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Occupational Noise Assessment

GLOSSARY OF TERMS USED

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Control of Noise at Work Regulations 2007

Under Section 8(2)(d) of the Safety, Health & Welfare at Work Act 2005, an employer has to ensure, so far as is reasonably practicable, the safety and prevention of risk to health at work of his or her employees relating to the exposure to noise.

The *General Principles of Prevention* in Schedule 3 of the Act and the *Safety, Health & Welfare at Work (General Applications) Regulations, 2007, Part 5, Chapter 1 (Control of Noise at Work)*, put an onus on the employer, so far as is reasonably practicable, to eliminate the risk from exposure to noise at source or reduce it to a minimum.

A competent person must assess noise exposure in the workplace, and if certain levels are exceeded, the employer must take additional measures. These levels are called '*Exposure Action Values*' and '*Exposure Limit Values*'.

Glossary of Terms

Noise - dB

Noise is any audible sound and is measured in decibels (dB).

Noise Survey

The survey of noise levels at specified locations, operator positions or within areas, before completing a full noise assessment.

Noise Assessment

The determination of the noise exposure of a person or a group of people exposed to high noise levels, so that action can be taken to manage and control the noise to prevent or minimise the risk to hearing damage.

A-weighting, dB(A)

The A-weighting is a standard electronic filter designed to mimic the response of the human ear to noise. The ear is not equally sensitive to sound at all frequencies and is most sensitive to noise frequencies in the middle of the audible range and its sensitivity falls at low and very high frequencies. This performance characteristic is closely associated with vulnerability to damage from high noise levels. Noise at frequencies to which the ear is most sensitive is most likely to cause damage.

C-weighting, dB(C)

The weighting of audible frequencies often used for the measurement of peak sound pressure level. As the noise level increases, the ear is better able to hear low and high frequency sounds. The C-weighting has an almost flat (or linear) response across the audible frequency range, so it is better than the A-weighting to represent high noise levels for peak noise measurements.

Peak Sound Pressure (P_{peak}) dB(C)

Means the maximum value of the C frequency weighted instantaneous sound pressure level.

Sound Pressure Level

It is the instantaneous noise level displayed by the Sound Level Meter in real time. It can be used to assess steady noise, but cannot be used to assess the risk to hearing if the noise is impulsive or changes with time.

Equivalent Continuous Noise Level, L_{eq}

This measurement must be used if the noise is impulsive or changes with time and it gives the same total sound energy over the measurement period as the fluctuating noise. It is the total sound energy received by an employee in a working day which determines the level of risk of hearing damage.

Daily Personal Noise Exposure, $L_{EX, 8hr}$ or $L_{ep,d}$

A measure of the average noise energy a person is exposed to in a working day and is directly related to the risk of hearing damage. It is of particular importance as the measurement will be above or below certain action values and limits in the Control of Noise at Work Regulations 2007 which in turn requires the employer to take certain actions.

Lower Exposure Action Value – 80dB(A) $L_{EX, 8hr}$ or 135dB(C)

If the level of 80dB(A) daily noise exposure ($L_{EX, 8hr}$) or peak sound pressure of 135dB(C) is exceeded (irrespective of any attenuation effect of individual hearing protectors), the Regulations require the employer to take specific actions to reduce the risk to employees.

The Regulations require that:

- Suitable and sufficient information is provided to employees and/or their representatives relating to risks resulting from the exposure to noise.
- Suitable personal hearing protection is provided for use by employees.
- Training in the use of hearing protection is given to employees.
- Hearing checks are made available to employees.

Upper Exposure Action Value – 85dB(A) $L_{EX, 8hr}$ or 137dB(C)

If the level of 85dB(A) daily noise exposure ($L_{EX, 8hr}$) or peak sound pressure of 137dB(C) is exceeded (irrespective of any attenuation effect of individual hearing protectors), the Regulations require the employer to take specific actions to reduce the risk to employees.

The Regulations require (in addition to the *Lower Exposure Action Value* obligations) that:

- Appropriate mandatory warning signs are displayed to indicate that the noise at the workstation is likely to exceed the *Upper Exposure Action Value*, and that hearing protectors are available and must be worn.
- Ensure the workstations in question are protected from unauthorised access by technically feasible barriers or other suitable means justified by the risk of exposure.
- Establish and implement a programme of technical and/or organisational measures to reduce the exposure.

Exposure Limit Values – 87dB(A) $L_{EX, 8hr}$ or 140dB(C)

If the level of 87dB(A) daily noise exposure ($L_{EX, 8hr}$) or peak sound pressure of 140dB(C) is exceeded, the Regulations require the employer to take specific actions to reduce the risk to employees. However, when applying the *Exposure Limit Values*, the employer shall take account of the attenuation effect provided by individual hearing protectors worn by the employee.

The Regulations require that:

- Immediate action is taken to reduce the exposure to below 87dB(A) $L_{EX, 8hr}$ or 140dB(C).
- Identify the reasons why the over-exposure has occurred.
- Amend the organisational and technical protection and prevention measures so as to prevent a reoccurrence.

Weekly Noise Exposure Level

For activities where the daily noise exposure varies markedly from one working day to the next, the employer may, for the purposes of applying the *Exposure Limit Values* and *Exposure Action Values*, use the *Weekly Noise Exposure Level* in place of the *Daily Exposure Level* to assess the levels of noise to which workers are exposed, on condition that:

- The *Weekly Noise Exposure Level* does not exceed the *Exposure Limit Value* of 87dB(A); and
- Appropriate measures are taken in order to reduce the risk associated with these activities to a minimum.

When considering whether to use weekly averaging, it is important to ensure there is no increase to risk in health. It would not, for example, be acceptable to expose workers to very high noise levels on a single day without providing them with hearing protection. There is an overriding requirement to ensure, so far as is reasonably practicable, that the risk from exposure to noise is eliminated at source or reduced to a minimum.

3dB Rule

An increase in noise of 3 decibels (+ 3dB) represents a doubling of noise energy. For example, if noise increases from 82dB to 85dB, it has effectively doubled, or indeed it has halved if it drops from 85dB to 82dB.

Also, a noise exposure of 85dB for 8 hours represents the same noise exposure for an employee as if they were exposed to 88dB for 4 hours.

As a guide, the following figures all represent a noise dose equivalent to 85dB(A) $L_{EP,d}$. For example, an 85dB(A) 8 hour L_{eq} is equivalent to 100dB(A) L_{eq} for 15 minutes.

Noise Level dB(A) L_{eq}	Time (hours/mins/secs)
82	16 hours
83	12 hours
84	10 hours
85	8* hours Current Limit (protection mandatory)
88	4 hours
91	2 hours
94	1 hour
97	30 mins
100	15 mins
103	7.5 mins
106	225 secs
109	113 secs
112	56 secs
115	28 secs
118	14 secs
121	7 secs
124	3.5 secs
127	1.7 secs
130	<1 sec

Table 1: Noise Dose Equivalent to 85dB(A)

Note:

On no account should this trade-off between noise level and time be used to justify the non-use of hearing protection in areas where there are high noise levels.

All noise doses received during a working day are additive.