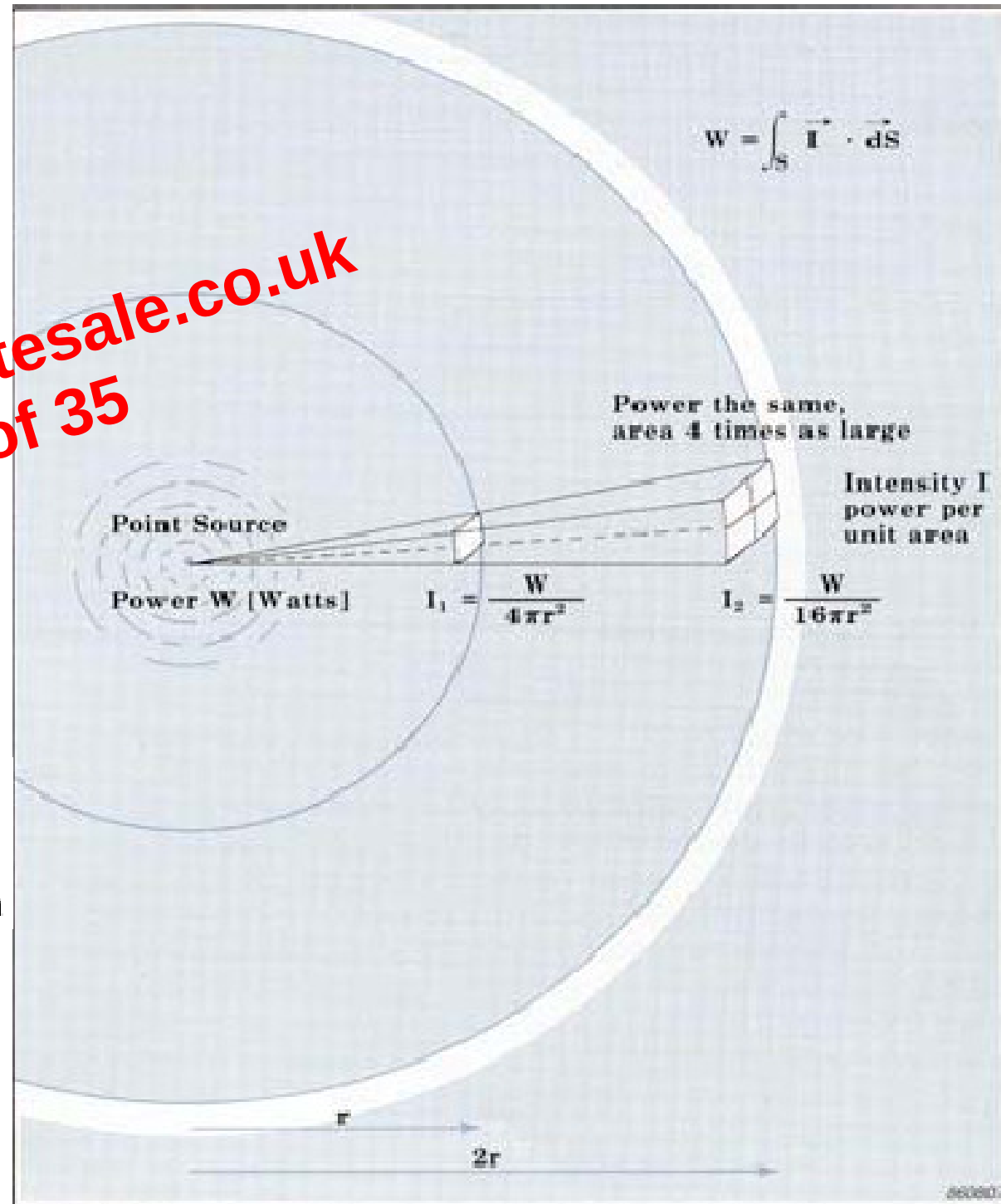


SOUND MEASUREMENT

- Provides definite quantities that describe and rate sound
- Permit precise, scientific analysis of annoying sound (objective means for comparison)
- Help Estimate Damage to Hearing
- Powerful diagnostic tool for noise reduction program: Airports, Factories, Homes, Recording studios, Highways, etc.

Preview from Notesale.co.uk
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Sound Intensity



Intensity = Pressure x Particle Velocity

$$= \frac{\text{Force}}{\text{Area}} \times \frac{\text{Distance}}{\text{Time}} = \frac{\text{Energy}}{\text{Area} \times \text{Time}} = \frac{\text{Power}}{\text{Area}}$$

INTENSITY RANGE

SOURCE	INTENSITY	INTENSITY LEVEL
Threshold of Hearing (TOH)	$1 \times 10^{-12} \text{ W/m}^2$	0 dB
Rustling Leaves	$1 \times 10^{-11} \text{ W/m}^2$	10 dB
Whisper	$1 \times 10^{-10} \text{ W/m}^2$	20 dB
Normal Conversation	$1 \times 10^{-6} \text{ W/m}^2$	60 dB
Busy Street Traffic	$1 \times 10^{-5} \text{ W/m}^2$	70 dB
Vacuum Cleaner	$1 \times 10^{-4} \text{ W/m}^2$	80 dB
Large Orchestra	$6.3 \times 10^{-3} \text{ W/m}^2$	98 dB
Walkman at Maximum Level	$1 \times 10^{-2} \text{ W/m}^2$	100 dB
Front Rows of Rock Concert	$1 \times 10^{-1} \text{ W/m}^2$	110 dB
Threshold of Pain	$1 \times 10^1 \text{ W/m}^2$	130 dB
Military Jet Takeoff	$1 \times 10^2 \text{ W/m}^2$	140 dB
Instant Perforation of Eardrum	$1 \times 10^4 \text{ W/m}^2$	160 dB

NOTE : The large range of associated intensity is one of the reasons we need alternate scale

SOUND BITS

Unless there is a 3 dB difference in SPL, human beings can not distinguish the difference in the sound

Sound is perceived as doubled in its loudness when there is 10dB difference in the SPL.

(Remember 6dB change represents doubling of sound pressure!!)

Ear is not equally sensitive at all frequencies:

highly sensitive at frequencies between 2kHz to 5kHz

less at other freq.

This sensitivity dependence on frequency is also dependent on SPL

NOTE: HUMAN EAR IS “LESS SENSITIVE IN LOWER FREQUENCIES”.

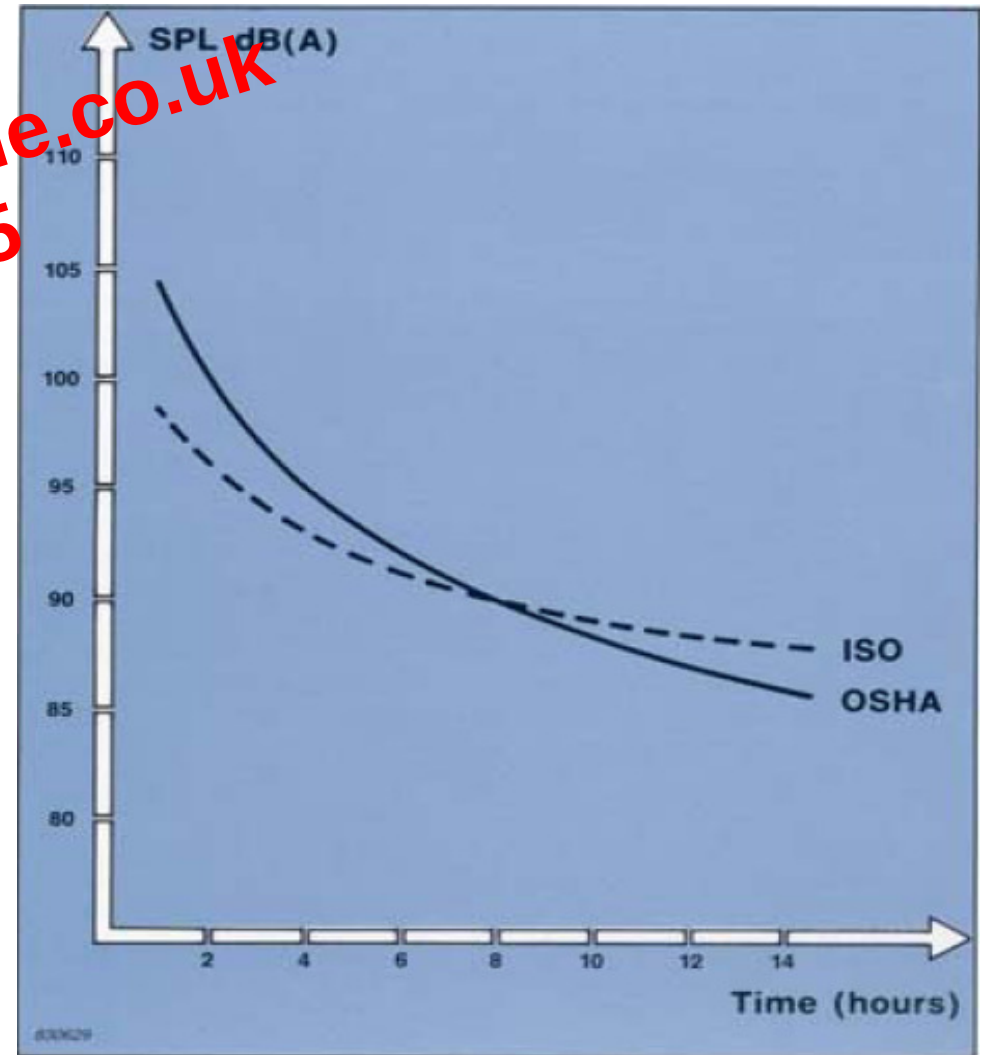
Noise Dose Meters display Noise Exposure Measurements

Regulations:

Basis of 90dB for 8hr a day.

ISO(1999): Increase in SPL from 90 to 93dB, must reduce time of exposure from 8 to 4 hours

OSHA: with every 5dB increase, reduce exposure by half



OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION