

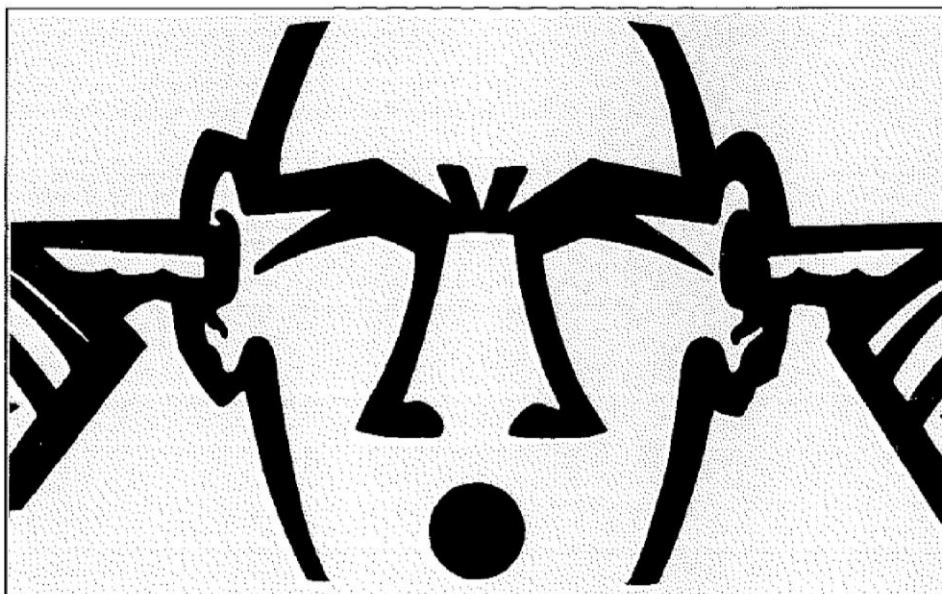


Noise at Work

Noise Guide No 1 : Legal duties of employers to prevent damage to hearing

Noise Guide No 2 : Legal duties of designers, manufacturers, importers and suppliers to prevent damage to hearing

The Noise at Work Regulations 1989



**GUIDANCE ON
REGULATIONS**

Health and Safety
Executive

Noise at Work

**Noise Guide No 1: Legal duties of employers to
prevent damage to hearing**

**Noise Guide No 2 : Legal duties of designers,
manufactures, importers and suppliers to
prevent damage to hearing**

The Noise at Work Regulations 1989

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Introduction

1 This guide deals with the legal obligations of employers to prevent damage to the hearing of workers from excessive noise at work. In addition to the general obligations to safeguard workers' health (including hearing) which employers have had since 1975 under the Health and Safety at Work etc Act 1974 (the HSW Act), from 1 January 1990 the law also required specific steps under the Noise at Work Regulations 1989.

2 The Regulations apply to all workers in Great Britain covered by the HSW Act except the crews of sea-going ships and aircraft or hovercraft moving under their own power. In certain circumstances they could also apply outside Great Britain, for example to a mine extending under the sea.*

The Regulations are based on a European Community (EC) Directive requiring similar basic laws throughout the Community on reducing the risk of hearing damage as far as is reasonably practicable.

3 Employers (and mine or quarry managers) are responsible for initiating action at the workplace. Employees must co-operate with their employer's programme to prevent hearing damage.

4 The guidance has been prepared by the Health and Safety Executive (HSE) for the Health and Safety Commission (HSC) after widespread consultation with industry. It deals with the main steps required under the Regulations and explains how the HSW Act general duties may apply to noise.

5 Separate guidance on more detailed technical matters is also available as indicated under the various sections.

6 Employers should also take into account any other HSC or HSE publications produced, for example to give guidance on action that should be taken in specific industrial sectors or to deal with noise from particular types of machine. Up to date information on these publications can be obtained from the public enquiry points.

7 Machine designers, manufacturers, importers and suppliers also have duties. Guidance on these, and how the HSW Act applies to noisy machinery is given in Noise Guide No 2 *Legal duties of designers, manufacturers, importers and suppliers to prevent hearing damage*.

* The regulations do not contain express provisions concerning application outside Great Britain, so the extent to which they apply is established by section 15(9) of the HSW Act and the Health and Safety at Work etc Act 1974 (Application Outside Great Britain) Order 1989.

Guidance on the HSW Act

General duties under the Health and Safety at Work etc Act 1974

8 The Regulations deal only with persons at work, and with risks to hearing, not other aspects of health, safety and welfare. The duties set out in the HSW Act are more general in scope and will mean that employers will need to take action if noise causes risks other than hearing damage, or creates risks to persons other than workers*. Examples of when action might be needed include:

- (a) if background noise reduces the audibility of a warning sound, it might be necessary either to reduce the noise or solve the problem in some other way such as a louder alarm, or one with a more distinct sound.
- (b) Where people who are not at work are exposed to noise risk by the employer's activities the employer will need to do what is reasonably practicable to safeguard their health and safety by action similar to that taken for employees. Some students in colleges might come into this category, for example those whose courses involve exposure to high noise levels from machines such as internal combustion engines, turbines, and textile machinery.

*An introduction to the Health and Safety at Work etc Act 1974 is given in a leaflet (HSC 2) The Act Outlined obtainable from the Health and Safety Executive.

Regulation 1

Regulation
1

Citation and commencement

1. These Regulations may be cited as the Noise at Work Regulations 1989 and shall come into force on 1 January 1990.

Regulation 2

Regulation

Interpretation

2.-(1) In these Regulations, unless the context otherwise requires -

"daily personal noise exposure" means the level of daily personal noise exposure of an employee ascertained in accordance with Part I of the Schedule to these Regulations, but taking no account of the effect of any personal ear protector used;

"exposed" means exposed whilst at work, and "exposure" shall be construed accordingly;

"the first action level" means a daily personal noise exposure of 85dB(A);

"the peak action level" means a level of peak sound pressure of 200 pascals;

"the second action level" means a daily personal noise exposure of 90dB(A);

(2) In these Regulations, unless the context otherwise requires, any reference to -

(a) an employer includes a reference to a self-employed person and any duty imposed by these Regulations on an employer in respect of his employees shall extend to a self-employed person in respect of himself;

(b) an employee includes a reference to a self-employed person;

and where any duty is placed by these Regulations on an employer in respect of his employees, that employer shall, so far as is reasonably practicable, be under a like duty in respect of any other person at work who may be affected by the work carried on by him.

(3) Duties under these Regulations imposed upon an employer shall also be imposed upon the manager of a mine or a quarry (within in either case the meaning of section 180 of the Mines and Quarries Act 1954(a)) in so far as those duties relate to the mine or quarry or part of the quarry of which he is the manager and to matters under his control.

(4) Unless the context otherwise requires, any reference in these Regulations to -

(a) a numbered regulation is a reference to the regulation in these Regulations so numbered; and

(b) a numbered paragraph is a reference to the paragraph so numbered in the regulation in which the reference appears.

(a) 1954 c.70; section 180 was modified by SI 1974/2013, Schedule 2, Part I, paragraph 3.

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Guidance

Action levels

9 There are three action levels of noise defined in Regulation 2:

the *First Action Level* - a daily personal noise exposure ($L_{EP,d}$) of 85 dB(A);

the *Second Action Level* - a daily personal noise exposure ($L_{EP,d}$) of 90 dB(A);

the *Peak Action Level* - a peak sound pressure of 200 pascals (140 dB re 20 μ Pa).

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10 The formal definition of $L_{EP,d}$ is in the Schedule to the Regulations. Generally, it can be regarded as the total exposure to noise throughout the day, taking account of the average noise levels in working areas and the time spent in them, but taking no account of any ear protectors (ear muffs or ear plugs) worn. The peak pressure is the highest pressure reached by the sound wave, for example the peak pressure of the sound impulse generated by a cartridge operated tool.

11 The Regulations require the employer to take certain basic steps where an employee is likely to be exposed to noise at or above the First Action Level. These, together with additional action, must be also taken where an employee is likely to be exposed at or above the Second or the Peak Action Level.

12 In practice action will usually be determined by the average noise level over the working day, from which the value of $L_{EP,d}$ can be determined, except where workers are exposed to infrequent but loud impact or explosive noises, eg from guns or cartridge operated tools, which might cause the Peak Action Level to be exceeded even though $L_{EP,d}$ is below the Second Action Level.

13 Where it is difficult or impracticable to establish $L_{EP,d}$ for the whole working day it might be necessary to base action on the noise over some shorter period or the area noise level of the workplace (see paragraphs 28 and 29).

The self-employed

14 Regulation 2(2) defines both 'employer' and 'employee' to include self-employed persons. They will need to take the same action to protect themselves as an employer takes to protect employees, and to use protective equipment on the same basis as employees.

Trainees

15 The Health and Safety (Training for Employment) Regulations 1988 and amending regulations made in 1989 require trainees on schemes provided under section 2 of the Employment and Training Act 1973, (but not those on courses at educational establishments such as polytechnics, universities, schools), to be treated as the employee of the person whose undertaking is providing the training.

Where more than one employer is involved

16 Sometimes one employer's activities cause the employees of other employers to be exposed to noise, for example where contractors take noisy tools into quiet premises to their job, or they go to do a quiet job in premises that are already noisy. The regulations place duties on all the employers involved; each will owe the duties set out in the regulations to:-

- (a) his own employees, and
- (b) as far as reasonably practicable, to anyone else at work who is affected by the work he carries on (Regulation 2(2)).

In most cases exchange of information and collaboration between employers will be needed to ensure that the duties are fulfilled without unnecessary duplication.

17 On multi-contractor sites or premises the various employers involved will usually need to agree on who is to co-ordinate their action to comply with the Regulations. Normally this will be the person in overall control of the work, for example a site agent on a construction project. This person should make sure that responsibilities for measures are clearly defined, for example it will often

Guidance

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be appropriate for the employer in overall control to make sure that exposure is assessed and that the information on noise is made available to all affected employers, while the actual employer of each worker provides any training needed. Where contractors and sub-contractors are involved it is usually best for responsibilities to be set out in the contractual arrangements.

18 Employers in charge of premises should make sure, so far as is reasonably practicable, that visitors know where exposure above the action levels is likely, and that they use adequate protection.

19 Employers whose employees need to visit noisy premises controlled by someone else (for example, for maintenance or survey work) will need to consider whether exposure over the action levels is likely, and what can reasonably be done to restrict it (for example by providing protection adequate for the worst likely exposure).

20 Employees should co-operate with their employers so far as this is necessary to enable an employer to meet his obligations (see under Regulation 10).

Regulation 3

Regulation

3

Disapplication of duties

3. The duties imposed by these Regulations shall not extend to -

- (a) the master or crew of a sea-going ship or to the employer of such persons, in relation to the normal ship-board activities of a ship's crew under the direction of the master; or
- (b) the crew of any aircraft or hovercraft which is moving under its own power or any other person on board any such aircraft or hovercraft who is at work in connection with its operation.

Regulation 4

Regulation

4

Assessment of exposure

4.-(1) Every employer shall, when any of his employees is likely to be exposed to the first action level or above or to the peak action level or above, ensure that a competent person makes a noise assessment which is adequate for the purposes -

- (a) of identifying which of his employees are so exposed; and
- (b) of providing him with such information with regard to the noise to which those employees may be exposed as will facilitate compliance with his duties under regulations 7, 8, 9 and 11.

(2) The noise assessment required by paragraph (1) shall be reviewed when -

- (a) there is reason to suspect that the assessment is no longer valid; or
- (b) there has been a significant change in the work to which the assessment relates;

and, where as a result of the review changes in the assessment are required, those changes shall be made.

Guidance

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The purpose of assessment

21 Regulation 4(1) requires employers to arrange for a noise assessment wherever an employee is likely to be exposed at or above the First or the Peak Action level. The assessment will need to:-

- (a) identify all workers likely to be so exposed, and
- (b) provide enough information to enable appropriate action to be taken.

Deciding whether an assessment is needed

22 A preliminary decision on whether an assessment is needed can usually be reached without making detailed noise measurements.

23 As a rough guide, an assessment of daily personal exposure, $L_{EP,d}$ will usually be needed wherever people have to shout or have difficulty being heard clearly by someone about 2 metres away, or they find it difficult to talk to each other. Where there is any doubt some measurements of the noise should be taken in a few representative places. If this suggests that any workers might be exposed to the First Action Level or more it will be necessary to go on to a more comprehensive assessment.

24 Assessments of peak pressure are most likely to be needed where workers are exposed to loud noises from explosive sources, such as cartridge operated tools or detonators. They also might be needed where there are high levels of impact noise.

Assessments

25 An assessment will be adequate if it meets the objectives set out above. It will need to be based on reliable information about work patterns and noise levels, so the affected employees and their safety representatives should be consulted; this will also help ensure their co-operation with any control measures that might turn out to be needed.

26 An adequate assessment can usually be made without making a detailed measurement of each worker's exposure, for example:

- (a) where groups of workers are employed in an area throughout which the noise level is reasonably uniform, the assessment might be based on noise levels measured in the working area and the length of the time that workers are likely to spend there.
- (b) Where groups of workers perform similar tasks sample measurements on a group or activity basis might be adequate provided that it is representative of individuals within the group;
- (c) Sometimes a calculated exposure will be adequate if sufficient information is available about the noise the machines produce during operation, and the nature and duration of tasks carried out by the workers. For example, where workers use noisy hand tools it may be possible to measure the noise level in typical jobs and assess the exposure produced by different patterns of use.

27 Detailed advice on noise surveys is given in Noise Guide No 3 : *Equipment and procedures for noise surveys*.

Variable exposure to noise

28 Some workers are exposed to noise levels which vary considerably either during the day or from one day to another, for example because they visit a number of noisy areas, or because they do a variety of jobs requiring intermittent use of noisy tools and machines. Sometimes it will be impracticable or of little use to make an accurate measurement of $L_{EP,d}$ for these workers.

29 In these circumstances the best course will usually be to treat all working areas where the average noise level (or "equivalent continuous sound level",

L_{eq}) is 85 or 90 dB(A) or more as places where the corresponding Action Levels are likely to be exceeded (see also paragraphs 49 and 64), until a better assessment can be made.

Review of assessments

30 The assessment will need to be kept up to date. After the employer has made his initial decision on the action required under the regulations, information will continue to be needed to allow him to keep his noise control and personal protection programmes under review (see paragraphs 43 and 59). Similarly, where practical difficulties limit the information that can be obtained (eg as described in paragraph 28) developments in assessment procedures and equipment might later mean that a more detailed assessment can be made. The assessment should be reviewed whenever there are any significant changes in equipment or the work, or any other reason to suppose it is no longer valid.

31 Changes that might create the need for a review include:

- (a) installation or removal of machinery,
- (b) substantial changes in workload, work pattern, or machine speeds,
- (c) changes in building structure or machine layout,
- (d) machine wear or general deterioration,
- (e) modifications to machinery and introduction of automation,
- (f) the noise control programme.

32 Even where there have been no obvious changes workplaces should not be left for long periods without checking to discover whether there is in fact any need for a review, for example because of a gradual increase in noise level due to machine wear. Spot checks can be made by establishing a few selected locations where the noise is measured periodically for example places where exposure is high or a gradual increase is likely. The interval between checks will depend on local circumstances but, for most kinds of machinery the maximum would be about two years (see also paragraphs 71 and 72).

Competent persons

33 The assessments have to be made by a competent person. The employer will need to make sure that the work is done by someone able to produce an assessment meeting the objectives in paragraph 21. The competent person will not have to make all noise measurements personally; often he or she will be able to supervise collection of information on noise levels and exposure, and its use in the final assessment.

34 The competent person will need to be capable of not only measuring noise but of bringing together and presenting enough information about the noise exposure to enable the employer to make correct decisions on what should be done to comply with the Regulations, or of advising on whether additional specialist support is needed. Knowledge alone will not be sufficient; the person should possess experience and skill appropriate to the situations to be handled. The skills and knowledge needed will include:

- (a) the purpose of the assessments;
- (b) an appreciation of his or her own limitations, whether of knowledge, experience, facilities or resources;
- (c) how to record results and explain them to others;

Guidance

- (d) the reasons for using various kinds of instrument and their limitations;
- (e) how to interpret information provided by others, for example on the noise generated by tools and the jobs done with them, to calculate probable exposures.

35 The level of expertise needed will depend largely on the complexity of the situation to be assessed. Where workers are regularly exposed to steady noise throughout the working day (for example in a weaving shed), or to intermittent but regular periods of steady noise, the task is straightforward and little beyond the ability to handle simple instruments and relate their readings to the requirements of the Regulations will be needed. Those who are to assess irregular exposures, or situations where workers intermittently use a variety of different machines will need a better understanding of techniques.

36 The ability to understand and apply HSE's guidance to make an assessment meeting the objectives in paragraph 21 is more important than formal qualifications. Many engineers, scientists and other technical staff will have gained sufficient skill to carry out a competent assessment through practical experience of making noise measurements and using the results. Some will, however, need further training. This may be available through short courses provided by technical colleges and other institutions. Advice on training is given in Noise Guide No 6: *Training for Competent Persons*.

Regulation 5

Regulation

5

Assessment records

5. *Following any noise assessment made pursuant to regulation 4(1), the employer shall ensure that an adequate record of that assessment, and of any review thereof carried out pursuant to regulation 4(2), is kept until a further noise assessment is made pursuant to regulation 4(1).*

Guidance

Recording of exposure

37 Under the Regulations the employer needs to make sure a record of the assessment is kept until a new one is made. However, it will usually be sensible to keep records longer than this to provide information on long-term trends, even though this is not required by the Regulations.

38 A suitable record will include details of:

- (a) the workplaces, areas or jobs assessed and what the results were;
- (b) when the assessment was made.

39 The records may be kept in any readily retrievable and easily understood form. No single form will be suitable for all circumstances; some that might be used include:

- (a) a tabular record of the noise exposure resulting from various tasks or activities, identified by person, work area or operation;
- (b) a plan showing noise levels at various places in the premises and a record of who works there and typical working times;
- (c) a record of the type of workplace likely to be visited by employees who move about and the associated noise levels and exposures.

40 An example of a record form, which may be altered to suit local circumstances, is shown in Noise Guide No 3: *Equipment and procedures for noise surveys*.

Regulation 6

Regulation
6

Reduction of risk of hearing damage

6. Every employer shall reduce the risk of damage to the hearing of his employees from exposure to noise to the lowest level reasonably practicable.

Guidance

6

General reduction of risk of hearing damage

41 Regulation 6 reflects the general duty in section 2 of the HSW Act that employers should so far as reasonably practicable secure the health, safety and welfare at work of all their employees by requiring them to reduce risk of hearing damage to the lowest level reasonably practicable.

42 There is a quantifiable risk of hearing damage from exposures between 85 and 90 dB(A), and a residual though small risk below 85 dB(A), so in practical terms this means that in addition to the specific steps required by the Regulations, the employer will need to consider whether it is reasonably practicable to do more to control the noise level, perhaps in the long term, to reduce any risk to hearing from exposures below the Second Action Level. A positive purchasing policy (see paragraph 50) should, in due course, bring real benefit. Attention should be paid to HSE published advice, and technical developments reported in trade and other journals.

Regulation 7

Regulation

7

Reduction of noise exposure

7. Every employer shall, when any of his employees is likely to be exposed to the second action level or above or to the peak action level or above, reduce, so far as is reasonably practicable (other than by the provision of personal ear protectors), the exposure to noise of that employee.

Guidance

7

Programme of measures

43 Where employees are exposed at or above the second or peak action levels the employer will have to reduce exposure as far as reasonably practicable by means other than provision of personal ear protectors. To achieve this the employer will need to implement a programme of control measures. Where adequate reduction is not reasonably practicable in the short term, the programme should continue to operate as long as necessary, and should include regular reviews of the feasibility of further noise reduction, taking account of developments in noise control techniques.

44 The most reliable way of limiting exposure is to reduce the noise level itself. An effective programme will:

- (a) identify the noise sources;
- (b) identify reasonably practicable steps to reduce noise level by engineering means;
- (c) establish priorities for action;
- (d) ensure that action is taken;
- (e) reassess noise exposure.

45 In establishing priorities, the aim should be to identify where action will bring most benefit. Factors to take into account are:

- (a) the number of people who would benefit from the noise reduction measures;
- (b) the noise exposure levels involved;
- (c) an engineering and organisational appraisal of the feasibility of exposure reduction. In general higher priority should be given to the more cost-effective measures;
- (d) the likelihood that engineering effort will produce worthwhile results;
- (e) any factors which make reliance on personal ear protection especially undesirable, such as strenuous work in a hot, dirty environment.

46 Programmes to control noise by engineering means will only be effective if the staff working on them are competent in noise control engineering, or are advised by someone who is. Sometimes, however, the noise can be obviated by more fundamental changes, such as using a different, quieter process, and here knowledge of the process and alternative ways of doing the job may be more important.

47 There are many ways of reducing noise; no single technique will be correct for every situation. Some of the measures that should be considered are outlined in Noise Guide No 4 : *Engineering control of noise*. Reference should be made to the literature on noise control engineering for more detailed information on techniques. Any successful engineering programme will include a systematic approach to identifying and introducing the right measures, assessment after installation, and further action if needed to overcome any unforeseen practical difficulties that may arise.

48 Limiting the time spent in noisy areas can also help to restrict daily personal noise exposure but usually only to a limited extent - halving the exposure time will reduce $L_{EP,d}$ by only 3 dB(A). Moreover, if it is to be relied upon for this purpose the exposure time will need to be effectively controlled. Nevertheless, any opportunity to obtain short periods out of noise, such as a noise refuge, will help by providing some relief from high noise levels and the need to wear ear protection continuously, even if this does not significantly reduce $L_{EP,d}$.

Workers with variable exposure to noise

49 Where noise exposure is highly variable, either from day to day or job to job (for example some farm work or in premises where workers must move about a great deal) it might be difficult to identify how far it is reasonably practicable to reduce exposure. However, the assessments should have identified the sources of noise exposure, and appropriate measures might then include:-

- (a) quietening noisy equipment or tools or replacing them with quieter types, perhaps phased in over time;
- (b) making special arrangements to limit noise exposure, particularly if the area visited is not usually occupied, for example by arranging for repairs in a normally unattended machine room to be done when other noisy machinery is shut down.

New machinery

50 Long term noise reduction programmes are only likely to be effective if they include a positive purchasing policy which makes sure noise is taken into account when selecting new machinery. When making enquiries purchasers

Guidance

should ask potential suppliers about information on the noise emission of machines likely to cause exposure at or above the First or Peak Action Level (which suppliers are required by Regulation 12 to provide*)

51 Data provided by suppliers will usually be the results of tests made under standardised conditions of installation and load. It should be used when comparing different machines, before deciding which to buy, and to predict where noise assessments will be needed when the machines are brought into use.

52 It is preferable for the tests to be carried out in accordance with recognised standards (for example BSI or international standards), where they exist, as this makes it easier to compare information provided by different potential suppliers. Where non-standard procedures are used the supplier should be asked for a clear explanation of them, and even then, skilled interpretation will probably be needed to compare the results of different kinds of test.

53 The machine maker's test data might also be useful for predicting the likely noise levels in working areas when the machines are brought into use. However, because the tests are normally made under standardised conditions skilled interpretation will probably be needed to use the data for this purpose, and the noise will in any case need to be checked after installation.

54 As an alternative to relying on standard test data arrangements might be made with the supplier for machines to be delivered with a guarantee that the noise after installation will not exceed an agreed value. If this is done the noise should be checked when the machine is brought into use.

55 Where it is necessary to purchase machinery causing workers to be exposed over the action levels, a record of the reasons for the decision will help guide future action, for example by providing those responsible for future machine specifications with information on where improvements are needed.

* Regulation 12 modifies the duties manufacturers, suppliers etc already have under section 6 of the HSW Act to include provision of information on the noise likely to be generated. Their duties to deal with noise emission of the machinery they supply are outlined in Noise Guide No 2 which also describes forms in which information is likely to be supplied.

Regulation 8

Regulation

Ear protection

8.-(1) *Every employer shall ensure, so far as is practicable, that when any of his employees is likely to be exposed to the first action level or above in circumstances where the daily personal noise exposure of that employee is likely to be less than 90 dB(A), that employee is provided, at his request, with suitable and efficient personal ear protectors.*

(2) *Every employer shall ensure, so far as is practicable, that when any of his employees is likely to be exposed to the second action level or above or to the peak action level or above, that employee is provided with suitable personal ear protectors which, when properly worn, can reasonably be expected to keep the risk of damage to that employee's hearing to below that arising from exposure to the second action level or, as the case may be, to the peak action level.*

8

The need for ear protectors

- 56 Regulation 8 deals with provision of good quality ear protection.
 57 The duty to provide protectors depends on the exposure level:-

Between First and Second Action Levels

Where employees are exposed between the First and Second Action Levels Regulation 8(1) requires the employer to provide protectors to employees who ask for them.

Note: Under Regulation 11 the employer will also need to provide information about the protectors and how to obtain them, but the regulations do not make it compulsory for them to be used.

Second and Peak Action Levels

Regulation 8(2) requires the employer to provide protectors to all workers likely to be exposed above the Second or Peak Action Levels.

Note: Under Regulation 10 the employer has to ensure these protectors are used, and the employees have to use them.

- 58 The employer will have to ensure that the required protectors are provided, so far as is practicable. This means he will need to make sure that the arrangements for their selection and issue follow good practice, as outlined below.

Choosing a suitable type of protector

- 59 To ensure that they are suitable for the conditions where they will be used and are efficient in providing protection attention should be paid to:-

- (a) *the level and nature of the noise exposure*. The 'assumed protection' (defined in Noise Guide No 5 : *Types and selection of personal ear protectors*) should be at least 5 dB(A) or the amount by which the exposure exceeds the second or Peak Action Levels, whichever is the greater;
- (b) *the job and working environment*. These can affect comfort, hygiene etc;
- (c) *compatibility* with any other protective equipment or special clothing worn;
- (d) *the fit* to the wearer.
- (e) *any difficulty or discomfort* experienced by the wearer.

- 60 Detailed advice on types of protector and their selection is given in Noise Guide No 5.

Arrangements for the issue of protectors

- 61 The arrangements for issuing protectors will need to include:-

Information on why they are being issued, where they should be used, how replacements can be obtained and the proper way to wear them and look after them (see under Regulations 9 and 10).

Ready availability. The arrangements should ensure that employees can readily obtain protectors and replacements when they need them. This might include personal issue to the individual employee. Alternatively, dispensers from which employees can take disposable protectors as they need them might be used. The dispensers will need to be located so that the employees can conveniently use them, and be kept topped up.

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Personal choice where this can reasonably be arranged. Individuals differ in what they find comfortable so wherever possible users should be given a personal choice of protector. The employer will need to make sure the choice is made from suitable and efficient types.

Personal issue should normally be arranged. Ear plugs should not be passed from one person to another. If ear muffs need to be re-used they should be adequately cleaned and disinfected first.

62 Before ear plugs are first issued the user should be asked whether he or she has any ear trouble such as irritation of the ear canal, earache, discharging ears, or is under treatment for any ear disease. Persons who report such troubles should be referred to a doctor for an opinion on whether they may use the devices with safety.

63 Some people tend to speak quietly when they are wearing ear protectors in noisy areas because they can hear their own voice more clearly, and instinctively lower its volume. This can cause communication problems, so the user should be advised to remember to speak up when wearing the protectors. Some users tend to remove protectors when speaking to others in noise - it should be explained to them that once they are used to the situation communication will be easier with protectors than without them.

Workers with variable exposure to noise

64 The employer should make sure that the employee has protectors adequate for the worst situation likely to be encountered and knows when and where to use them (see also paragraph 28-29).

Regulation 9

Regulation

9.-(1) *Every employer shall, in respect of any premises under his control, ensure, so far as is reasonably practicable, that -*

(a) *each ear protection zone is demarcated and identified by means of the sign specified in paragraph A.3.3 of Appendix A to Part 1 of BS 5378, which sign shall include such text as indicates -*

(i) *that it is an ear protection zone, and*

(ii) *the need for his employees to wear personal ear protectors whilst in any such zone; and*

(b) *none of his employees enters any such zone unless that employee is wearing personal ear protectors.*

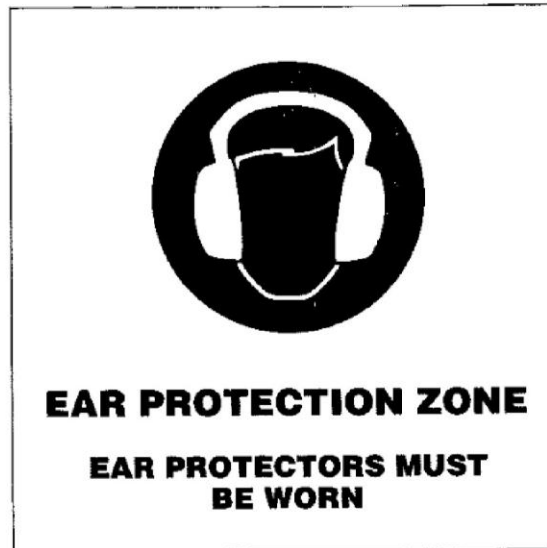
(2) *In this regulation, "ear protection zone" means any part of the premises referred to in paragraph (1) where any employee is likely to be exposed to the second action level or above or to the peak action level or above, and "Part 1 of BS 5378" has the same meaning as in regulation 2(1) of the Safety Signs Regulations 1980(a).*

(a) SI 1980/1471

Guidance

Ear protection zones

65 Wherever reasonably practicable the employer will need to mark ear protection zones with signs showing that they are areas where ear protectors are needed (Figure 1). They will need to be located at all entrances to the zones, with repetition as necessary within them. The employer has to ensure so far as is reasonably practicable that all who go into these zones wear protectors.



Figures 1: Sign for informing that ear protectors must be worn (white on a circular blue background)

Based on British Standard 5378 Part 1: 1980

Regulation 10

Regulation

Maintenance and use of equipment

10.-(1) Every employer shall -

- (a) ensure, so far as is practicable, that anything provided by him to or for the benefit of an employee in compliance with his duties under these Regulations (other than personal ear protectors provided pursuant to regulation 8(1)) is fully and properly used; and
- (b) ensure, so far as is practicable, that anything provided by him in compliance with his duties under these Regulations is maintained in an efficient state, in efficient working order and in good repair.

(2) Every employee shall, so far as is practicable, fully and properly use personal ear protectors when they are provided by his employer pursuant to regulation 8(2) and any other protective measures provided by his employer in compliance with his duties under these Regulations; and, if the employee discovers any defect therein, he shall report it forthwith to his employer.

10

Guidance

Use and maintenance of equipment

66 Regulation 10(1) deals with the employer's duty to ensure, so far as is practicable, that things he provides under the Regulations are (except for ear protectors where exposure is between the First and Second Action Levels) are used and all the equipment is maintained. This will involve following good practice, including the elements outlined below.

10

Use of equipment

Noise control equipment

67 Regular checks will be needed to find out whether noise control equipment is being properly used. Any deficiencies should be put right promptly. There will also need to be a system enabling employees to report any defects or problems to someone with authority and responsibility for remedial action.

Programmes to encourage use of ear protectors

68 People are often reluctant to use protectors, and even where they have been accepted, use tends to fall off over time. Employers should have a systematic programme to maintain usage, taking into account the following elements:-

the firm's *safety policy*. This should include a firm commitment on personal protection;

signs and warning notices - to ensure awareness of where and when protectors should be used (see under Regulation 11);

clear responsibilities. The employer should identify who is responsible for the ear protection programme, and the distribution and maintenance of protectors;

information, instruction and training for all employees on the risks and the action they should take (see under Regulation 11);

records. These should detail issue of protectors, arrangements for ensuring users know where and how to use them, and any problems encountered in their use;

monitoring including spot checks to find whether the protectors are being used. A record should be kept, and deficiencies reported to a person with responsibility and authority for remedial action. Where an employee is not using protection properly he or she should be asked why, and either the difficulty should be resolved or a verbal warning given and recorded. Where people persistently fail to use protectors properly they should be given a written warning and normal disciplinary procedures should be followed.

Maintenance of equipment

Ear protectors

69 Re-usable protectors will need to be inspected periodically and repaired or replaced if necessary. Where disposable protectors are used checks should ensure that supplies are continuously available, with dispensers topped up regularly. The arrangements should include a system for employees to report any damaged, defective or lost protectors.

70 Proper provision should be made for clean storage of re-usable protectors, such as storage bags for ear muffs or clean lockers where they can be kept with other clothing, and strong cases for ear plugs. Where special cleaning materials are needed these should be kept available to users.

Noise control equipment

71 Noise control equipment such as silencers or enclosures should be checked periodically to make sure they are kept in good condition. Their effectiveness also needs to be monitored; usually spot checks of the noise level at preselected locations will be adequate (see also paragraph 32).

Guidance

72 The results of these checks should be reported to someone with responsibility and authority for taking remedial action.

Employees' duties

73 Programmes for controlling noise exposure are likely to succeed only where there is co-operation between employer and employee. Regulation 10(2) deals with the employee's duty to use the measures provided by the employer under the Regulations, and this will include:-

- (a) co-operating with the assessment of noise exposure;
- (b) using noise control measures such as exhaust silencers and machine enclosures, in accordance with the employer's instructions;
- (c) wearing ear protection provided at or above the Second or Peak Action Levels, and in areas marked as ear protection zones. It is in their own interest to use protectors made available for exposures between the First and Second Action Levels, though this is not a statutory duty under the Regulations;
- (d) taking care of ear protectors and noise control equipment they need to use;
- (e) reporting, in accordance with the employer's procedure, any defect found in the ear protectors or other protective measures or difficulties in using them.

10

Regulation 11

Regulation

Provision of information to employees

11. Every employer shall, in respect of any premises under his control, provide each of his employees who is likely to be exposed to the first action level or above or to the peak action level or above with adequate information, instruction and training on -

- (a) the risk of damage to that employee's hearing that such exposure may cause;
- (b) what steps that employee can take to minimise that risk;
- (c) the steps that that employee must take in order to obtain the personal ear protectors referred to in regulation 8(1); and
- (d) that employee's obligations under these Regulations.

11

Guidance

Information, instruction and training for employees

74 Where employees are likely to be exposed at or above any of the action levels the employer's information, instruction and training will need to include:

Information

- (a) the likely noise exposure and the risk to hearing noise creates;
- (b) how to report defects in ear protectors and noise control equipment;
- (c) where and how ear protectors can be obtained;
- (d) the employee's duties under these Regulations.

11

Instruction and training

- (e) What the employee should do to minimise the risk, such as the proper way to use ear protectors and other equipment, how to look after it, and where ear protectors should be used.

75 Employees should also be advised that if any symptoms appear, such as difficulty in understanding speech or using the telephone, or permanent ringing in the ears, it is in their own interest to seek medical advice.

76 Where it is not reasonably practicable to mark ear protection zones (see paragraph 65), for example where noise sources are moved about a great deal, adequate alternative arrangements should be made to help make sure that employees know where protectors should be worn. These could include:

- (a) attaching signs to tools warning that protectors must be worn when using them;
- (b) written and oral instructions on how to recognise where and when protectors should be worn, for example by designating particular tasks or operations as ones where protectors must be used.

77 Information, instruction and training can be provided by health and safety staff and managers in various forms, including:

- (a) oral explanations;
- (b) individual counselling and training;
- (c) leaflets and posters;
- (d) films, video tapes and sound recordings;
- (e) short local training sessions.

No single form will be suitable for all circumstances, and reinforcement from time to time will be needed - the employer's monitoring of how equipment is being used (see under Regulation 10) will provide a guide to how often this is needed. The employee's attention should be drawn to any relevant advice published by the Health and Safety Commission or Executive.

78 The employer should make sure that information is given in a form which the employee can be expected to understand (for example special arrangements might be needed if the employee does not understand English or cannot read).

79 Employers are required by the Safety Representatives and Safety Committees Regulations 1977 to make certain information available to safety representatives appointed under the regulations, and the representatives are entitled to inspect certain of the employer's documents*. This will normally include records of noise assessments covering the employees represented. The employer should make sure the representatives know how the information can be obtained and are given any necessary explanations of their meaning. In mines and quarries separate but similar requirements apply †.

* The Regulations, an associated Approved Code of Practice and Guidance Notes are published in a Health and Safety Commission booklet *Safety representatives and safety committees* (HMSO, ISBN 0 11 883959 4)

† Mines and Quarries Act 1954, section 123 Workmen's Inspections

[Note: **Regulation 12** is to be found in Noise Guide No 2]

Regulation 13

Exemptions

Regulation

13.-(1) Subject to paragraph (2), the Health and Safety Executive may, by a certificate in writing, exempt any employer from -

- (a) the requirement in regulation 7, where the daily personal noise exposure of the relevant employee, averaged over a week and ascertained in accordance with Part II of the Schedule to these Regulations, is below 90 dB(A) and there are adequate arrangements for ensuring that that average will not be exceeded; or
- (b) the requirement in regulation 8(2), where -
 - (i) the daily personal noise exposure of the relevant employee, averaged over a week and ascertained in accordance with Part II of the Schedule to these Regulations, is below 90 dB(A) and there are adequate arrangements for ensuring that that average will not be exceeded,
 - (ii) the full and proper use of the personal ear protectors referred to in that paragraph would be likely to cause risks to the health or safety of the user, or
 - (iii) (subject to the use of personal ear protectors affording the highest degree of personal protection which it is reasonably practicable to achieve in the circumstances) compliance with that requirement is not reasonably practicable;

and any such exemption may be granted subject to conditions and to a limit of time and may be revoked at any time by a certificate in writing.

(2) The Executive shall not grant any such exemption unless, having regard to the circumstances of the case and in particular to -

- (a) the conditions, if any, which it proposes to attach to the exemption; and
- (b) any other requirements imposed by or under any enactments which apply to the case,

it is satisfied that the health and safety of persons who are likely to be affected by the exemption will not be prejudiced in consequence of it.

13

Guidance

Exemptions granted by Health and Safety Executive

80 Regulation 13 allows the Health and Safety Executive limited powers to grant exemptions from some of the requirements of the Regulations where they are satisfied that the health and safety of persons who are likely to be affected by the exemption will not be prejudiced in consequence of it. In general, exemptions will need to be linked to an agreed programme to make sure noise exposure is controlled and checked, and that improvements are introduced as soon as they become reasonably practicable.

81 Situations where exemptions can be considered are broadly:-

- (a) where there are substantial fluctuations in noise exposure from day to day and effective control can be exercised over the weekly exposure;

13

Guidance

13

- (b) where there is concern that compulsory use of ear protectors might increase danger overall, outweighing the risk of hearing damage;
- (c) where it is not reasonably practicable to use ear protectors meeting the general standard required by the Regulations (see under Regulation 8).

82 Employers considering whether to apply for an exemption should follow the advice in Noise Guide No 8 *Exemptions from certain requirements of the Noise at Work Regulations 1989*.

Regulation 14

Modifications relating to the Ministry of Defence etc.

Regulation

14

14.-(1) *In this regulation, any reference to -*

- (a) *"visiting forces" is a reference to visiting forces within the meaning of any provision of Part I of the Visiting Forces Act 1952(a); and*
- (b) *"headquarters or organisation" is a reference to a headquarters or organisation designated for the purposes of the International Headquarters and Defence Organisations Act 1964(b).*

(2) *The Secretary of State for Defence may, in the interests of national security, by a certificate in writing exempt -*

- (a) *Her Majesty's Forces;*
- (b) *visiting forces; or*
- (c) *any member of a visiting force working in or attached to any headquarters or organisation,*

from any requirement imposed by these Regulations and any such exemption may be granted subject to conditions and to a limit of time and may be revoked at any time by a certificate in writing, except that, before any such exemption is granted, the Secretary of State for Defence must be satisfied that suitable arrangements have been made for the assessment of the health risks created by the work involving exposure to noise and for adequately controlling the exposure to noise of persons to whom the exemption relates.

(a) 1952 c.67.

(b) 1964 c.5.

Regulation 15

Revocation

Regulation

15

15. *Regulation 44 of the Woodworking Machines Regulations 1974(a) is hereby revoked.*

(a) SI 1974/303 to which there are amendments not relevant to these regulations.

Part I**Daily personal noise exposure of employees**

The daily personal noise exposure of an employee ($L_{EP,d}$) is expressed in dB(A) and is ascertained using the formula:

$$L_{EP,d} = 10 \log_{10} \left\{ \frac{1}{T_0} \int_0^{T_e} \left[\frac{p_A(t)}{p_0} \right]^2 dt \right\}$$

where -

T_e = the duration of the person's personal exposure to sound;

T_0 = 8 hours = 28,800 seconds;

p_0 = 20 μ Pa; and

$p_A(t)$ = the time-varying value of A - weighted instantaneous sound pressure in pascals in the undisturbed field in air at atmospheric pressure to which the person is exposed (in the locations occupied during the day), or the pressure of the disturbed field adjacent to the person's head adjusted to provide a notional equivalent undisturbed field pressure.

Part II**Weekly average of daily personal noise exposure of employees**

The weekly average of an employee's daily personal noise exposure ($L_{EP,w}$) is expressed in dB(A) and is ascertained using the formula:

$$L_{EP,w} = 10 \log_{10} \left[\frac{1}{5} \sum_{k=1}^{k=m} 10^{0.1 (L_{EP,d})_k} \right]$$

where -

$(L_{EP,d})_k$ = the values of $L_{EP,d}$ for each of the m working days in the week being considered.

Noise Guide
No 2
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Introduction

1 This guide deals with the legal obligations of designers, manufacturers, importers and suppliers of plant and machinery for use at work to provide noise information and control the noise emission of machinery.

2 Section 6 of the Health and Safety at Work etc Act 1974 (the HSW Act) imposes general duties on suppliers etc to provide articles that are safe and without risks to health and to provide information needed for their safe use. Advice on the implications of this for noise control are given in paragraphs 4 to 8 below. The Noise at Work Regulations 1989 (the NAW Regulations), made under the HSW Act, modifies this duty to include specific requirements for provision of information on the noise emission. These are dealt with in the rest of the Guide.

3 Makers etc of machinery will need to keep abreast of developments in other legal requirements and any HSC or HSE guidance about noise-testing and limiting noise emission from the types of product they supply. For some kinds of machinery European Community (EC) Directives setting noise requirements have been adopted, and more specifications are likely to be developed as part of the EC's continuing programme for harmonisation of technical standards on machinery*. Compliance with a relevant harmonised EC requirement will generally be adequate for the purposes of the 1989 Regulations (see also paragraph 8). Suppliers of second-hand machinery will usually be able to rely on information originally supplied with the machine if this is available, but may need to consider whether to provide more, for example if original information is no longer available, or the machine has been significantly modified.

Section 6 of the Health and Safety at Work etc Act 1974

4 To comply with their duties under this legislation designers, manufacturers, importers and suppliers of articles for use at work will need to ensure, so far as reasonably practicable, that the articles are safe and without risks to health at all times when they are being set, used, cleaned or maintained by a person at work. All reasonably foreseeable use must be taken into account, and relevant research, testing and examination carried out. Information must be provided to those supplied with the articles and brought up to date if serious risks to health or safety become known subsequently. Also those who erect or install articles for use at work must ensure, so far as reasonably practicable, that they do not create risks to health or safety when they are subsequently used.

5 The provisions are explained and reproduced in full in the free leaflet, IND(G) 1(L) *Articles and substances used at work*.

6 As far as noise is concerned, these duties mean that if a machine is likely to produce noise capable of harming health, action will need to be taken to:

- (a) reduce the noise to the extent reasonably practicable. This will involve an engineering appraisal of the feasibility of noise control and the application of effective techniques, by engineers conversant with modern methods of noise control;
- (b) provide information on any measures needed to keep noise under control when the machine is used. For example, if a machine has a pneumatic exhaust intended to be connected to a separate exhaust pipe this should be mentioned in the installation instructions.

* European Community Directives setting noise requirements for some machines have been adopted and implemented through the Construction Plant and Equipment (Harmonisation of Noise Emission Standards) Regulations 1985. A general Directive establishing harmonised basic safety requirements for new machinery, including noise requirements (89/392/EEC), was adopted by the Council of Ministers in June 1989, and has to be implemented by December 1992.

Introduction

7 Design guidance on noise control engineering can be found in many text books and technical journals. Engineers should keep up to date on the subject, and with any HSE publications on standards of noise control that can be achieved at particular kinds of machine. For those requiring training many technical colleges can provide part-time or full-time courses in noise control engineering, such as those leading to the Diploma in Acoustics and Noise Control of the Institute of Acoustics.

8 For a few machines noise emission limits have been established by law. Where such limits are intended to control noise at worker positions compliance with them will be adequate to meet section 6. However, the manufacturer, supplier etc should make sure that the limit is intended for this purpose - some requirements are meant to limit nuisance noise and further action might be needed to satisfy section 6. For example, if a machine with a driver's cab is subject to an external noise limit intended to control neighbourhood nuisance, it might still be necessary to reduce the noise inside the cab.

Regulation 12

Modification of duties of manufacturers etc. of articles for use at work and articles of fairground equipment

Regulation

12. *In the case of articles for use at work or articles of fairground equipment, section 6 of the Health and Safety at Work etc. Act 1974^(a) (which imposes general duties on manufacturers etc. as regards articles for use at work, substances and articles of fairground equipment) shall be modified so that any duty imposed on any person by subsection (1) of that section shall include a duty to ensure that, where any such article as is referred to therein is likely to cause any employee to be exposed to the first action level or above or to the peak action level or above, adequate information is provided concerning the noise likely to be generated by that article.*

(a) 1974 c.37; Section 6 was amended by the Consumer Protection Act 1987 (c.43), Schedule 3, paragraph 1.

12

Guidance

The need to provide information on noise

9 If a machine is likely to cause persons at work to receive a daily personal noise exposure at or above 85 dB(A), or a peak sound pressure at or above 200 Pa (140 dB re 20 µPa), Regulation 12 places a duty on the manufacturer, designer, importer and supplier to ensure that adequate information is provided on the noise likely to be generated. The rest of the Regulations deal with the duties of employers and employees in the workplaces where the machines are used, and are explained in Noise Guide No 1: *Legal duties of employers to prevent hearing damage.*

When information should be provided

10 Machine suppliers will not usually know the exact noise exposure their products will cause in use. They will therefore need to make an assessment, taking into account all reasonably foreseeable ways in which the machine might be used, to decide whether it is likely to cause exposure over the action levels in paragraph 9. For example, when deciding whether noise information is needed for a plastics granulator, the kinds and hardness of the plastics it is capable of processing need to be taken into account. Similarly, the maker of a textile machine commonly used in an array with other similar machines will need to assume there will be some increase in noise level over that from a single machine tested in isolation.

12

11 Where there is no better information, a useful rule of thumb is to assume that:

- (a) the effects of reflections from nearby surfaces, noise from nearby machinery and some wear, may cause the average A-weighted level, in actual use to be about 6 dB(A) higher than when the machine is tested in isolation, and
- (b) the machine will be used for about 8 hours per day.

There is no need to make a similar assumption for peak pressure which is unlikely to be increased by reflections etc. Information should thus be provided if the machine, when tested in isolation but under representative operating and loading conditions, produces a sample equivalent continuous sound level ($L_{eq(s)}$) of more than 79 dB(A), or peak sound pressure of more than 200 Pa (140 dB re 20 μ Pa) at positions likely to be occupied by workers.

The purpose and nature of the information

12 The purpose of the information is:

- (a) to alert purchasers to the noise emission of machines, and help them in selecting suitable products and designing the layout of areas where they will be used, and
- (b) to enable them to plan their arrangements to protect their workers.

It can be provided in any convenient way which will meet these objectives and bring it to the attention of the purchaser - in catalogues, separate data sheets etc. A full test report should also be provided to the purchaser on request.

13 The information will usually be obtained from tests under standardised conditions which are unlikely to produce the same noise level as in the workplace where the machine is ultimately used. The employer purchasing the machine is responsible for assessing the noise in the workplace.

14 For machines produced in series, the information will usually be obtained from tests of representative examples of the machine. This will need to be backed up by good quality control such as simple noise checks of individual machines.

15 The test report should include sufficient information to allow interpretation of the data, including:

- (a) installation, operating and loading conditions during the test (see paragraphs 28-30),
- (b) the points at which noise was measured (see paragraphs 18-20),

Where a procedure published by a recognised authority (such as BSI, the European standards organisation CEN, or the International Standards Organisation) is used, a reference to the standard will be sufficient. There should also be supporting information on the variations in noise generated in the various foreseeable ways the machine will be used (for example information on the effect of different cutters, workpieces, feed rates etc).

16 As an alternative to providing the results of standard noise tests suppliers may reach agreement with the purchaser on guaranteed noise levels in working areas near the machine when it is brought into use. Where this arrangement is made it will be necessary to make sure the levels are checked after installation and that information on the measured levels is provided to the purchaser.

17 Although A-weighted levels (and where necessary peak pressure) are sufficient to meet the requirements of the Regulations, most users will find it helpful if the data include a frequency analysis. This is usually provided in the form of an octave band analysis.

Noise at worker positions

18 Noise levels should be given for positions likely to be occupied by the heads of workers operating and/or close to the machine. For most types of machine suitable forms will be:

- (a) the sampled equivalent continuous sound level ($L_{eq(s)}$);
- (b) for some machines (for example tools used intermittently) the noise exposure level ('noise dose') caused by a single operation or working cycle of the machine might be appropriate. An example of this type of measurement is given in Noise Guide No 7; *Procedures for noise testing*;
- (c) the peak sound pressure, where this is likely to exceed 200 pascals (140 dB re 20 μ Pa). Normally this will only be needed where the machine creates a high level of noise from an impulsive source (for example a cartridge operated tool).

19 For some machines, such as small hand-held tools, a statement of sound power level, perhaps accompanied by information on directivity might be adequate. This form however should only be used where it has been established that it will meet the general objectives described in paragraph 12.

Noise at other positions

20 The information on noise emitted to worker positions will sometimes need to be supplemented with information on noise emitted to the general environment around the machine, for example when a machine is to be used inside a building where it will generate a high noise level throughout the area surrounding it. This is usually given either as the sound pressure level at a number of locations around the machine, or as the sound power level

Table 1:

Ways of expressing noise radiated to the general environment around a machine

Sound pressure level at specified locations

Advantages

The full measurements are presented, with no subsequent averaging of results.

The information clearly indicates the directional radiation pattern enabling identification of the noisiest and quietest sides.

The form is convenient when the aim is to limit the greatest amount of sound radiated in any single direction, since a maximum sound pressure level at any one point can be specified.

A simpler array of microphone locations might be possible because measurements can be confined to directions of interest. For example, if a machine is used out of doors well away from buildings there might be no interest in the noise radiated upwards.

Disadvantages

It can be difficult to compare the results of tests on machines differing greatly in size (ie with different size microphone arrays).

Inconvenient where the user will calculate the total reverberant noise level created by several machines in a room.

Sound power level

Advantages

Less information needs to be presented.

More suitable for calculation of reverberant sound level inside rooms with little sound absorption.

Simplifies approximate calculation of sound level at a substantial distance from a large group of machines oriented randomly to one another. Such calculations are, however, unlikely to be needed for the NAW Regulations because it is unusual for groups of machines to create noise harmful to hearing over great distances.

Comparison of total noise emission of machines greatly differing in size is easier.

Disadvantages

Of little use for calculating sound pressure level near to the machine.

Sound power calculation involves averaging the sound radiated around the machine, so gives no guide to the direction of greatest radiation. It therefore needs to be supplemented by information on directivity.

accompanied if necessary by information on directivity. Each form has its advantages and disadvantages, as listed in Table 1.

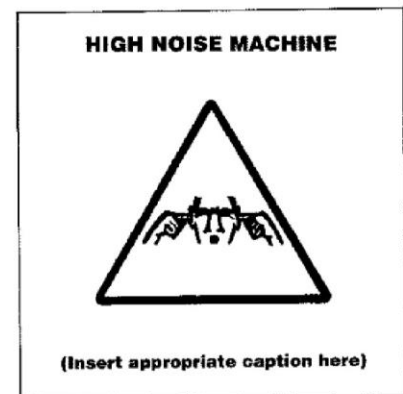
Labelling noisy machines

21 If it is reasonably foreseeable that the workers who use the machine will be required by the Regulations to use ear protectors (ie their noise exposure will be at or above the 200 pascals peak or 90 dB(A) Second Action Levels described in Noise Guide No 1: *Legal duties of employers to prevent hearing damage*, the information should, wherever reasonably practicable, include warning signs or labels attached to the machine. The nature and content of the sign will depend on the type of machine concerned, and might for example include:

- (a) a permanent sign, warning that ear protectors are to be used when operating the machine (A in Figure 1);
- (b) a removable sign for machines which produce high noise levels in some modes of use, warning that a noise survey will be needed after installation (B in Figure 1);
- (c) a removable notice saying that information on noise emission is available separately.



A: Sign for informing that ear protectors should be worn. (white on a circular blue background)
Based on BS 5378 Part 1:1980



B: Sign suitable for warning that action is needed on installation

Figure 1 Warning signs

22 All signs should comply with the Safety Signs Regulations 1980. Machines subject to legislation implementing EC Directives (see paragraph 8) may be subject to special labelling requirements.

Test procedures

23 Machine testing needs to be controlled by personnel conversant with both the acoustical procedures and the machinery being tested. A technologist who understands why errors might arise will usually be able to obtain data adequate for the Regulations using comparatively simple facilities which can probably be arranged at the manufacturer's or supplier's premises. Many engineers and scientists will have gained sufficient skill through practical experience of making noise measurements and using the results. For those requiring training, courses leading to recognised qualifications are available (see paragraph 7)

24 The test procedure should be chosen to provide a fair and reasonable test of the machine's capacity for generating noise at places occupied by workers, when used for the purposes for which it is sold, and in ways the manufacturer can reasonably foresee. Because of the wide range of machine types and sizes no particular form of test is ideal for all circumstances. If advice on testing or information for specific types of machine has been published or approved by the Health and Safety Commission or Executive this should be followed.

25 Information is best provided on the basis of recognised standard test procedures, as this will allow the user to compare information from different machine suppliers. However, it should be established that the procedure meets the objectives described in paragraph 12. Some standards meet other objectives, for example bystander noise from motor vehicles or earth moving machines, and the information may need to be supplemented by additional measurements, relevant to operator positions.

26 Where no suitable procedure is available the machine maker, supplier etc will need to develop one. Noise Guide No7 gives further general advice on how this can be done.

27 When any new procedure is devised it will itself need to be tested to establish:

- (a) that it provides a fair and reasonable test of all the potentially noisy components of the machine;
- (b) the reproducibility and repeatability of the results.

When it is developed it is advisable to consider whether to submit the procedure for wider use through a standards organisation such as BSI or ISO as this will allow other similar machines to be tested in the same way.

Installation and operating conditions

28 When the machine is tested it should normally be mounted as described in the machine makers instructions, and loaded so as to establish, as far as possible, the noisiest condition likely in normal use. Where machines produce highly variable noise levels in different modes of use it might be necessary to use two or more operating conditions to obtain information representative of the foreseeable range of uses.

29 Sometimes simplified operating conditions might be suitable, for example where the noise level is not significantly affected by the type of load. However, they should only be used where prior tests have established that they will provide sufficient information for the purposes of the Regulations.

30 If the machine has adjustable features which, while not directly associated with its loading and operation, will significantly affect noise exposures, the test should establish the noisiest condition. For example, if the machine has a cab with windows that can be opened in use it will usually need to be tested with the windows both open and shut.

31 The test will need to be carried out in an environment adequately free from sound reflections from nearby walls or background noise that might interfere with the measurement. Advice on how this can be achieved is given in Noise Guide No7. Usually a suitable area at the supplier's premises can be treated to provide information adequate for the Regulations.

(Note: Where testing is being carried out in accordance with British or other Standards it will be necessary to make sure that the environment also meets the requirements specified in the standard).



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