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**DRAFT**

**Guide to the  
Safety, Health and Welfare at Work (Control of Noise at  
Work)(Protection of Employees) Regulations 2006**

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## Foreword

This Guide is aimed at safety and health practitioners, employers, managers, employees, safety representatives and others to give guidance on the Safety, Health and Welfare at Work (Control of Noise at Work)(Protection of Employees) Regulations 2006. The objective of the Guide is to give general guidance aimed at the prevention of occupational accidents or ill health. It is not intended as a legal interpretation of the legislation.

The Regulations transpose Directive 2003/10/EC of the European Parliament and the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise).

In accordance with Article 14 of Directive 2003/10/EC, separate guidelines (Code of Conduct) will be produced by the Health and Safety Authority, to provide practical guidance to assist employers and employees in the music and entertainment sectors to whom the Regulations will apply from 15 February 2008.

The Regulations come into effect from .....2006, other than, in accordance with Article 11 of Directive 2003/10/EC –

- ◆ Regulation 11 defers the application of the Regulations in the “music and entertainment” sectors until 15 February 2008, and
- ◆ Regulation 11 also defers the application of the exposure limit value to personnel on board seagoing vessels (Regulation 6(5) until 15 February 2011.

(The text of the Regulations quoted in these Guidelines is shown in italics.)

## Glossary of Terms

### **Definitions as specified in Regulation 2(1) of the Safety, Health and Welfare at Work (Control of Noise at Work)(Protection of Employees) Regulations 2006**

“daily noise exposure level ( $L_{EX, 8h}$ ) (dB)(A) re: 20  $\mu$ Pa) means the time-weighted average of the noise exposure level for a nominal eight-hour working day as defined by international standard ISO 1999: 1990, point 3.6, covering all noises present at work, including impulsive noise;

“Directive” means Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003<sup>1</sup>;

“exposure action values” mean for any employee the level of daily noise exposure or peak pressure level which, if exceeded, requires specified action to be taken to reduce risk;

“exposure limit value” means for any employee the level of daily noise exposure or peak sound pressure which must not be exceeded;

“noise” means any audible sound;

“peak sound pressure ( $p_{\text{peak}}$ )” means the maximum value of the “C”-frequency weighted instantaneous noise pressure;

“risk assessment” means the assessment of risk required by Regulation 5(1);

“weekly noise exposure level ( $L_{\text{EX}, 8\text{h}}$ )” means the time-weighted average of the daily noise exposure levels for a nominal week of five eight-hour working days as defined by international standard ISO 199: 1990, point 3.6 (note 2);

## **Introduction**

### **The impact of noise at work.**

Every day, millions of employees in the European Union are exposed to noise at work and all the risks this can entail.

While noise is most obviously a problem in industries such as manufacturing and construction, it can also be an issue in a wide range of other working environments, from call centres to schools, orchestra pits, bars etc.

One in five of Europe's workers have to raise their voices to be heard for at least half of the time that they are at work and 7% suffer from work-related hearing difficulties. (European Agency for Safety and Health at Work).

Noise-induced hearing loss is the most common reported occupational disease in the EU.

There is good evidence that a risk to hearing from prolonged exposure to noise exists at levels down to 85 dB(A) and a residual risk down to 80 dB(A).

Workers who are regularly exposed above the upper exposure action value of 85 dB(A) will be at increased risk of damage to their hearing resulting in noise-induced hearing loss.

Effects on hearing 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 as it is a sign that continued or regular exposure to such noise could cause permanent damage.

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. Hearing damage can also be caused immediately by sudden, extremely loud noises e.g. from electric arcs, foundry fettling machines, guns or cartridge-operated machines, though this is not common. Noise-induced hearing loss is permanent and incurable and can affect anybody.

Exposure to noise may also cause tinnitus, which is a sensation of noises in the ears such as ringing or buzzing. This may occur in combination with hearing loss.

These conditions are entirely preventable if-

- manufacturers design machinery to operate more quietly,
- employers introduce controls to reduce exposure to noise at source, and
- employees make use of the protective measures supplied.

## **Who is at risk?**

Anyone who is exposed to noise is potentially at risk. The higher the noise level and the longer you are exposed to it, the more risk you have of suffering ill effects from noise.

In manufacturing and mining, 40% of employees experience significant noise levels for more than half of their working time. For construction, the proportion is 35% and in many other sectors, including agriculture, transport and communications, the figure is 20%. (European Agency for Safety and Health at Work).

It is not only manufacturing and other traditional industries where noise is a problem. Noise is being recognised as a problem in service sectors such as education and healthcare, bars and restaurants.

## **How will these guidelines help me?**

These guidelines are intended for employers and employees to assist in understanding the Safety, Health and Welfare at Work (Control of Noise at Work)(Protection of Employees) Regulations 2006. They apply generally to all work activities. They introduce measures protecting employees from the risks associated with noise. They cover a range of risks posed by noise in the workplace to safety and health of employees, in particular, as it relates directly to adverse effects on employees' hearing.

In accordance with Article 11 of Directive 2003/10/EC, Regulation 11 defers the application of the Regulations in the "music and entertainment" sectors until 15 February 2008, until which date the European Communities (Protection of Workers)(Exposure to Noise) Regulations 1990 will continue to apply. This 2-year transitional period applies to "all workplaces where live music is played or where recorded music is played in a restaurant, bar, public house, disco or nightclub or alongside live music". Specific guidance on the practical measures that can be taken in these workplaces will be issued by the Health and Safety Authority before the transitional period expires, in accordance with Article 14 of Directive 2003/10/EC.

In accordance with Article 11 of Directive 2003/10/EC, Regulation 11 also defers the application of the exposure limit value to personnel on board seagoing vessels until 15 February 2011.

### ***Regulation 4 - Exposure Limit Values and Exposure Action Values.***

4. (1) *For the purposes of these Regulations, the exposure limit values and exposure action values in respect of the daily noise exposure levels and peak sound pressure are -*

(a) *exposure limit values -*

$$L_{EX,8h} = 87 \text{ dB(A)} \text{ and } P_{peak} = 140 \text{ dB(C)} \text{ in relation to } 20 \mu\text{Pa.},$$

(b) *upper exposure action values -*

$L_{EX,8h} = 85 \text{ dB(A)}$  and  $P_{peak} = 137 \text{ dB(C)}$  in relation to  $20 \mu\text{Pa}$ .,

(c) *lower exposure action values -*

$L_{EX,8h} = 80 \text{ dB(A)}$  and  $P_{peak} = 135 \text{ dB(C)}$  in relation to  $20 \mu\text{Pa}$ ..

(2)(a) *An employer, when applying the exposure limit values referred to in paragraph (1)(a) in determining an employee's effective exposure, shall take account of the attenuation provided by individual hearing protectors worn by the employee.*

(b) *The exposure action values referred to in paragraphs (1)(b) and (c) shall not take account of the effect of any such hearing protectors as referred to in subparagraph (a).*

(3) *For activities where the daily noise exposure varies markedly from one working day to the next, the Authority may, on written application from an employer, for the purposes of applying the exposure limit values and the exposure action values, authorise him or her to use the weekly noise exposure level in place of the daily noise exposure to assess the levels of noise to which his or her employees are exposed, provided that -*

(a) *the weekly noise exposure level as shown by adequate monitoring does not exceed the exposure limit value of  $87 \text{ dB(A)}$ , and*

(b) *appropriate measures are taken in order to reduce the risk associated with these activities to a minimum.*

The exposure limit value means for any worker the level of daily exposure or peak sound pressure which must not be exceeded.

The **exposure limit values** are

$L_{EX,8h} = 87 \text{ dB(A)}$  and  $P_{peak} = 140 \text{ dB(C)}$  in relation to  $20 \mu\text{Pa}$ .

The exposure action values mean for any worker the levels of daily noise exposure or peak pressure level which, if exceeded, requires specified action to be taken to reduce risk.

The **upper exposure action values** are

$L_{EX,8h} = 85 \text{ dB(A)}$  and  $P_{peak} = 137 \text{ dB(C)}$  in relation to  $20 \mu\text{Pa}$ .

The **lower exposure action values** are

$L_{EX,8h} = 80 \text{ dB(A)}$  and  $P_{peak} = 135 \text{ dB(C)}$  in relation to  $20 \mu\text{Pa}$ .

When applying the exposure limit values, the determination of an employee's effective exposure must take account of the attenuation provided by individual hearing protectors worn by the worker. It should be noted that the exposure action values shall not take account of the effect of any such protectors.

## **Risk Assessment**

### ***Regulation 5 - Determination and Assessment of Risks.***

5. (1) *Without prejudice to the requirements of section 19 of the Act, where employees are liable to be exposed to noise at work at or above a lower exposure value, an employer shall, in consultation with his or her employees or representatives, or both, make a suitable and appropriate assessment of the risk arising from such exposure.*

(2) *In carrying out the risk assessment referred to in paragraph (1), an employer shall, if necessary, measure the levels of noise to which his or her employees are exposed.*

(3) *An employer shall be responsible for the assessment referred to in paragraphs (1) and (2) being competently planned and carried out at suitable intervals and any sampling shall be representative of the daily personal exposure of an employee to noise.*

(4) *The methods and apparatus used in the measurement of noise at work for the purposes of these Regulations shall be adapted to the prevailing conditions, particularly in the light of the characteristics of the noise to be measured, the length of exposure, ambient factors and the characteristics of the measuring apparatus and shall make it possible to determine the parameters defined in Regulation 2 and to decide, whether in a given case, the values specified in Regulation 4 have been exceeded.*

(5) *An employer shall give particular attention, when carrying out a risk assessment under this Regulation to the following -*

- (a) *the level, type and duration of exposure, including any exposure to impulsive noise,*
- (b) *the exposure limit values and the exposure action values specified in Regulation 4,*
- (c) *the effects of exposure to noise on employees whose safety or health is at particular risk from such exposure,*
- (d) *as far as technically possible, any effects on employees' safety and health resulting from interactions between noise and work-related ototoxic substances and between noise and vibrations,*
- (e) *any indirect effects on employees' safety or health resulting from interactions between noise and warning signals or other sounds that need to be observed in order to reduce the risk of accidents,*



- (f) *any information on noise emission provided by the manufacturers of work equipment in accordance with relevant Community Directives,*
- (g) *the availability of alternative equipment designed to reduce noise emission,*
- (h) *the extension of exposure to noise beyond normal working hours under the employer's responsibility,*
- (i) *appropriate information obtained from health surveillance including, where possible, published information,*
- (j) *the availability of hearing protectors with adequate attenuation characteristics.*

*(6) Without prejudice to the provisions of section 19(3) of the Act, an employer shall review a risk assessment undertaken for the purposes of these Regulations where the results of health surveillance undertaken in accordance with Regulation 9 show it to be necessary.*

*(7) An employer shall record-*

- (a) *the findings of the risk assessment as soon as it is practicable after it is made, and*
- (b) *the steps which he or she has taken to meet the requirements of Regulations 6, 7 and 8.*

Employers have a legal duty to protect the safety and health of employees from all noise-related risks at work. They should conduct a risk assessment (See Regulation 5) which may include the need to carryout noise measurements.

The purpose of this risk assessment is to enable the employer to make a valid decision about whether action is necessary to prevent or adequately control exposure of his or her employees to noise at the workplace. A suitable and sufficient noise risk assessment is one which -

- identifies the employees who are exposed above the lower exposure action values,
- where exposures are likely to be at or above the upper exposure action values, contains information on noise exposure derived from measurements of noise in the workplace and information on the type and duration of exposure, for the employees so exposed taking account of all activities and tasks performed at the workplace which may generate noise,
- identifies the necessary measures to eliminate the risks or reduce them to a minimum,

- includes such information as is necessary to permit compliance with other duties under the Regulations, and
- is based on competent advice as required and/or appropriate.

The employer must give particular attention, when carrying out the risk assessment to the following -

- the level, type and duration of exposure, including any exposure to impulsive noise,
- the exposure limit values and the exposure action values,
- any information on noise emission provided by the manufacturers of the work equipment,
- the availability of alternative equipment designed to reduce noise emission,
- the availability of modifications or enclosure panels etc fitted to existing equipment designed to reduce noise emissions,
  - ◆ as far as technically possible, any effects on employees' safety and health resulting from interactions between noise and work-related ototoxic (ear damaging) substances and between noise and vibrations,
- the availability of hearing protectors with adequate attenuation characteristics [i.e. the PPE (personal protective equipment) must be appropriate to the task/activity based on a site specific risk assessment].

The level of exposure to noise may be assessed by means of, -

- observation of specific work practices,
- reference to relevant information on the probable levels of noise corresponding to any equipment used in the particular working conditions, and
- if necessary, measurement of the level of noise to which employees are likely to be exposed.

### **Exposure to Noise at or above an Upper Exposure Value**

#### ***Regulation 6 - Provisions aimed at Avoiding or Reducing Exposure.***

6. (1) *In compliance with the general principles of prevention set out in Schedule 3 to the Act, and in consultation with his or her employees or representatives, or both, an employer shall ensure that the risk arising from exposure of his or her employees to noise is either eliminated at source or, where this is not reasonably practicable, reduced to a minimum.*

*(2) In complying with the requirements of paragraph (1), an employer shall into account, in particular -*

- (a) other methods of work which eliminate or reduce exposure to noise,*
- (b) the choice of appropriate work equipment, including work equipment subject to Community provisions, which, taking account of the work to be done, emits the least possible noise,*
- (c) the design and layout of workplaces and workstations,*
- (d) adequate information and training to instruct employees to use work equipment correctly and safely in order to reduce their exposure to noise to a minimum,*
- (e) noise reduction by technical means, such as -*
  - (i) reducing air-borne noise, by use of shields, enclosures, and sound absorbent coverings,*
  - (ii) reducing structure-borne noise, by damping or isolation,*
- (f) appropriate maintenance programmes for work equipment, the workplace and workplace systems,*
- (g) organisation of work to reduce noise by –*
  - (i) limiting the duration and intensity of the exposure,*
  - (ii) arranging appropriate work schedules with adequate rest periods.*

*(3) If a risk assessment referred to in Regulation 5 indicates that an upper exposure action value is exceeded an employer shall establish and implement a programme of technical or organisational measures, or both, designed to reduce exposure to noise, taking into account in particular, the measures referred to in paragraphs (1) and (2).*

*(4) If a risk assessment indicates that there are workplaces where employees are likely to be exposed above an upper exposure action value, an employer shall -*

- (a) post signs which are clearly visible and easily legible indicating that-*
  - (i) the noise level at that workplace is likely to exceed 85dB(A), and*
  - (ii) hearing protectors are available and must be worn.*

- (b) *delimit the areas where noise levels exceed 85dB(A) and restrict access, where the risk of exposure so justifies such restrictions and where the said measures are technically feasible.*

*(5) Subject to Regulation 11, an employer shall-*

- (a) *ensure that his or her employees are not exposed to noise above an exposure limit value, or*
- (b) *if exposure above an exposure limit value is detected he or she shall forthwith -*
  - (i) *take action to reduce exposure to noise to below the limit value,*
  - (ii) *identify the reasons for that limit being exceeded, and*
  - (iii) *amend the organisational and technical measures taken in accordance with paragraphs (1) and (2) to prevent it being exceeded again.*

*(6) Where, owing to the nature of the activity, rest facilities are provided an employer shall ensure that noise in those facilities is reduced to a level compatible with their purpose and the conditions of use.*

*(7) An employer shall adapt any measure taken in compliance with the requirements of this Regulation to take account of any employee whose safety or health is at particular risk from exposure to noise.*

If any worker is likely to be exposed to noise at or above an upper exposure value, the employer must establish and implement a programme of technical and organisational measures, excluding the provision of personal hearing protectors, intended to reduce exposure to noise. In this respect, the employer must take into account, in particular, the following -

- (a) other working methods which eliminate or reduce exposure to noise,
- (b) choice of appropriate work equipment emitting the least possible noise, taking account of the work to be done,
- (c) the design and layout of workplaces, work stations and rest facilities,
- (d) suitable and sufficient information and training for employees, such that work equipment may be used correctly, in order to minimise their exposure to noise,
- (e) reduction of noise by technical means including, in the case of airborne noise, the use of shields, enclosures and sound-absorbent coverings; and in the case of structure-borne noise by damping and isolation,
- (f) appropriate maintenance programmes for work equipment, the workplace and workplace systems,

(g) limitation of the duration and intensity of exposure to noise, and

(h) appropriate work schedules with adequate rest periods (whereby there is a rest or break from that particular noisy task or work activity).

The employer must –

- provide a personal hearing protector to any worker who is so exposed and ensure that it is used correctly and always within the designated zone in which such exposure can occur -
- post signs which state that -
  - (a) the noise level at the workplace is likely to exceed 85 dB(A), and
  - (b) hearing protectors are provided and **must** be worn,
- delimit the areas where noise levels exceed 85dB(A) and restrict access to the delimited area where this is practicable and the risk from exposure justifies it (i.e. only those required to enter such an area should be allowed entry and only then if they are firstly adequately protected against the risk of noise),
- make available the services of a registered medical practitioner to carry out, or to have carried out on his responsibility, a hearing check if the risk assessment reveals a risk to the employee's health.
- ensure that hearing protection is worn by all persons entering a designated PPE zone.

The employer must ensure that his or her employees are not exposed to noise above an exposure limit value, or if exposure above an exposure limit value is detected he or she must forthwith:

- take action to reduce exposure to noise below the limit value,
- identify the reason for that limit being exceeded, and
- amend the technical and organisational measures taken in accordance with the upper exposure action level being reached or exceeded.

### ***Regulation 7 - Personal Protection***

7. (1) *In accordance with sections 8, 9, 10 13 and 14 of the Act, and where the risks arising from exposure to noise cannot be prevented by other means, appropriate, properly fitting, individual hearing protectors shall be made available by an employer and used by his or her employees under the conditions laid down in paragraphs (2) and (3).*

*(2) Where noise exposure exceeds the lower exposure action values, an employer shall make individual hearing protectors available.*

*(3) An employee whose exposure equals or exceeds the upper exposure action values shall use individual hearing protectors.*

*(4) Individual hearing protectors referred to in paragraph (1) shall be selected, following consultation with the employees concerned or their representatives, or both, so as to eliminate the risk to hearing or reduce the risk to a minimum.*

*(5) An employer shall ensure, as far as is reasonably practicable, that -*

*(a) hearing protectors are used in accordance with paragraph (3), and*

*(b) the measures taken under this Regulation are effective.*

Personal protective equipment (PPE), such as earplugs and earmuffs, should be used as a last resort after all efforts to eliminate or reduce the source of the noise have been exhausted. Issues to take into account when using PPE include -

- making sure the PPE chosen is appropriate for the type and duration of the noise: it should also be compatible with other protective equipment (i.e. must take into account the specific requirements of the work activity or tasks being performed),
- employees should have a choice of suitable hearing protection so they can select the most comfortable solution,
- the PPE should be correctly stored and maintained, and
- training should be given on why the PPE is necessary, when it should be used, how it should be worn and how to store and maintain it properly and safely,
- employees should report any defects in PPE without delay.

### ***Regulation 8 - Employee Information and Training.***

*8. (1) Without prejudice to section 10 of the Act, an employer shall, where or her his employees are exposed to noise at work at or above the exposure action values provide them and their representatives, or both, with suitable and sufficient information and training relating to risks resulting from exposure to noise.*

*(2) Without prejudice to the generality of paragraph (1), the information and training provided under that paragraph shall include -*

*(a) the nature of such risks,*

*(b) the organisational and technical measures taken in order to comply with the requirements of Regulation 6,*

- (c) *the exposure limit values and the exposure action values specified in Regulation 4,*
- (d) *the results of the assessment and measurements of the noise carried out in accordance with Regulation 5 and an explanation of their significance and the potential risks,*
- (e) *the correct use of hearing protectors,*
- (f) *why and how to detect and report signs of hearing damage,*
- (g) *the circumstances in which employees are entitled to health surveillance, and its purpose, in accordance with Regulation 9,*
- (h) *safe working practices to minimise exposure to noise.*

If any worker is likely to be exposed to noise at or above a lower exposure action value, the employer must provide suitable and sufficient information and training relating to risks resulting from exposure to noise, including on

- ◆ the nature of the risks,
- ◆ the measures to avoid or reduce exposure,
- ◆ the results of risk assessments and noise measurements,
- the correct use of individual hearing protectors,
- entitlement to and purpose of health surveillance,
- safe working practices.

***Regulation 9 - Health Surveillance.***

9. (1) *Without prejudice to section 22 of the Act, it shall be the duty of an employer to make provision for appropriate health surveillance to be made available, under the responsibility of an occupational health care professional, to those employees for whom a risk assessment referred to in Regulation 5 reveals a risk to their health.*

(2) *Without prejudice to the generality of paragraph (1) an employer shall, in the case of employees whose exposure exceeds an upper exposure action value, make available the services of a registered medical practitioner to carry out, or to have carried out on his or her responsibility, a hearing check and, in the case of employees whose exposure exceeds a lower exposure action value, make available the services of an occupational health care professional to carry out preventive audiometric testing.*

*(3) The purpose of hearing checks and audiometric tests referred to in paragraph (2) shall be to provide early diagnosis of any hearing loss due to noise and to assist in the preservation of hearing.*

*(4) An employer shall ensure that a health record in respect of each of his or her employees who undergoes health surveillance in accordance with paragraphs (1) or (2), is made and maintained and that that record or a copy thereof is kept available in a suitable form.*

*(5) An employer shall -*

- (a) on request, allow an employee access to his or her personal health record,*
- (b) provide the Authority with copies of such health records as the Authority may require, and*
- (c) if he or she ceases to trade, notify the Authority forthwith in writing and make available to the Authority all health records kept by him or her in accordance with these Regulations.*

*(6) Where, as a result of surveillance of the hearing function in accordance with this Regulation, an employee is found to have identifiable hearing damage, an occupational health care professional, shall assess whether such damage is likely to be the result of exposure to noise at work and, if so established -*

- (a) every relevant employee shall be informed by the occupational health care professional of the result which relates to him or her personally; and*
- (b) the employer shall -*
  - (i) review the risk assessment carried out in accordance with Regulation 5,*
  - (ii) review the measures provided for to eliminate or reduce risks in accordance with Regulation 6,*
  - (iii) take into account the advice of the occupational healthcare professional or other suitably qualified person or the Authority in implementing any measures required to eliminate or reduce risk in accordance with Regulations 6 and 7, including the possibility of assigning the employee to alternative work where there is no risk of further exposure, and*
  - (iv) arrange systematic health surveillance and provide for a review of the health status of any other employee who has been similarly exposed.*



Health surveillance identifies early signs and symptoms of work-related ill health and allows action to be taken to prevent its progression. It is also useful in monitoring the effectiveness of controls, though it is not in itself a control measure or a substitute for controlling risk at source. Regulation 9 requires employers to provide appropriate health surveillance where the risk assessment indicates a risk to employees' health.

Employers would be expected to provide health surveillance to employees regularly exposed above the upper exposure action values. Where exposure is between 80 dB(A) and 85 dB(A), or where employees are only occasionally exposed above the upper exposure action values, health surveillance will only be required if information comes to light that an individual may be particularly sensitive to noise-induced hearing loss. This may be from past medical history, audiometric tests results from previous jobs, other independent assessments or a history of exposure to noise levels exceeding the exposure action values.

[**Note:** The Health and Safety Authority intends to publish separate complementary "Guidelines on Audiometry and Hearing Checks".]

### ***Regulation 10 - Exceptional Exemption Certificates.***

10. *(1) Subject to paragraphs (2) and (3), the Authority may, by a certificate in writing, exempt any person or class of persons from the requirements of Regulations 6(5) and 7(1), (2) and (3) where because of the nature of the work the full and proper use of personal hearing protectors would be likely to cause greater risk to safety or health than not using such protectors, and any such exemption may be granted subject to conditions and to a limit of time and may be revoked by a certificate in writing at any time.*

*(2) The Authority shall not grant an exemption under this Regulation unless -*

*(a) it consults such representatives of employers and employees, and such other persons, as it considers appropriate,*

*(b) the risks resulting from the exemption concerned are reduced to as low a level as is reasonably practicable, and*

*(c) the employees concerned are subject to increased health surveillance.*

*(3) Notwithstanding paragraphs (1) and (2), an exemption issued under this Regulation shall be reviewed by the Authority at least once every four years and shall be revoked as soon as the reason for its issue no longer obtains.*

Regulation 10 is an enabling provision which transposes Article 11 of Directive 2003/10/EC which provides that "In exceptional situations where, because of the nature of the work, the full and proper use of individual hearing protectors would be likely to cause greater risk to health or safety than not using such protectors, Member States may grant derogations from the provisions of Articles 6(1)(a) and (b) and 7."

### **Prevention or control of risks**

There is a hierarchy of control measures that can be followed to ensure the safety and health of employees -

- elimination of noise sources,
- control of noise at source,
- collective control measures through work organisation and workplace layout,
- personal protective equipment.

### **Eliminate the noise source**

The elimination of the source of noise is the most effective way to prevent risks to employees, and should always be considered when new work equipment is being selected/purchased/commissioned, or when workplaces are being planned. A “no noise or low noise” procurement policy is usually the most cost-effective way to prevent or control noise.

### **Control of noise at source**

The reduction of noise, either at its source or in its path, should be a major focus of noise management programmes, considering both equipment and workplace design and maintenance. A range of engineering controls can achieve this, including -

- isolation of the source, via location, enclosure, or vibration damping using metal or air springs or elastomer supports,
- reduction at the source or in the path, using enclosures and barriers, mufflers or silencers on exhausts, or by reducing cutting, fan, or impact speeds,
- replacement or alteration of machines- including belt drives as opposed to noisier gears, or electrical rather than pneumatic tools,
- application of quieter materials- such as rubber liners in bins, conveyors, and vibrators,
- active noise reduction (“anti-noise”) in certain circumstances (active noise control is an electronically-controlled noise reduction method and involves the reduction or cancellation of one sound by the introduction of a second “opposite” sound. The second sound is usually derived electronically from the original, using a microphone signal processing system and loudspeaker. The technique can be particularly effective in reducing low frequency noise. It has been used to control noise in ducted systems such as diesel engine exhausts and the low frequency rumble from gas turbine stacks),
- carrying out preventive maintenance: as parts become worn, noise levels can change (check for worn bearings, gears, belts etc.).

## **Collective control measures**

Where noise cannot be adequately controlled at source, further steps should be taken to reduce the exposure of employees to noise. These can include changing the:

- workplace-sound absorption in a room (e.g. a sound absorbing ceiling, panels on walls etc.) can have a significant effect on reducing employees' exposure to noise,
- work organisation (e.g. using working methods that require less exposure to noise),
- work equipment: how work equipment is installed, and where it is located, can make a big difference to employees' noise exposure, and
- rotation of staff in/out of noisy area or alternate between noisy and non or less noisy tasks, i.e. reduce the duration of exposure of employees to high levels of noise during the working day by developing suitable systems or patterns of work (where possible).

## **Sources of Further Information and Bibliography**

To be inserted