



## **CONTROL OF NOISE EMISSIONS**

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## **1. Introduction.**

Noise can be defined as any audible sound or as an unwanted sound that is loud, unpleasant, unexpected or undesired. With increasing economic development such as expanding transport systems, increasing traffic volumes, industrialisation and urbanisation, noise levels are on the increase, whilst the value of a low noise environment is becoming more widely appreciated.

Environmental noise is that which is experienced throughout the community, particularly in, built up areas, public parks, near schools, hospitals or other noise sensitive areas. Sources of environmental noise include sites of industrial activity or means of transport such as, rail, air or road traffic. Occupational noise is experienced in the workplace as a result of various processes or the use of industrial machinery. Industries such as construction and manufacturing can have high noise levels but it can be a wide ranging problem affecting other workplaces such as schools or call centres too.

Prolonged exposure to noise as a result of both occupational and environmental sources can result in potentially serious health effects. Hearing impairment is perhaps the most significant effect and the consequences for any individual are severe. Other effects such as sleep disturbance are significant and in some instances noise can even provoke changes in social behaviour. Consequently there is a need for control of both environmental and occupational noise sources. Control in this context is exercised in the form of legislation which sets down and prescribes limits which must be adhered to in order for compliance to be achieved.

## **2. Environmental Noise.**

The [Environment Protection Agency](#) is the statutory authority with responsibility for licensing, enforcement, monitoring and assessment of activities associated with



environmental protection. Hence, the issue of environmental noise pollution is addressed primarily by the Environmental Protection Agency.

## **2.1 Industrial Noise.**

In 2003, the [Protection of the Environment Act](#) gave effect to the [Integrated Pollution Prevention Control \(IPPC\) Directive 96/61/EC](#). An IPPC licence is a single integrated licence which covers all emissions from a facility and its environmental management. In the case of certain large scale industrial facilities control of noise emissions is exercised through IPPC licensing or through planning conditions. These licences are granted by the Environmental Protection Agency (EPA) and may have conditions attached to control noise, including emission limit values which must not be exceeded.

### **Noise Limit Values.**

In relation to industrial noise the EPA has drawn up a guide entitled [Guidance Note for Noise in Relation to Scheduled Activities - 2<sup>nd</sup> Edition](#). This provides general guidance and sets limits for licensed facilities. According to the aforementioned guide, licensed facilities should take all reasonably practicable measures to minimise the noise impact of the activity and “Best Available Techniques” (BAT) should be used in the selection and implementation of appropriate noise mitigation measures and controls. While BAT is applied on a case by case basis the noise attributable to on-site activities should not generally exceed a free field  $L_{Ar,T}$  value of 55 dB by daytime (08:00-22:00), at any noise sensitive location. ( $L_{Ar,T}$  is the equivalent continuous A-weighted sound pressure level during a specified time interval, T, plus specified adjustments for tonal character and impulsiveness of the sound). At night time (22:00-08:00), the noise attributable to on-site activities should not exceed a free field  $L_{Aeq, T}$  value of 45 dB. ( $L_{Aeq, T}$  is the equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period T). Audible tones and impulsive noise should be avoided at all noise



sensitive locations especially at night time and a penalty of 5 dB for tonal and/or impulsive noise should be applied to the day time measured values.

In addition to the foregoing criteria, noise from a licensed facility should not be of such a nature or occur at such a time that it gives grounds for annoyance. Furthermore, in remote or rural areas which generally have low background noise levels, a lower noise limit may be more appropriate and this may be reflected in more stringent licence limits. Noise limits may be applied to individual sources of noise on site, at the boundary of the plant, or at the nearest noise sensitive locations. The assignment of such limits will be decided during the licensing of the facility.

#### **Noise Assessment.**

Normally a licensed facility will be required to have a periodic noise assessment. The nature and scope of the assessment should be determined by site specific conditions and operational history. If it has been the case that there has been a history of complaints regarding noise, then the Environmental Protection Agency will require a licensee to undertake a more extensive assessment. Noise measurement should be appropriate to the facility and representative sampling intervals should be selected and justified. For instance, the time intervals used may need to be adapted to site specific conditions such as cycles of noise emission at a plant. Further information can be found in the [Environmental Noise Survey Guidance Document](#) by the Environmental Protection Agency.

#### **Noise Control and Mitigation.**

The licensed facility must address the issue of noise control and mitigation. This can be achieved by either using an alternative approach to eliminate the impact or by reducing the severity of the impact. Measures used to reduce the impact could include, process alterations, installing or altering control equipment, restricting the hours or intensity of operation of a plant, or modifying the site or plant layout. It is important to consider that the measures taken to reduce noise do not have secondary impacts. For instance, if a noise control mechanism is fitted to a piece of equipment it



should not affect its performance by causing it to be less energy efficient. It is considered appropriate for most facilities to have a noise management programme. This should take the approach of a risk assessment and can allow for facilities to be categorised into high or low risk in relation to noise emissions. If it is determined that the facility is low risk, for example, if it always complies with licence limits for day and night, there is no history of justifiable noise complaint and sensitive receptors are well screened or remote from dominant noise sources then a noise management programme is unlikely to be required. On the other hand if the facility is not compliant for noise limits, the noise is tonal and/or impulsive and there is a history of noise complaint, then there is clearly the need for a noise management programme. In either case a periodic review should be carried out at the facility.

### **Complaints.**

If there are complaints as a result of operations at the facility then licence conditions will generally require all environmental noise complaints to be logged and investigated. The licensee must comply with the conditions specified in the licence relating to the handling and recording of complaints. An investigation should be undertaken within a reasonable timeframe and the complainant should be notified in writing of the findings. The details of any remedial work along with a time frame for completion should also be communicated to the complainant.

### **Environmental Protection Agency Act, 1992.**

Legislation relating to the control of environmental noise is also contained in the [Environmental Protection Agency Act 1992](#); specifically part VI, sections 106, 107 and 108. Section 106 deals with the introduction of regulations for the control of noise. Section 107 of the Act gives powers to local authorities to require measures to be taken to prevent or limit noise. They can thereby prevent or limit noise from commercial and industrial premises within their functional area. The local authority has the power to serve a notice on any person in charge of a premises or activity which is not controlled by the Environmental Protection Agency.



Section 108 of the Act addresses noise as a nuisance. This means that noise which is so loud, so continuous, so repeated or of such duration or pitch or occurring at such a time that it is giving reasonable cause for annoyance can be addressed. A person, a local authority or the Environmental Protection Agency may complain to the District Court and the Court may order the person or body responsible for the noise to take the measures necessary to reduce the noise to a specified level or to stop it altogether. The [Environmental Protection Agency Act, 1992 \(Noise\) Regulations, 1994](#) specify the precise form of the notice of intention to complain to the District Court.

## **2.2 Environmental Noise Regulations 2006.**

The [Environmental Noise Regulations 2006 \(S.I. No. 140 of 2006\)](#) transpose Council Directive 2002/49/EC relating to the assessment and management of environmental noise into Irish law. The implementation of the 2006 Regulations provides for a common approach to noise pollution within the European Community. The aim is to avoid, prevent and reduce the harmful effects caused by exposure to environmental noise. These Regulations apply particularly to built up areas, public parks, quiet areas in open country or in an agglomeration, areas near schools or hospitals and other noise sensitive buildings and areas. They do not apply to noise that is caused by the exposed person, noise from domestic activities, noise created by neighbours, noise at work places, noise inside a means of transport or noise due to military activities within military areas.

### **National Authority.**

The Environmental Protection Agency is the designated national authority for the purpose of these Regulations. It will supervise the actions and functions of “noise mapping bodies” and “action planning authorities” and provide guidance or advice to such bodies. The Environmental Protection Agency is also responsible for the submission of particular information requirements to the Commission.



### **Noise Mapping Bodies.**

Within the context of the Regulations specific noise-mapping bodies have been designated throughout the country. For instance, for the agglomeration of Cork, Cork City Council and Cork County Council are the designated bodies, while for major airports it is the relevant airport authority. Their purpose is to make and approve strategic noise maps for their designated area.

### **Action Planning Authorities**

Designated action planning authorities are listed in the regulations and the responsibility of making and approving action plans lies primarily with the local authorities. These plans are to be made in conjunction with the Environmental Protection Agency.

### **Noise Indicators and Assessment Methods.**

The noise indicators  $L_{den}$  and  $L_{night}$  shall be used by noise-mapping bodies for the preparation or revision of strategic noise maps.  $L_{den}$  is the day-evening-night level and is defined by a specific formula outlined in Part I of the First Schedule of the Regulations.  $L_{night}$  is the night-time noise indicator and it is defined in Part II of the First Schedule. Part III of the First Schedule contains information on supplementary noise indicators which may be used in special circumstances subject to approval by the Environmental Protection Agency. Noise mapping bodies shall use the assessment methods recommended in Part II of the Second Schedule.

### **Strategic Noise Maps.**

The Third Schedule of the Regulations sets out the minimum requirements for strategic noise maps. This process involves the presentation of data on one of the following aspects; an existing, a previous or a predicted noise situation in terms of a noise indicator, the exceeding of a limit value, the estimated number of buildings, schools and hospitals in a certain area that are exposed to specific values of a noise indicator or the estimated number of people located in an area exposed to noise. The



noise map may be presented to the public as graphical plots, numerical data in tables, or numerical data in electronic form. The first set of strategic noise maps were required to be ready by the 30<sup>th</sup> of June 2007. These maps covered the following areas; the agglomeration of Dublin, a major road which has more than 6 million vehicle passengers per year, a major railway which has more than 60,000 train passengers per year and a major airport. By the 30<sup>th</sup> June 2012 strategic noise maps or revised maps for each of the following areas are required: an agglomeration with more than 100,000 inhabitants, a major road and a major railway. Noise mapping bodies shall cooperate with their European counterparts, particularly with regard to the strategic noise mapping of border areas. Additionally a noise map shall be reviewed by the noise mapping body every five years after the date on which it was made or earlier if requested by the Environmental Protection Agency. If the information gathered by the noise-mapping body is required by the Environmental Protection Agency for submission to the Commission then this should be done no later than one month after the date on which a map or a revised map was made.

### **Action Plans.**

The minimum requirements for action plans are set out in the Fourth Schedule of the Regulations. In consultation with the Environmental Protection Agency, the action planning authorities shall make an action plan for each of the following areas by the following dates. By the 18<sup>th</sup> of July 2008; the agglomeration of Dublin, places near a major road which has more than 6 million vehicle passengers per year, places near a major railway which has more than 60,000 train passengers per year and places near a major airport. By the 18<sup>th</sup> of July 2013; an agglomeration with more than 100,000 inhabitants, places near a major road and places near a major railway. Action plans shall address priority areas where noise limit values or other relevant criteria have been exceeded. The most important area or areas as established by strategic noise mapping shall be addressed. The Environmental Protection Agency following consultation with noise mapping bodies and action planning authorities may establish other relevant criteria for action plan priorities for the likes of road, rail or airport



traffic noise or noise on industrial activity sites and inform the Minister, the Minister of Transport and the Commission of such criteria. Action plans shall aim to protect quiet areas and satisfy the minimum requirements set out in the Fourth Schedule of these Regulations. Specific duties are required of the action planning authorities in relation to the public, for instance there must be opportunity for public consultation and time frames should be adapted which will allow sufficient time for public participation. The public should also be informed of the decisions taken in relation to action plans. The Regulations set out the circumstances where a review of an action plan is required. Additionally, action planning authorities shall co-operate with their counterparts in Member States. A summary of each action plan or revised action plan shall be sent to the Environmental Protection Agency no later than one month after the date on which it was made. More detail on the requirements for action plans is set out in the Fourth Schedule of these Regulations.

#### **Access to Information.**

Strategic noise maps and action plans shall be made available to the public and disseminated through appropriate means, including the use of available information technologies. Information provided to the public on noise maps and action plans shall be clear, comprehensive and accessible and shall include a summary of the most important points. They shall also be made available to the public no later than one month after the date on which they are made.

#### **Reporting.**

The Environmental Protection Agency following consultation with noise mapping bodies, action planning authorities and the minister shall make information available to the Commission. The time lines for reporting and the types of infrastructure and sizes of agglomerations are outlined in the Regulations. The Fifth Schedule of the Regulations provides details on the data to be sent to the Commission.



### **3. Occupational Noise Legislation.**

The [Health and Safety Authority](#) is the competent body with responsibility for securing health and safety at work, consequently the issue of occupational noise is addressed by the Health and Safety Authority.

#### **Safety, Health and Welfare at Work Act 2005.**

The [Safety, Health and Welfare at Work Act, 2005](#) repealed and replaced the [Safety, Health and Welfare at Work Act of 1989](#). The purpose of the new Act is to make further provision for the safety, health and welfare of persons at work. It sets down responsibilities for employers, employees, the self employed and other groups in relation to safety and health at work. Measures for securing health and safety at work are detailed, in addition to requirements concerning safety consultation and representation. The role and functions of the Health and Safety Authority are outlined along with enforcement measures and details regarding offences and penalties for breach of occupational health and safety.

#### **Safety, Health and Welfare at Work (General Application) Regulations 2007.**

On the 1<sup>st</sup> of November 2007, Chapter 1 of Part 5 of the [Safety, Health and Welfare at Work \(General Application\) Regulations 2007](#) retransposed [Directive 2003/10/EC](#) on the minimum health and safety requirements regarding worker exposure to noise. Chapter 1 of Part 5 applies to activities where employees are likely to be exposed to noise which could pose a risk to safety and health and in particular pose a risk to hearing. The 2007 Regulations replace the [Safety, Health and Welfare at Work \(Control of Noise at Work\) Regulations 2006 \(S.I. No. 371 of 2006\)](#) which have been revoked from that date. There are two areas whereby the application of these Regulations has been deferred and they include personnel on board seagoing vessels and the music and entertainment sectors.



### **Noise Measurement.**

A sound level meter is the name given to the instrument used for measuring noise. In the case of measuring personal exposure a dosimeter is worn by the employee. Noise is measured in decibels (dB). In order to address the way the human ear responds to sound of different frequencies an A-weighting is applied and measurements are expressed in dB (A). A wide band frequency-weighting or C-weighting dB(C) is applied to measure peak, impact or explosive noises.

### **Exposure Limit Values and Exposure Action Values.**

Specific “Exposure Limit Values” and “Exposure Action Values” are prescribed in the Regulations. The “Exposure Limit Values” represents the level of daily noise exposure or peak sound pressure which must not be exceeded for any employee.

The “Exposure Limit Values” prescribed in the regulations are;

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

The “Exposure Action Values” are the level of daily noise exposure or peak pressure level which if exceeded requires specific action to be taken to reduce the risk to an employee. The Regulations also prescribe upper and lower exposure action values.

The “Upper Exposure Action Values” prescribed in the regulations are;

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

The “Lower Exposure Action Values” prescribed in the regulations are;

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

The Regulations allow an employer to calculate exposure over a week rather than a day in instances where noise exposure varies significantly from day to day. The formula for calculating weekly exposure is defined by international standard ISO



1999: 1990, point 3.6 (note 2). However, when considering using weekly averaging it is essential to ensure that there is no increased risk to health.

### **Assessment of Risks above a Lower Exposure Action Value.**

In workplaces where employees are liable to be exposed to noise which is above a “Lower Exposure Action Value”, the employer must determine and assess the risks arising from such exposure. This should be done in conjunction with sections 19 and 20 of the Safety, Health and Welfare at Work Act 2005. If it is deemed necessary noise levels shall be measured. The risk assessment shall be carried out competently at suitable intervals and shall be representative of the daily personal exposure. The methods and apparatus used should conform to those specified in the Regulations. The employer should give particular attention to the level, type and duration of exposure and also the likelihood of exposure to impulsive noise. The “exposure limit values” and the “exposure action values” should be given particular attention as should the effects of noise exposure on employees. Further measures for attention are outlined in Regulation 124 (e). A review of a risk assessment should be conducted where the results of health surveillance indicated that it is necessary. The findings of risk assessments should be recorded in the safety statement as soon as it is practicable and any steps deemed necessary to comply with the Regulations should be taken. Provision is also made in these Regulations for the review of risk assessments and measurements.

### **Provisions aimed at Avoiding or Reducing Exposure.**

An employer shall, so far as is reasonably practicable, ensure that the risk arising from exposure to noise is either eliminated at source or reduced to a minimum. Methods of achieving this include the use of work practices which eliminate or reduce exposure, choosing equipment that emits the least possible noise or proper layout and design of workplaces. An employer shall also ensure information and training for employees on the correct use of equipment. If it is possible to do so noise reduction should be carried out by technical means and appropriate maintenance programmes for work



equipment should also be put in place. Exposure to noise can also be reduced through organisation of work, such as, limiting the duration and intensity of exposure and arranging appropriate work schedules with adequate rest periods. Where rest facilities are provided the noise levels there should be compatible with their purpose. The employer should also adapt any measure taken in compliance with these Regulations and Regulation 126 and 127 where an employee's health and safety is at a particular risk from noise exposure.

#### **Application of Upper Exposure Action Values.**

If a risk assessment reveals that an "Upper Exposure Action Value" is exceeded then it is the duty of the employer to establish and implement a programme of technical or organisational measures or both designed to reduce noise exposure, whilst also taking into account the measures referred to in Regulation 125.

#### **Prevention of Exposure above Noise Level of 85 dB (A).**

If it is established through a risk assessment that there are workstations within the place of work where employees are likely to be exposed to noise above 85 dB (A) then mandatory warning signs should be displayed. These should convey that noise levels are likely to exceed the upper exposure action value and that hearing protectors are available and should be worn. These workstations should also be protected from unauthorised access by suitable means.

#### **Application of Exposure Limit Value.**

Subject to Regulation 122 an employer shall ensure that employees are not exposed to noise above the exposure limit value. But if it is detected that employees have been exposed above this limit then immediate action must be taken to reduce exposure and the reasons for the occurrence must be identified. In accordance with Regulation 125 organisational and technical measures must be taken to prevent the exposure limit value being exceeded again.



### **Personal Protection.**

An employer shall in accordance with sections 8, 9, 10, 13 and 14 of the Safety, Health and Welfare at Work Act, 2005 make available individual hearing protectors which comply with the relevant statutory provisions. This shall be done where the risks arising from exposure cannot be prevented by other means. Where noise exposure exceeds the lower exposure action values an employer shall make available individual hearing protectors. Individual hearing protectors should be selected in consultation with employees or their representatives. An employer shall also ensure that hearing protectors are used appropriately and effectively. Employees whose exposure to noise equals or exceeds the upper exposure action values shall use individual hearing protectors.

### **Employee Information, Training and Consultation.**

In workplaces where employees are exposed to noise at or above the lower exposure action value either they or their representatives should be provided with suitable and sufficient information and training relating to the risks that result from noise exposure. The information and training should include; the nature of the risks, compliance measures to be taken, the exposure limit values and exposure action values specified in the Regulations, the results of risk assessments and an explanation of their significance. Also the correct use of hearing protectors should be outlined as well as how to detect signs of hearing damage. The circumstances in which health surveillance is made available should also be outlined in addition to safe working practices to minimise exposure to noise. Consultation with employees should be carried out in conjunction with section 26 of the Safety, Health and Welfare at Work Act 2005 along with the relevant sections of these Regulations.



### **Health Surveillance and Record Management.**

An employer shall ensure that appropriate health surveillance is made available where a risk assessment reveals it necessary to do so. In cases where employees are exposed above an upper exposure action value then a registered medical practitioner should be made available for carrying out hearing checks. In the case of employees whose exposure exceeds a lower exposure action value then preventive audiometric testing should be made available. The purpose of these checks is to detect early signs of work related ill-health and to assist in the preservation of hearing. An employer shall also maintain a health record for each employee who undergoes health surveillance and a record or copy of this shall be kept for the future. An employee shall be allowed access to his or her health record. The employer shall make available to the Health and Safety Authority copies of records if requested to do so. When an employer ceases to trade they then shall notify the Authority in writing and make available all records kept by them.

If an employee is found to have identifiable hearing damage then the employer shall ensure that a registered medical practitioner assesses whether such damage is likely to be as a result of exposure to noise at work. If it is so, then every relevant employee shall be informed of the result which relates to them personally. The employer shall review the risk assessment and the measures provided to eliminate or reduce the risks. They shall also take into account the advice of the medical practitioner, or the Health and Safety Authority in implementing measures to reduce risk including reassigning the employee to alternative work which does not have further risk of exposure. If there are other employees who have been similarly exposed then their health status should be reviewed and systematic health surveillance provided.

### **Exemptions.**

In exceptional circumstances the Health and Safety Authority may make exemptions to Regulations 128 and 129 by a certificate in writing. This could be that because of the nature of the work the full and proper use of personal hearing protectors would be likely to cause a greater risk to health and safety than not using such protectors. An



exemption may be granted with conditions including a limit of time not exceeding four years. The Health and Safety Authority shall not grant an exemption unless it consults with representatives of employees or any other person the Authority considers appropriate. Additionally, the risks resulting from the exemption are, so far as is reasonably practicable, reduced to a minimum. Appropriate health surveillance is to be made available to the employees concerned. The Health and Safety Authority may revoke this exemption at any time by a certificate in writing as soon as the justifying circumstances no longer apply.

#### **4. Additional Sources of Information.**

[NP2 A Guide to the Noise Regulations](#)

[Environmental Legislation 6- Noise & Nuisance](#)

[The Department of the Environment, Heritage & Local Government](#)