



# NOISE AT WORK - Advice for employers

## Introduction

This leaflet tells you about:

- the health effects of exposure to loud noise;
- your legal duties to protect the hearing of your workers;
- how to assess and control noise;
- how to choose quieter equipment and machinery;
- different methods of hearing protection;
- health surveillance.

- people use equipment which causes loud explosive noises such as cartridge-operated tools or guns.

People who work in engineering workshops, sawmills, foundries, bottling plants, discos or textile mills, or who use noisy equipment and machinery on a farm, in forestry, or on a construction site, are just some of those who could be exposed to dangerous noise levels. If your job involves visiting these places you could also be at risk.

### Do you have a noise problem at work?

This will depend on how loud the noise is and how long people are exposed to it. As a simple guide you *may* have a problem if:

- you have to shout to be clearly heard by someone 2 m away;
- your, or your employees', ears are still ringing after leaving the workplace;

Noise is measured in decibels (dB). To address the way the human ear responds to sound of different frequencies (itches), an A-weighting is commonly applied, and the measurements are expressed in dB(A). Some examples of typical dB(A) levels are shown in Figure 1 in the 'Legal duties' section.



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## Health effects of noise at work

### Hearing loss

Hearing loss can be temporary or permanent. Temporary deafness is often experienced after leaving a noisy place. Although hearing recovers within a few hours, this should not be ignored. It is a sign that continued exposure to the noise could cause permanent damage. Permanent hearing damage can be caused immediately by sudden, extremely loud, explosive noises, eg from guns or cartridge-operated machines. But hearing loss is usually gradual due to prolonged exposure to noise. It may only be when damage caused by noise over the years combines with normal hearing loss due to ageing that people realise how deaf they have become. This incurable hearing loss may mean their family complains about the television being too loud, they cannot keep up with conversations in a group, or they have trouble using the telephone.

Eventually everything becomes muffled and people find it difficult to catch sounds like 't', 'd' and 's', so they confuse similar words. Social situations can become very difficult.

### Other effects of noise

Hearing loss is not the only problem. Tinnitus (ringing, whistling, buzzing or humming in the ears) may occur. This distressing condition can also lead to disturbed sleep. Noise can also create stress, and can be a safety hazard at work, interfering with communication and making warnings harder to hear. The Noise at Work Regulations 1989 (the Noise Regulations) do not deal with these problems, but bear them in mind when thinking about the general safety, health and welfare of your employees.

**Remember: Young people can be damaged as easily as the old**

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## Legal duties

You have a legal duty under the Noise Regulations to reduce the risk of damage to your employees' hearing.

The main requirements apply where employees' noise exposure is likely to be at or above any of three 'action levels'. Two of the action levels are values of 'daily personal exposure to noise' shortened to  $L_{EP,d}$ . These depend on the noise levels in the working area and how long people are exposed to the noise. The values take account of noise exposure over the whole working day or shift:

- first action level -  $L_{EP,d}$  of 85 dB(A);
- second action level -  $L_{EP,d}$  of 90 dB(A).

The other action level is a value of the maximum pressure reached by the sound wave, ie a single loud noise:

- peak action level - maximum pressure 200 Pascals (140 dB).

The requirements of the Noise Regulations at each of these action

levels are summarised in Table 1 (see the centre pages of the leaflet).

## Proposed Physical Agents (Noise) Directive

A proposal for a new Noise Directive is likely to be adopted in late 2002. This will be implemented by new Noise Regulations in 2005, which will revoke the Noise at Work Regulations 1989 and introduce new requirements. Visit the HSE website [www.hse.gov.uk/hthdir/noframes/noise.htm](http://www.hse.gov.uk/hthdir/noframes/noise.htm) for details.



**Figure 1** Examples of typical dB(A) levels



# NOISE AT WORK - Advice for employers

## Noise assessment

If any of your employees is likely to be exposed to the first or peak action level or above, you must arrange for a competent person to assess the actual level of noise exposure. A competent person should know how to carry out a noise assessment in the particular circumstances of the workplace - the ability to do the job properly and to know their limits is more important than formal qualifications. The aim of the noise assessment is to:

- identify the workers at risk from hearing damage (so you can prepare an action plan to control noise exposure);
- determine the daily personal noise exposure ( $L_{EP,d}$ ) of workers;
- identify additional information to comply with the legislation, eg whether noise control measures or

hearing protection are needed, and, if so, where and what type.

You should:

- keep a record of the noise assessment;
- regularly review the noise assessment - the law requires it to be reviewed whenever there is a change to the process or new equipment which may alter noise levels. It is good practice to review your assessment every two years, as noise levels can change over time as, for example, machinery wears out or working practices change;
- use the assessment to develop an action plan for introducing noise control measures.

**Damage to hearing can be prevented  
by controlling noise exposure**

# NOISE AT WORK - Advice for employers

## Controlling exposure

Where your employees are likely to be exposed to the second or peak action level or above, you must, so far as is reasonably practicable, reduce their exposure to noise in ways **other than by providing hearing protection**.

Your noise assessment should identify the sources of noise in your workplace, and suggest ways of reducing noise exposure. Use this information to:

- tackle the immediate risk, eg by providing hearing protection (this is only a stop-gap while other controls are being investigated and developed);
- identify which steps are reasonably practicable to reduce the noise exposure of your employees by engineering or organisational means;
- establish priorities for action (eg consider where there could be immediate benefits, what changes may need to be phased in over a longer period of time and the number of people exposed to the noise in each case);
- make someone responsible for ensuring that action is taken, and monitor the programme. Reassess noise exposures after any changes in the workplace.

There are many ways of reducing noise and noise exposure - no single technique will be appropriate for every situation. First think about how to remove the risk caused by noise altogether. If that is not possible, do all you can to control the noise at source, before considering redesigning the workplace, reorganising working patterns and taking measures to protect individual workers. Consider the following in this order:

- Use a different, quieter process or quieter equipment, eg:
  - can you do the work in some other quieter way?
  - can you replace whatever is causing the noise with something that is less noisy?



# NOISE AT WORK - Advice for employers

## Controlling exposure

- introduce a low-noise purchasing policy for machinery and equipment.
- Introduce engineering controls:
  - avoid metal-on-metal impacts, eg line chutes with abrasion-resistant rubber, and reduce drop heights;
  - vibrating machine panels can be a source of noise - add material to reduce vibration ('damping');
  - isolate vibrating machinery or components from their surroundings, eg with anti-vibration mounts or flexible couplings;
  - fit silencers to air exhausts and blowing nozzles.
- See the 'References' section for other information on how to control noise.
- Modify the paths by which the noise travels through the air to the people exposed, eg:
  - erect enclosures around machines to reduce the amount of noise emitted into the workplace or environment;
  - use barriers and screens to block the direct path of sound;
  - position noise sources further away from workers.
- Design and lay out the workplace for low noise emission, eg:
  - use absorptive materials within the building to reduce reflected sound, eg open cell foam or mineral wool;
  - segregate noisy machinery and processes from quieter areas;
  - design the workflow to keep noisy machinery out of areas where people spend most of their time.
- Limit the time spent in noisy areas - every halving of the time spent in a noisy area will reduce noise exposure by 3 dB.

Proper and regular maintenance of machinery and equipment is essential as it will deteriorate with age and can become noisier. Listen out for changes in noise levels - it may be time to replace worn or faulty parts.

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## A low-noise purchasing policy

Introducing a positive purchasing policy could be the single most cost-effective long-term measure that you take to reduce noise at work. Choosing quieter equipment and machinery from the start can save you the cost of introducing noise-reduction measures once it is installed. Your policy could include the following:

- Consider at an early stage the effect that new or replacement machinery will have on the existing noise levels in the workplace - set a target to reduce the noise levels if possible.
- Ensure the specification for all new machinery includes a realistic noise output level, and that tenderers and suppliers are aware of their legal duties.
- Ask the suppliers about noise levels under all operating conditions, as well as standard test conditions. Agree a common format for the data so you can compare information.

- Try to purchase only from suppliers who can demonstrate a low-noise design, with noise control as a standard part of the machine, not as a costly optional extra.
- Document your decision process, to help show that you have met your legal duties to reduce workplace noise.

**Remember: Noise output data will only ever be a guide as many factors affect the noise levels experienced by employees, but it will help you to buy quieter machines.**

Remember to ask your supplier about:

- installation arrangements, eg methods of mounting and location, to ensure machinery operates as quietly as possible;
- operational factors which could affect the noise produced by the machine;



# NOISE AT WORK - Advice for employers

## A low-noise purchasing policy

- post-installation and maintenance arrangements to ensure the machine continues to operate properly and does not get louder over time.

Under the Health and Safety at Work etc Act 1974, the Noise Regulations, and the Supply of Machinery (Safety) Regulations 1992 (as amended), a supplier of machinery must do the following:

- Provide equipment that is safe and without risk to health, with the necessary information to ensure it will be used to meet those aims.
- Design and construct machinery so that the noise produced is as low as possible.
- Provide information about the noise the machine produces under actual working conditions if it is likely to cause people to be exposed to the first or peak action levels or above of the Noise Regulations.

New machinery must be provided with:

- a 'Declaration of Conformity' to show that it meets essential health and safety requirements;
- a 'CE' mark;
- instructions for safe installation, use and maintenance;
- information on the risks from noise at workstations including:
  - sound pressure level, where this exceeds 70 dB(A);
  - instantaneous sound pressure values, where this exceeds 63 Pascals (130 dB);
  - sound power (a measure of the total sound energy) emitted by the machinery, where the sound pressure level exceeds 85 dB(A);
- a description of the operating conditions under which the noise tests were carried out.

# Table 1: Summary of legal requirements

Action required	Where $L_{EP,d}$ is likely to be:			Where sound pressure = 200 Pa Peak action level
	below 85 dB(A)	85 dB(A) First action level	90 dB(A) Second action level	
<b>EMPLOYERS' DUTIES</b>				
<b>General duty to reduce risk</b> Risk of hearing damage to be reduced to the lowest level reasonably practicable (regulation 6)	■	■	■	■
<b>Assessment of noise exposure</b> Noise assessments to be made by a competent person (regulation 4) Record of assessments to be kept until a new one is made (regulation 5)		■	■	■
<b>Noise reduction</b> Reduce exposure to noise as far as is reasonably practicable other than by hearing protection (regulation 7)			■	■
<b>Hearing protection</b> Ensure so far as is practicable that protectors are: - provided to employees who ask for them (regulation 8(1)) - provided to all exposed (regulation 8(2)) - maintained and repaired (regulation 10(1)(b)) - used by all exposed (regulation 10(1)(a)) Ensure so far as is reasonably practicable that all who go into a marked hearing protection zone use hearing protectors (regulation 9(1)(b))		■	■	■





<p><b>Maintenance and use of equipment</b> Ensure so far as is practicable that:</p> <ul style="list-style-type: none"> <li>- all equipment provided under the Regulations is fully and properly used, except for the hearing protectors provided between 85 and 90 dB(A) (regulation 10(1)(a))</li> <li>- ensure all equipment is maintained (regulation 10(1)(b))</li> </ul>	<p>■ ■ ■ ■</p>	<p>■ ■ ■ ■</p>	<p>■ ■ ■ ■</p>
<p><b>Provision of information to workers</b> Provide adequate information, instruction and training about risks to hearing, what employees should do to minimise risk, how they can obtain hearing protectors if they are exposed to between 85 and 90 dB(A), and their obligations under the Regulations (regulation 11)</p> <p>Mark ear protection zones with notices, so far as is reasonably practicable (regulation 9)</p>	<p>■ ■ ■ ■</p>	<p>■ ■ ■ ■</p>	<p>■ ■ ■ ■</p>
<p><b>Health surveillance</b> Provide as appropriate (regulation 6, Management of Health and Safety at Work Regulations 1999)</p>			<p>* ■</p>
<p><b>EMPLOYEES' DUTIES</b></p> <p><b>Use of equipment</b> So far as is practicable:</p> <ul style="list-style-type: none"> <li>- use hearing protectors (regulation 10(2))</li> <li>- use any other protective equipment (regulation 10(2))</li> <li>- report any defects discovered to employer (regulation 10(2))</li> </ul>		<p>■ ■ ■ ■</p>	<p>■ ■ ■ ■</p>
<p><b>MACHINE MAKERS' AND SUPPLIERS' DUTIES</b></p>			
<p><b>Provision of information</b> Provide information on the noise likely to be generated (regulation 12)</p>		<p>■ ■ ■ ■</p>	<p>■ ■ ■ ■</p>

\* HSE recommended good practice

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## Hearing protection

Hearing protection should be considered only as a last resort to control noise exposure. Use it either:

- as a short-term measure until other controls to reduce the noise exposure have been introduced; or
- where all reasonably practicable measures have been taken and a risk to hearing remains.

Give HSE's pocket card *Protect your hearing or lose it!* to your employees to remind them to wear their hearing protection.

exceeds the second or peak action level;

- identify ear protection zones where any employee's noise exposure exceeds the second or peak action level, and mark them with signs showing that hearing protection must be worn;
- provide your employees with training and information on how to use and care for the hearing protection;
- ensure that the hearing protection is properly used and maintained.

### Legal duties

You are required to:

- provide your employees with hearing protection if they ask for it and their noise exposure is between the first and second action levels;
- provide your employees with hearing protection and ensure they use it properly when their noise exposure





# NOISE AT WORK - Advice for employers

## Hearing protection

### Effective hearing protection

The main types of hearing protection are:

- earmuffs, which completely cover the ear;
- earplugs, which are inserted in the ear canal;
- semi-inserts (also called 'canal caps'), which cover the entrance to the ear canal.

Use the results from your noise assessment and the information from hearing protection suppliers to make the best choice of hearing protection. It must:

- reduce employees' noise exposure to below 90 dB(A);
- be suitable for the employees' working environment - consider comfort and hygiene;
- be compatible with other protective equipment used by the employee

(eg hard hats, dust mask and eye protection).

Wherever possible, provide your employees with a suitable range of effective hearing protection so they can choose the one that suits them best. Some employees may prefer a particular type, or may not be able to use some types of hearing protection because of the risk of ear infections.

### Maintenance

Ensure that hearing protection works effectively and check that:

- its overall condition is still good and it is clean;
- earmuff seals are undamaged;
- the tension of the headbands is not reduced;
- there are no unofficial modifications;
- compressible earplugs are soft, pliable and clean.

# NOISE AT WORK - Advice for employers

## Hearing protection

### Supervision

You need to ensure that employees use hearing protection when required to. You may want to:

- include the need to wear hearing protection in your safety policy and put someone in authority in overall charge of issuing it and making sure replacement hearing protection is readily available;
- carry out spot checks to see that the rules are being followed and that hearing protection is being used properly. If employees persistently fail to use protectors properly you should follow your normal company disciplinary procedures;
- ensure that all managers and supervisors set a good example and wear hearing protection at all times when in ear protection zones.



**The problems of fitting muff-type ear protectors (eg with long hair, safety glasses or jewellery)**



**Correct**



**The correct and incorrect fitting of earplugs**

**Incorrect**



# NOISE AT WORK - Advice for employers

## Information, instruction and training

Where your employees are likely to be exposed at or above any of the action levels you are required to provide information, instruction and training including:

- the likely noise exposure and the risk to hearing this noise creates;
- where and how people can obtain hearing protectors;
- how to report defects in hearing protectors and noise control equipment;
- the employee's duties under the Noise Regulations;
- what the employee should do to minimise the risk, such as the proper way to use hearing protectors and other noise control equipment, how to look after them and store them, and where to use hearing protectors.

You should make sure that you give information in a way the employee can be expected to understand (for

example you might need to make special arrangements if the employee does not understand English or cannot read).

### Employee and safety representatives

Consulting with trade union-appointed safety representatives or other employee representatives is a legal requirement. Working with safety representatives and employees' representatives is a very useful means of communicating on health and safety matters in your workplace. For example, you should discuss with them any plans you may have for a new type of hearing protector, or for identifying an ear protection zone, or for introducing a health surveillance programme.

**Remember: Involving your employees in decisions can help to foster closer working relationships and make your employees more receptive to new ideas.**

# NOISE AT WORK - Advice for employers

## Health surveillance

Under the Management of Health and Safety at Work Regulations 1999, employees exposed to hazards such as high noise levels should be provided with appropriate health surveillance.

The aim of health surveillance is to:

- warn you when employees might be suffering from early signs of hearing damage;
- give you an opportunity to take steps to reduce risk; and
- act as a means of checking that control measures are working.

Health surveillance usually means:

- regular hearing checks in controlled conditions to measure the sensitivity of hearing over a range of sound frequencies;
- informing employees about the results of their hearing checks;
- keeping records;

- encouraging employees to seek further advice from a doctor where hearing damage is suspected.

It is good practice for employers to arrange regular hearing checks on all employees whose daily personal noise exposure exceeds the second action level, and to encourage them to attend their appointments.

### How to introduce health surveillance

Programmes for hearing checks need to be under the control of someone who can make sense of audiometric data and advise individuals on the state of their hearing and on follow-up action. This might be a doctor, a nurse with appropriate training and experience, an audiological scientist or a trained audiometrician ready to refer employees to a more qualified person when they need more advice.



# NOISE AT WORK - Advice for employers

## Health surveillance

The best programme would begin with a baseline audiogram, giving details of the condition of an individual's hearing before exposure to noise. A programme can, however, be introduced at any time for employees already exposed to noise. This would be followed by a regular series of audiograms, usually annually for the first two years of employment and then at three-yearly intervals (although this may alter where an abnormality is detected or where the risk of hearing damage is high).

### How to use the results

Use the results to make sure your employees' hearing is being effectively protected. This can be achieved by:

- the significance of hearing damage;
  - the importance of following the employer's noise control and hearing protection programmes;
  - the condition of the individual's hearing;
  - what happens next if any abnormality is detected;
  - proper fitting and maintenance of hearing protection;
  - encouraging employees to seek further medical advice where recommended.
- Analysis of the results of your health surveillance for groups of workers with different levels of noise exposure can provide an insight into how well your hearing conservation programme is working. Use the results to target your noise reduction, education and compliance practices more accurately. Make the information available to employee or safety representatives.

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## References

*Reducing noise at work. Guidance on the Noise at Work Regulations 1989*

L108 HSE Books 1998

ISBN 0 7176 1511 1

*Sound solutions: Techniques to reduce noise at work* HSG138 HSE Books 1995

ISBN 0 7176 0791 7

*Health surveillance at work* HSG61 (Second edition) HSE Books 1999

ISBN 0 7176 1705 X

*Protect your hearing or lose it!* Pocket card INDG363 HSE Books 2002 (single copy free or priced packs of 25 ISBN 0 7176 2540 0 or priced packs of 25 pocket cards and five posters ISBN 0 7176 2550 8)

*Buying new machinery: A short guide to the law and some information on what to do for anyone buying new machinery for use at work* Leaflet INDG271 HSE Books 1998 (single copy free or priced packs of 15 ISBN 0 7176 1559 6)

*A guide to audiometric testing programmes*

Medical Guidance Note MS26 HSE Books 1995

ISBN 0 7176 0942 1



There are also several free HSE sector-specific publications on noise (for example construction, engineering, food, foundries, paper and woodworking). These are available to download from the HSE website [www.hse.gov.uk](http://www.hse.gov.uk).

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