ACOUSTICS GLOSSARY

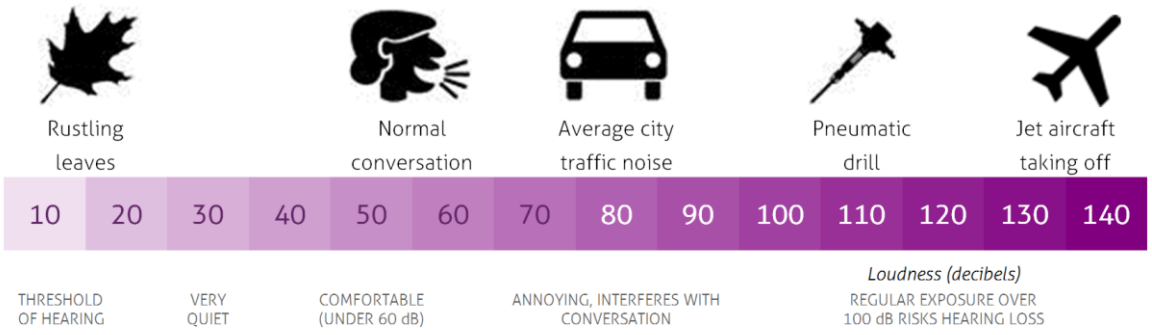
Noise

There is a ten million to one ratio between the threshold of hearing and the highest tolerable sound pressure. Noise is therefore measured using a logarithmic scale, to account for this wide range, called the decibel (dB). Noise is defined as unwanted sound and the range of audible sound varies from around 0 dB to 140 dB.

The human ear is capable of detecting sound over a range of frequencies from around 20 Hz to 20 kHz, however its response varies depending on the frequency and is most sensitive to sounds in the mid frequency range of 1 kHz to 5 kHz. Instrumentation used to measure noise is therefore weighted across the frequency bands to represent the sensitivity of the ear. This is called 'A weighting' and is represented as dB(A). 'C weighting' represented as dB(C) is also used which is a more linear weighting.

It is generally accepted that under normal conditions humans are capable of detecting changes in steady noise levels of 3 dB, whilst a change of 10 dB is perceived as a doubling or halving of the noise level. An indication of the range of noise levels commonly found in the environment is given below.

Figure A1: Typical noise levels



A number of different indices are used to describe the fluctuations in noise level over certain time periods. See acoustic parameters below.

$L_{A90,T}$	This is the noise level exceeded for 90% of the measurement period and provides a measurement of the quieter 'lull' periods in between noise events. It is often referred to as the background noise level.
$L_{Aeq,T}$	This is the "equivalent continuous A weighted sound pressure level" and is the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of noise in the environment, which can be referred to as the ambient noise.
$L_{Amax,F}$	This is the maximum sound pressure level measured in a given time period with the sound level meter set to 'fast' response.

Reference is often made to acoustic measurements being undertaken in 'free-field' or 'façade' locations. Free-field measurements represent a location away from vertical reflecting surfaces, normally by at least 3.5 metres. A façade measurement is undertaken, or calculated to a position 1 metre from an external façade and a correction of up to 3 dB can be applied to account for the sound reflected from the façade. This latter position is often used when assessing the impact of external noise affecting residents inside properties.

Acoustic Parameters and Definitions

$D_{nT,w}$	Weighted normalised sound level difference. A single-number rating of the room-to-room sound insulation of a separating construction as installed on site. The higher the value, the better the result
R_w	Weighted sound reduction index. A single-figure quantity which characterises the airborne sound insulating properties of a material or element over a range of frequencies. Used to quantify the maximum sound insulation performance of a construction element when tested under laboratory conditions.
C / C_{tr}	A-weighted spectrum adaptation term, taking account of pink noise or road traffic, respectively. This is term is added to single-number ratings (i.e. R_w or $D_{nT,w}$) to take account of characteristics of a particular sound spectrum (C for pink, C_{tr} for traffic noise).
$L_{nT,w}$	Weighted normalised impact sound pressure level. A single number rating of the room-to-room impact sound insulation of a separating construction. As this is a sound pressure level, measured with a calibrated impact source, the lower the value, the better the result (as opposed to airborne sound insulation, where the higher the value, the better the performance).
ΔL_w	Reduction in weighted normalised impact sound pressure level. Generally used to measure the effectiveness of a resilient layer.
NR	Noise Rating Level – single figure rating used to quantify indoor ambient noise levels, usually building services noise.
$L_{Aeq,T}$	"Equivalent continuous A weighted sound pressure level" - the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of noise in the environment, which can be referred to as the ambient noise.
$L_{A90,T}$	Noise level exceeded for 90% of the measurement period - provides a measurement of the quieter 'lull' periods in between noise events. It is often referred to as the background noise level.
$L_{Amax,F}$	This is the maximum sound pressure level measured in a given time period with the sound level meter set to 'fast' response.
L_{IA}	A-weighted sound intensity level due to rainfall on tested construction element (in accordance with BS EN ISO 140-18).
Reverberation rime (RT_{60})	The time for the sound pressure level in a room to decrease by 60 dB after the sound source has stopped.
Speech Transmission Index, STI	Measure of objective speech intelligibility of a transmission channel (such as a speaker in a room). Value between 0 and 1, with 0 indicating perfect privacy and 1 indicating perfect intelligibility.
SPP	Speech Privacy Potential. Sum of noise level plus sound insulation level difference across a partition.
Sound Absorption Class	A classification system applied to materials to describe the level of sound absorption they provide (generally ranging between Class A to D). Determined by comparing the practical sound absorption coefficient of the material with the values given in BS EN ISO 11654:1997.
STC	Sound Transmission Class, American metric indicative of the sound insulation of a building element. It is sometimes considered equivalent to R_w, mostly used in Europe.
T_{mf}	Mid-frequency reverberation time. arithmetic average of the T_{30} reverberation times in the 500 Hz, 1 kHz and 2 kHz octave bands.
T_{30}	Reverberation time, based on the first 30 dB of the sound decay curve (-5 dB to -35 dB from the initial sound level).