

Q is the directivity factor of the sound source

R is the room constant

Example:

$$\text{loss} \\ (4') = 10 \log \left[\frac{6}{4\pi(4)^2} \frac{4}{1000} \right] = -14.71 \text{ dB}$$

$$\text{loss} \\ (40') = 10 \log \left[\frac{6}{4\pi(40)^2} \frac{4}{1000} \right] = -23.67 \text{ dB}$$

The difference is $23.67 - 14.71 = 8.96$ dB-SPL

Outdoors, the formula for the inverse square law is as follows:

loss in dB-SPL at the measurement point, $r = 20 \log \frac{r}{r_1}$

where:
r is the distance to the measurement point

r₁ is the measured reference distance

APPENDIX 1-1

Low frequency dispersion control.

At lower frequencies sound is dispersed in a very wide pattern. This is because the cone of the transducer is small in comparison to the wavelength of the low frequencies being reproduced. The approximate wavelength of a frequency in feet can be achieved by using this simple formula:

$$\text{wavelength} = \frac{1130'}{\text{frequency}}$$

example:
wavelength of 250 Hz = $\frac{1130'}{250 \text{ Hz}} = 4.52'$

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