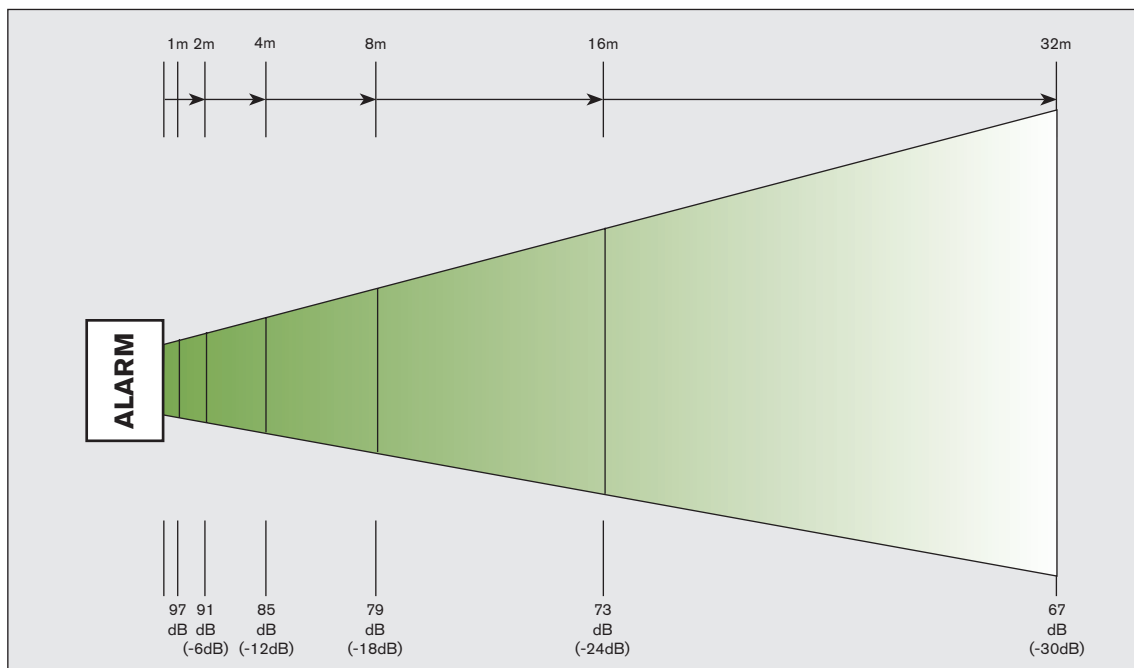


The Basics of Sound - What is a Decibel?

As the human ear detects sound on such an enormous dynamic range, it is more convenient to measure sound levels on a log scale – the decibel (dB). The ‘threshold of audibility’ is defined as 0dB, and the ‘threshold of pain’ is around 130dB. On this scale, daytime background (ambient) noise in the countryside is about 45dB(A) and the background¹ noise in a busy high street is about 65dB(A). A pneumatic ‘jack-hammer’ generates around 100/110dB(A) @ 1m.

Four factors should be taken into account when deciding how loud an audible warning should be.

1. DIN 33404 defines 10dB as the minimum difference for unequivocal audibility.
2. Sound volume falls by 6dB for every doubling in distance from a point source². See diagram for an example of a reversing bleeper producing 97dB @ 1m. (i.e. a reading of 97dB measured 1 metre from the alarm).
3. The human ear does not detect all frequencies equally. The A weighted decibel measurement allows for the non uniform frequency response of the ear, and most audible warning alarm manufacturers quote performance figures in dB(A) @ 1m.
4. Each 10dB increase in output is equivalent to a perceived doubling of volume³.



Notes:

1. Background noise is measured as a general level and therefore should be at a distance from all noise sources such that an average level is received (and no one source dominates).
2. A point source is defined as a source which is small in relation to the distance from the receiver (eg a reversing alarm)
3. This is a subjective measure – using real subjects. A measured increase of 3dB is just noticeable whereas an increase of 10dB is judged by most people as a doubling of loudness.

