Noise at Work

Introduction

This section seeks to give practical guidance to employers on complying with the Control of Noise at Work Regulations, which form part of the Safety, Health and Welfare at Work (General Application) Regulations 2007 and the Guidelines on Hearing Checks and Audiometry under those regulations.

What are the risks for employees exposed to high levels of noise?

Exposure to high levels of noise, either continuously or as a sudden loud bang from equipment such as cartridge-operated tools or guns, can have a number of physiological and psychological effects on employees, including tinnitus and stress. If exposed to high noise levels over long periods of time, permanent loss of hearing can occur. High noise levels can also interfere with communications in the workplace, leading to an increased risk of accidents.

How do I know if my workplace is noisy?

Generally if you find it difficult to clearly hear a person talking to you at a distance of two metres, this indicates a noisy work-place. Machinery and power tools generate noise. Noise is generated when the moving part of the tool or machine comes into contact with the work piece e.g. blade of a circular saw cutting wood or metal. Significant noise can also be generated from pneumatic or air-fed tools when the air is released.

How is the noise measured?

Noise levels are measured using a noise meter. This is an electronic device that is easy to use by following simple instructions that come with the meter. You can use a noise meter initially to get an indication of noise levels or to carry out a more detailed noise survey. Alternatively you can get an external noise surveyor to carry out a noise survey.

While measuring noise using a meter is straightforward, interpreting the results of measurement in accordance with the regulations can be quite technical and may require external expert assistance.

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What are the units of noise?

Noise is measured in units known as decibels (dB). Noise can be measured both as an average level over a day or as a maximum instantaneous level. These terms are described as follows:

The daily noise exposure level is the average exposure level over an eight-hour day and is expressed as $L_{EX, 8h}$ dB (A).

Peak sound pressure is the maximum value of the noise pressure and is expressed as p_{peak} dB (C).

As a rough guide, if it is difficult to hear a normal conversation at a distance of two metres from the person speaking, it is likely that the noise level in the area is above 80 dB (A).

What are exposure action values?

These are the daily noise exposure levels or peak sound pressure levels, which if exceeded for any employee require specified actions to be taken by the employer to reduce risk. The exposure action values do not take account of any attenuation or reduction in noise exposure provided by hearing protection.

There are two action values:

Lower exposure action values:

- $L_{EX,8h}$ = 80 dB (A)
- p_{peak} = 135 dB (C)

Upper exposure action values:

- $L_{EX,8h}$ = 85 dB (A)
- p_{peak} = 137 dB (C)

What is the exposure limit value?

This is the level of daily noise exposure or peak sound pressure that must not be exceeded for any employee. In determining an employee's effective exposure, you may take account of the attenuation provided by hearing protection worn by the employee.

Exposure limit values:

- $L_{EX,8h}$ = 87 dB (A)
- p_{peak} = 140 dB (C)

What measures are required above the lower exposure action value of 80 dB (A)?

You must reduce noise exposure and make an audiometric screening test available to employees.

What measures are required above the upper exposure action value of 85 dB (A)?

You must design and implement a programme to reduce noise exposure. Mandatory warning signs must be displayed, and hearing protectors must be available and must be worn. A hearing check, including audiometric screening test, must be made available to employees.

How often should measurements be taken?

Measurement of noise must be repeated at appropriate intervals especially if there is any significant change in work patterns or equipment.

The measurements must reflect the actual amount of noise the employee is exposed to over the working day. Measurements can either be taken using the appropriate equipment in the workplace used by the employee or by using instruments attached to the employee.

Should I inform employees when noise exceeds the lower action exposure level of 80 dB (A)?

Yes. Employees are entitled to know:

- Results of the risk assessment.
- Measures taken to reduce exposure.
- How to use hearing protectors correctly.
- Results of audiometry.

How is noise exposure reduced?

You must reduce the risks resulting from exposure to noise to the lowest level reasonably practicable, taking account of technical progress and the availability of measures to control the noise, in particular at source.

Consideration should be given to:

- Choice of work equipment.
- Design and layout of work equipment and workstations.
- Proper use of work equipment.
- Reducing airborne noise by shields, enclosures and sound-absorbent coverings.
- Reducing structure-borne noise by damping or isolation.
- Maintaining work equipment.
- Organisation of work to limit duration and intensity of exposure.
- Adequate rest periods.

Should I carry out a noise risk assessment?

Employers are required to carry out a risk assessment where employees are liable to be exposed to noise at work above the lower exposure action level.

Please see Section 2 of this Toolkit on the five-step risk assessment process.

What should I pay particular attention to when carrying out a risk assessment?

- The level, type and duration of the exposure.
- Whether the exposure action values and limit values are exceeded.
- The routine work employees carry out or are likely to carry out.
- Variations in the type of work.
- Direct and indirect effects of noise.
- Identifying what it is possible to control, and how the risk can be reduced.
- The availability of alternative equipment that is provided to reduce the noise emission.
- The availability of adequate hearing protection.
- Results of any health surveillance.

Does it matter how long an employee is exposed to noise?

The potential risk to an employee's hearing can be related to the length of time the person is exposed to certain levels of noise, both the daily and the cumulative amounts over a number of years.

When should I review the risk assessment?

The risk assessment should be reviewed when:

- There has been a significant change in the workplace (e.g. a new machine has been installed).
- It is no longer deemed to be valid.
- The results of health surveillance find identifiable hearing damage.

What information and training should employees receive?

Information and training relating to risk resulting from exposure to noise should include:

- The nature of such risks.
- The organisational and technical measures taken.
- The exposure limit values and the exposure action values.
- The results of the risk assessment and measurements of the noise and an explanation of their significance and the potential risks.
- The correct use of hearing protectors.
- Why and how to detect and report signs of hearing damage.
- The circumstances in which health surveillance is made available to employees, and its purpose.
- Safe working practices to minimise exposure to noise.

What steps can I take to prevent or control the risks associated with noise-induced hearing loss?

As with any other hazard, the control of noise has a hierarchy of control options: elimination, substitution, reduction, personal protective equipment (PPE) etc.

Noise elimination and control can be seen as:

- Engineering measures, for example control of vibration by damping or tightening parts in the noise source.
- Administrative measures, for example by good procurement or by rescheduling work to decrease exposure time of the employees involved.
- Use of PPE, as a last resort, for example by the use of suitably selected personal ear protection.

The options can be summarised as follows:

- If possible, remove the source of noise from the workplace.
- Control the noise at source by identifying what is actually making the noise in the noise source and dealing with the problem.
- Use collective control measures, for example engineering controls such as enclosing the noise source, workplace design such as isolating the noise source or suitable acoustics within the work area to reduce the transmission of noise.
- Use individual control measures (PPE) if the measures above are not adequate.

Is it my responsibility to provide Personal Protective Equipment (PPE)?

Yes, the employer must supply sufficient numbers of suitable ear protectors where the lower exposure action level is exceeded. You should consult with the employees regarding suitability and adequacy of the type chosen.

You must also ensure that all hearing protection is properly stored when not in use and that a suitable programme for cleaning and maintenance of the hearing protection is introduced.

All employees need proper training to put the earplugs in properly.

When must PPE be worn?

Whereas you must make PPE available to employees when the lower exposure action level is exceeded, employees must wear the PPE when the upper exposure action level is exceeded.

Work activities that may require the use of PPE include:

- Work with metal presses.
- Work with pneumatic drills.
- Work with turbines.
- The work of ground staff at airports.
- Pipe-driving work.
- Wood and textile work.

What type of PPE should be used?

PPE should be used as a last resort after all efforts to eliminate or reduce the source of the noise have been exhausted.

Types of PPE include:

- Earplugs and similar devices.
- Full acoustic helmets.
- Earmuffs which can be fitted to industrial helmets.
- Ear defenders with receiver for LF induction loop.
- Ear protection with intercom equipment.

There are Irish, British and International Standards (ISO) set for ear protectors. Contact the National Standards Authority of Ireland for further details.

How should PPE be chosen?

The choice between earmuff and earplugs must be made using the following criteria:

- The level of protection should be determined after measuring the level of the noise and the relevant frequencies.
- The type of protection selected will depend on the type of work and personal characteristics of the employee. For example, people who have to wear eye protection during grinding may have a limited range of products available as the hearing protection has to be complementary with the eye protection. The arms of spectacles or goggles can stop a good seal with earmuffs so the person loses hearing protection. Also facial hair may reduce the seal achieved by the ear protectors so that the protection is reduced.
- The type of workplace may also influence the range of protection available (e.g. use of earplugs in dirty workplaces may increase the risk of ear infection).
- Earplugs may not fit everyone. Employees with a narrow ear canal or ear infections may not be able to use earplugs.
- Earplugs may cause ear infections. To avoid this problem disposable plugs should not be re-used often or shared and non-disposable plugs should be properly cleaned at regular and frequent intervals in accordance with the manufacturer's instructions.
- Some people experience dizziness and a sensation of vertigo when using earplugs.
- Some people find wearing earmuffs uncomfortable, particularly in warm or humid working conditions.

Can an employee in a noisy environment be overprotected?

Yes. If the protection (known as attenuation) provided by personal ear protection is too high, employees can be overprotected. Communication becomes difficult and people end up working in isolation. Standard EN 458 states that the level of attenuation is good if the noise level is 5 dB under the national action level. This will mean that communications in the workplace are not disturbed too much.

Can a noisy work environment increase the likelihood of accidents?

Yes. A noisy workplace can increase the risk of accidents in two ways:

- High noise levels can make it more difficult to hear approaching dangers (e.g. vehicles), verbal warnings or alarms.
- Noise can increase the likelihood of accidents through creating demands on attention and affecting concentration. Information will be processed less efficiently, reflexes will be slower and risk-taking will increase. This does not leave much capacity for noticing risks and emergencies that may cause accidents and therefore increases the likelihood of accidents happening.

What is the purpose of hearing checks and audiometric testing?

Hearing checks and audiometric testing seek to provide an early diagnosis of any hearing loss due to noise and to assist in the preservation of hearing.

Who should health surveillance be made available to?

Health surveillance should be made available to employees where the risk assessment reveals a risk to their health. Health surveillance includes hearing checks and audiometric screening tests.

A hearing check involves:

- Taking a medical history, with particular reference to ear problems and existing ear protection use.
- Examining the external auditory canal and the tympanic membrane.
- The audiometric screening test.

Audiometric screening tests should be made available to employees exposed to noise above the lower exposure action value. Hearing checks including audiometric screening tests should be made available for employees exposed to noise above the upper exposure action value.

A health record is required to be maintained for each employee who undergoes health surveillance.

What are the categories arising from audiometric screening tests?

There are four hearing categories arising from audiometric screening tests:
Category 1: acceptable hearing ability; no action required.
Category 2: mild hearing impairment; warning required.
Category 3: poor hearing; referral required.
Category 4: rapid hearing loss; referral required.

How often should audiometric testing take place?

The first audiometric screening test should be made available within twelve months of the employee being exposed to noise above the lower exposure action level. However, a baseline pre-employment test is preferable.

For those categorised as having acceptable hearing ability (category 1), a second screening test should be conducted within a year and thereafter at the recommended interval of not more than five years, reduced to three years if the upper exposure action level is exceeded or yearly if exposure is greater than 95 dB (A). A three-year interval is generally recommended.

For those in category 2, it is recommended that testing takes place every two years. Referrals (categories 3 and 4) should be tested annually.

What should I do if an employee is found to have hearing damage as a result of exposure to noise at work?

- Ensure that the registered medical practitioner informs the employee of his or her test results.
- Review the risk assessment and the control measures provided to eliminate or reduce risks.
- Take account of the advice of the registered medical practitioner or any other competent person in reducing the risk, including assigning the employee to other work where there is no risk of further exposure.
- Ensure systematic health surveillance of other employees who may be similarly exposed.

Contacts/References

See the HSA's website (www.hsa.ie) for copies of:

- **Guide to the Safety, Health and Welfare at Work (General Application) Regulations 2007 (see Chapter 1 of Part 5: Control of Noise at Work).**
- **Guidelines on Hearing Checks and Audiometry Under the Safety, Health and Welfare at Work (General Application) Regulations 2007, Control of Noise at Work.**
- **Safety Toolkit and Short Guide to General Application Regulations 2007, Small Business Edition.**
- **The Noise of Music: Sound Advice for the Music and Entertainment Sectors.**

Further information on PPE is available from:

- **National Standards Authority of Ireland. Telephone: 01 807 3800. Website: www.nsai.ie.**
- **BS EN 352-1-3:2002 – Hearing protectors, safety requirements & testing.**
- **Earmuffs, earplugs and earmuffs attached to an industrial safety helmet can be viewed on www.bsi-global.com.**

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