

Introduction

The human ear is capable of responding to a wide range of noise levels from low frequencies (ie notes) up to very high frequencies. This capability will be reduced with:

- Age
- Exposure to unacceptably high levels of noise for long enough periods.

This document tells you about the effects and what can be done towards preventing them

What are the effects?

Without getting too scientific, there are two effects:

- Short term decrease in hearing, from which you make a full recovery. For example, life sounds quieter when you leave a room where loud music has been played, but you are back to normal in the morning.
- Permanent decrease in hearing

Obviously, the latter is the greater concern.

What causes permanent loss?

Hearing loss is caused by the combination of noise level and the time we are exposed to that noise. Up to a certain level, we can cope with high levels of noise for a short period. On the other hand, lower levels of noise for long periods may be more harmful.

How can it be prevented?

Hearing loss can be prevented by:

- Reduction of the level of noise at source
- Use of hearing protection
- Reduction of the time exposed to the noise.

It is important to realise that the best prevention route is to reduce or contain the noise where it is being generated, rather than by the other two steps.

What can, or must, I do?

What you **must** do:

Where devices have been supplied to contain the noise at source, (acoustic hoods, booths, etc.) you must use these devices.

When the $L_{EP,d}$ (see below) is at, or above 85 dB(A), you must wear hearing protection. Your employer is empowered to insist on this.

What you **may** do:

When the $L_{EP,d}$ (see below) is between 80 and 84 dB(A) you have the choice of whether or not to wear hearing protection. You are strongly advised to do so.

What can, or must, the employer do?

The employer must take all reasonably practical measures to reduce noise.

Where there is reason to suspect that noise levels are above 80 dB(A)¹, the employer must carry out an assessment. If this shows that the $L_{EP,d}$ is between 80¹ and 84 dB(A)¹, he must provide hearing protection, information and advice to those who may be affected, but he cannot insist on protection being worn.

Where the $L_{EP,d}$ is 85 dB(A)¹ or above, he **must** insist on hearing protection on being worn. However, as with any risk, the employer may chose to impose this requirement when the $L_{EP,d}$ is below 85 dB(A)¹.

In addition, there are requirements to post signs in the areas where noise is excessive.

Noise and how it is measured

Because we can hear such a large range of sound levels, sound is measured by a logarithmic scale called decibels or dB for short. The human ear responds in different ways to different frequencies, so sound levels are normally adjusted to mimic the ear's response. This is then called dB(A).

Example	dB(A)
Library	35
Office	65
Street traffic	85
Pneumatic road drill	100

This is a logarithmic scale and because of this, a change of 3dB(A) means either a doubling or halving of the noise level. Therefore, a change from 86 dB(A) to 83 dB(A) doesn't seem much but the noise is actually half what it was. Were we to lower it to 80 dB(A) then it would be a quarter of the level at 86 dB(A).

What are the problem levels?

Problems occur with unacceptable combination of noise level and time.

This combination is called a daily personal noise exposure or "dose" and is given the term $L_{EP,d}$.

An $L_{EP,d}$ of 85 means that the noise dose is the same as that from a constant 85 dB(A) for 8 hours. If you know the noise level and duration, you can look up the $L_{EP,d}$ in a chart.

For example, 4 hours at 88 dB(A) gives an $L_{EP,d}$ of 86 dB(A). In other words, 4 hours at 88 dB(A) has the same effect on you as 86 dB(A) for 8 hours.

When it comes to durations at different levels, you cannot simply average the readings. So 4 hours at 85 dB(A) and 4 hours at 75 dB(A) is not the same as 80 dB(A) for 8 hours. We have to use calculations or charts to work this out.

The Control of Noise at Work Regulations 2005 identifies noise doses of 80 dB(A) and 85 dB(A) as action points.

Legal Requirements

The Control of Noise at Work Regulations 2005 list a number of obligations:

These define the obligations on the employer and employee as summarised above.

In addition, the Health and Safety at Work, etc., Act 1974 states that:

- The employer must take reasonably practical steps to control risk
- The employee must co-operate with the employer with regard to these steps,
- Nobody shall intentionally or recklessly interfere with anything which the employer has provided to control risks.

Noise Control Measures

The best control measure is to stop the noise at its source, say by replacing worn machine parts that generate noise, or to use air nozzles which are designed to emit lower noise levels.

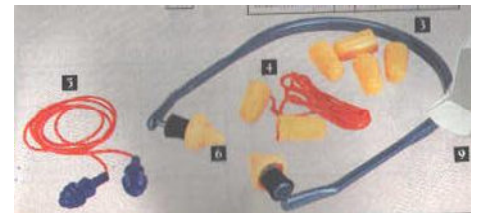
Where this is not feasible, then the next option is to house the noisy equipment in an acoustic enclosure and/or prevent the transmission of the noise through the structure by the use of rubber feet, etc. People working on processes where such devices have been fitted must ensure that enclosures are shut when the machine is running.

This picture shows typical measures to contain noise at its source on a buckle folder.

It comprises a hinged hood and sliding backplate. Using both of these typically reduces the noise by 3 dB(A), but if the backplate is left off, there is little reduction. Awkward though it may be, you must replace the backplate.



Where the above control measures not feasible, then hearing protection is an alternative.



Hearing protection can take the form of ear muffs (shown left) which fit over the ear or plugs (shown right) which fit in the ear. When properly fitted, the protection of plugs is better but the main criterion is personal preference.

Hearing protection is available through your supervisor. Follow these simple rules:

- Do not wear ear muffs if you have long hair covering the ears, thick framed glasses or large ear-rings. These reduce the effectiveness of the protection.
- Ensure than ear plugs fit snugly in the ear and do not leave gaps. Mould them to your ear, if possible.
- For hygiene reasons, do not share hearing protection.
- Report defects in hearing protectors to your supervisor