impulse Sound Level Meter set to impulse response, It is measured in A-weighted decibels, denoted dBAI.

(15)   Impulse Sound Level Meter
An "Impulse Sound Level Meter" is a sound level meter which meets the specifications of Publication NPC-102 - Instrumentation, for Impulse Sound Level Meters.

(16)   Integrating Sound Level Meter
An "Integrating Sound Level Meter" is a sound level meter which is capable of being used to derive the equivalent sound level (L_{eq}) and which meets the specifications of Publication NPC-102 - Instrumentation, for Type B Integrating Sound Level Meters.

(17)   Logarithmic Mean Impulse Sound Level
The "Logarithmic Mean Impulse Sound Level", sometimes denoted L_{LM} of N impulsive sounds, is ten times the logarithm to the base 10 of the arithmetic mean of ten to the power of one tenth the impulse sound level of each impulsive sound.

Algebraically, it can be written as:

$$L_{LM} = 10 \log_{10}\left[\frac{1}{N} \left(10^{dBAI_1/10} + 10^{dBAI_2/10} \ldots + 10^{dBAI_N/10} \right) \right]$$

where, $dBAI_1$, $dBAI_2$, $dBAI_N$ are the N impulse sound levels.

(18)   Overpressure

The "overpressure" at a point due to an acoustic disturbance is the instantaneous difference at that point between the peak pressure during the disturbance and the ambient atmospheric pressure. The unit of measurement is the pascal. One pascal, abbreviated Pa, is the same as one newton per square metre, abbreviated N/m^2.

(19)   Overpressure Level

The "overpressure level" is twenty times the logarithm to the base 10 of the ratio of the peak pressure to the reference pressure of 20 μPa.

(20)   Peak Particle Velocity

The "peak particle velocity" is the maximum instantaneous velocity experienced by the particles of a medium when set into transient vibratory motion. This can be derived as the magnitude of the vector sum of three orthogonal components and is measured in cm/s.

(21)   Peak Pressure Level Detector

A "Peak Pressure Level Detector" is a device capable of measuring peak pressure or pressure level perturbations in air and which meets the specifications of Publication NPC-102 - Instrumentation, for Peak Pressure Level Detectors,

(22)   Percentile Sound Level

The "x percentile sound level", designated L_x, is the sound level exceeded x percent of a specified time period, It is measured in dBA.

(23)   Quasi-Steady Impulsive Sound

"Quasi-Steady Impulsive Sound" is a sequence of impulsive sounds emitted from the same source, having a time interval of less than 0.5 s between successive impulsive sounds.

(24)   Slow Response

"slow response" is a dynamic characteristic setting of a sound level meter meeting the applicable specifications of Publication NPC-102 - Instrumentation.

(25)   Sound

"sound" is an oscillation in pressure, stress, particle displacement or particle velocity, in a medium with internal forces (e.g. elastic, viscous), or the superposition of such propagated oscillations, which may cause an auditory sensation.

(26)   Sound Level
"sound level" is the A-weighted sound pressure level.

(27)   Sound Level Meter
A "sound level meter" is an instrument which is sensitive to and calibrated for the measurement of sound.

(28)   Sound Pressure
The "sound pressure" is the instantaneous difference between the actual pressure and the average or barometric pressure at a given location. The unit of measurement is the micropascal (μPa) which is the same as a micronewton per square metre ($μN/m^2$).

(29)   Sound Pressure Level
The "sound pressure level" is twenty times the logarithm to the base 10 of the ratio of the effective pressure (p) of a sound to the reference pressure (P_r) of 20 μPa. Thus the sound pressure level in dB = $20 \log_{IO} P/Pr$

(30)   Tonality
A "tone" or a "tonal sound" is any sound which can be distinctly identified through the sensation of pitch.

(31)   Vibration
"vibration" is a temporal and spatial oscillation of displacement, velocity or acceleration in a solid medium.

(32)   Vibration Velocity Detector
A "Vibration Velocity Detector" is a device which is capable of measuring vibration velocity and which meets the specifications of Publication NPC-102 - Instrumentation, for Vibration Velocity Detectors.