UNIVERSITY OF PORTSMOUTH
CORPORATE GOVERNANCE

CONTROL OF NOISE TECHNICAL GUIDANCE NOTES (TGN)

Corporate Health and Safety Guidance

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Introduction

The Control of Noise at Work Regulations 2005. Require you to take specific action at certain action values. These relate to:

- The levels of exposure to noise of employees averaged over a working day or week; and
- the maximum noise (peak sound pressure) to which employees are exposed in a working day.

Daily (or weekly) personal noise exposure represents a daily (or weekly) noise 'dose' a combination of 'how loud' and 'how long exposed' for the various noises that an employee is exposed to in a working day (or week). The formulae for calculating daily and weekly personal noise exposure levels appear in Schedule 1 of the Noise Regulations.

Very high peak sound pressure levels can damage hearing. The formula for peak sound pressure level appears in Schedule 2. 2 of the Noise Regulations.

The Exposure Action Values (EAVs), are the levels of exposure to noise at which you are required to take certain actions.

The Exposure Limit Values (ELVs), are the levels of exposure to noise above which an employee must not be exposed (see regulation 6(4)).

Exposure Limit Values and Exposure Action Values

Lower Exposure Action Value:

- 80dB (A-weighted), personal exposure averaged over a day or week
- 135 dB (C- weighted) Peak Sound pressure.

Upper Exposure Action Value:

- 85dB(A), personal exposure averaged over a day or week
- 137 dB(C), peak sound pressure.

Wherever exposure exceeds these levels, certain actions are required. Where exposure is very varied, average exposure may be calculated over a week rather than a day.

Exposure Limit Values:

- 87dB (A - weighted) (exposure averaged over a day or a week)

- 140 dB (C - weighted) Peak Sound Pressure.

This is the maximum sound exposure permitted for any individual and takes hearing protection into account, i.e. it is the actual sound exposure of the individual, “at the ears” (close to the ears), following any attenuation (reduced affect) from hearing protection.

Where the exposure of an employee to noise varies markedly from day to day, an employer may use weekly personal noise exposure in place of daily personal noise exposure for the purpose of compliance with the Regulations.

In applying the exposure limit values, but not in applying the lower and upper exposure action values account must be taken of the protection given to the employee by any personal hearing protectors provided by the employer in accordance with regulation 7(2).

Noise Risk Assessment

Regulation 5 of The Control of Noise at Work Regulations 2005 requires an employer who carries out work which is liable to expose any employees to noise at or above a lower exposure action value, to make a suitable and sufficient assessment of the risk from that noise to the health and safety of those employees. The risk assessment must identify the measures which need to be taken to meet the requirements of the regulations.

A risk assessment is required wherever it is likely that noise exposure will occur at or above the Lower Exposure Action Value. As a guide to this, the following may be considered:

- If noise is intrusive but normal conversation is possible, likely noise level is approx. 80dB.
- If you have to shout to talk to someone 2m away, likely noise level is approx. 85 dB.
- If you have to shout to talk to someone 1m away, the likely noise level is 90dB.

The decibel scale used to measure noise is logarithmic. An increase in 3 dB equates to a doubling of sound. The increase from 80 to 85 dB is almost a four- fold increase in sound level.

A table saw and a hand drill are each likely to generate at least 90dB (A). A vibration table or printing press may be well over 100dB (A).

Personal noise exposure is the combination of noise level and length of exposure. An individual working in an area where the noise level was 80dB would have a personal exposure of 80dB if that individual worked there for 8 hours per day. Working in an area where the noise level was 85dB for 2 hours a day would also give a personal exposure of 80dB.

Where noise exposure is accompanied by exposure to vibration or to some chemicals such as solvents, the risk of adverse effects may be higher at a given noise level.

A formal, documented risk assessment should be carried out if any individual works in an area exceeding 80 dB on a regular basis i.e. 4 hours or more, most days or if noise levels exceed 85dB, even if exposure is infrequent or irregular. If a risk assessment is deemed not to be necessary this should be recorded, for example as part of a faculty or department general risk assessment.

Risk assessment requires:

Assessment of the level and type of noise; this may come from manufacturer's data for individual pieces of machinery/equipment, or from a sound level measurement, especially where multiple pieces of equipment operate in an area simultaneously. Additional noise i.e. from background music should also be included;

- identification of who might be affected;
- the likely exposure time of those individuals, considering working patterns, noise exposure during breaks etc;
- assessment of indirect risk i.e. the risk of individuals not hearing warning alarms due to the noise level;
- consideration of additional risk factors such as the presence of vibration or solvents.

The risk assessment should include an action plan which documents the control measures already in place to reduce the risk from noise exposure and any further control measures planned. The noise risk assessment can be a stand-alone document, or can be incorporated into the overall risk assessment document for a faculty, department or process where this is more appropriate.

The risk assessment should also identify those at greater risk, such as people with existing hearing loss or hearing damage. The risk assessment should be reviewed if there is any change in noise exposure, changes in staff, machinery/equipment, or the law, or simply if people think the existing assessment is no longer valid and at intervals of no longer than 2 years. The risk assessment for noise, and any associated measurement should be carried out in conjunction with the Corporate Health and Safety Team to ensure that the assessor has the necessary skills and experience.

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Reducing Noise Exposure

Regulation 6 of The Control of Noise at Work Regulations 2005 outlines the requirements placed on the University regarding reducing a noise hazard. The noise risk assessment should enable the employer to identify and decide on reasonably practicable ways of reducing the risk of hearing damage and safety hazards arising from noise at work.

The Health and Safety Executive (HSE), says that, as a general rule, whenever there is noise at work (and regardless of whether any exposure action values are exceeded), employers should seek to adopt alternative processes, equipment and/or working methods which would make the work quieter or mean that workers are exposed to noise for shorter times, as far as is reasonably practicable. They should also be keeping up with – and adopting if reasonably practicable – good practice and the standard for noise control for their industry.

HSE adds that if noise exposures are below the lower exposure action values, the risks to hearing and safety are low and employers will generally only be expected to take actions that are relatively simple and inexpensive to carry out.

Measures should be put in place to reduce risks from noise exposure to as low a level as reasonably practicable (ALARP), even if noise levels are below the Lower Exposure Action Value. Consideration should be given as to whether further reductions are practical.

Wherever noise levels may exceed the Lower Exposure Action Level i.e. personal exposure exceeding 80 dB, assistance should be sought from the Corporate Health and Safety Team to assist with risk assessment and noise reduction.

Formal measures to reduce noise exposure must be introduced if the Upper Exposure Action Value is exceeded, i.e. personal exposure is above 85dB. Provision of hearing protection is not an adequate solution in these circumstances. Personal protective equipment (PPE), is the last resort or should be used in conjunction with other measures such as engineering controls.

Personal noise exposure MUST NOT exceed the Exposure Limit Value of 87dB. (This measurement considers the effect of hearing protection (i.e. PPE).

Measures to reduce noise exposure may include:

- Replacing machinery, equipment and tools with alternatives which create lower levels of noise.
- Ensuring all equipment is properly maintained.
- Reducing exposure by reducing time exposed to noise.

- Shielding or enclosure (of either a piece of machinery/equipment or the operator).

Detailed guidance on ways of reducing noise exposure can be found: The Approved Code of Practise for The Control of Noise at Work Regulations 2005. HSE Guidance.

Hearing Protection

Providing personal hearing protection should be one of the first considerations on discovering a risk to the health of employees due to noise. However, it must not be used as an alternative to controlling noise by technical and organisational means, but for tackling the immediate risk while other control measures are being developed. In the longer term, it should be used where additional protection is provided, beyond what has been achieved through noise control measures.

Where personal hearing protection is needed it is important that the selected types are comfortable for those expected to wear them and provide a level of protection appropriate to their noise exposures. It is important to make sure that it is used and looked after properly.

Hearing protection can be used as an additional measure once noise has been reduced as far as is reasonably practicable by other means; or as an interim measure pending noise reduction. It must not be used as the sole method of protection if personal noise exposures exceed the upper action value (85dB).

Hearing protection should be made available on request if noise exceeds the lower action value (80dB)

Any area where noise levels exceed 85 dB (or peak sound level of 137dBC) must be designated as Hearing Protection Zones (areas where the use of hearing protection is compulsory), and marked with appropriate signage. Within these areas, wearing of hearing protection will be compulsory, even though exposure may only be for short periods of time.

Hearing protection provided must be suitable for the levels and type of noise individuals are exposed to. Guidance on choosing suitable hearing protection can be found in the HSE Guidance for The Control of Noise at Work Regulations 2005.

Hearing protection should be stored properly, kept well maintained and regularly inspected by a competent person. Pre-use checks must be carried out by the user. Any defects reported and defective equipment replaced before starting or resuming work. The University PPE Issue Form and the PPE Assessment Checklist should be completed.

Approved Code of Practise

Approved codes of practice (ACOP) are detailed guidance documents approved by the Health and Safety Executive (HSE) and published to accompany a set of health and safety regulations. They are documents that help to comply with the legal requirements.

An ACOP is approved by the HSE, with the consent of the Secretary of State. It describes the preferred or recommended methods (by HSE) that can be used, or standards to be met, to comply with the Regulations and the duties imposed by the Health & Safety at Work etc Act 1974.

By following the advice, it is enough to comply with the law, in respect of those specific matters on which the Code gives advice. However, the Code has a special legal status. If prosecuted for breach of health and safety law, and it is proved that the relevant provisions of the Code were not followed. Proof will be required to show that the law had been complied with in some other way or a Court will find the employer at fault.

The ACOPs for The Control of Noise at Work Regulations 2005: Approved Code of Practise (ACOPS), L108.

Health Surveillance

Health Surveillance for those exposed to noise at work is a requirement of Regulation 9 of The Control of Noise at Work Regulations 2005. If a risk assessment indicates that there is a risk to the health of employees who are, or are liable to be, exposed to noise, the University must ensure that such employees are placed under suitable health surveillance, which shall include testing of their hearing (audiometry).

Where, as a result of health surveillance, an employee is found to have identifiable hearing damage the University must ensure that the employee is examined by a doctor and, if the doctor or any specialist to whom the doctor considers it necessary to refer the employee considers that the damage is likely to be the result of exposure to noise, the University must, if the risk assessment indicates that there is a risk to health:

a) Where hearing damage has been identified, a suitably qualified occupational health professional should explain the significance of the results to the worker and give them advice on the risks of future noise exposure at work;

b) review any measure taken to comply with regulations 6, 7 and 8, considering any advice given by a doctor or occupational health professional, or by the enforcing authority;

c) consider assigning the employee to alternative work where there is no risk from further exposure;

d) to noise, considering any advice given by a doctor or occupational health professional; and

e) ensure continued health surveillance and provide for a review of the health of any other employee who has been similarly exposed.

An employee to whom this regulation applies must, when required by the University and at the cost of the University, present themselves during their working hours for such health surveillance procedures as may be required.

Audiometry (Health surveillance):

Must be carried out for staff who are regularly exposed to noise above the upper exposure action value (85 dB).

Health surveillance will also be offered to those exposed above the Lower Exposure Action Value if they are at increased risk i.e. if they report a known sensitivity to early hearing damage or a family/personal history of deafness/hearing impairment.

Where health surveillance is required it will usually be carried out annually, this may be subject to change depending on an individual's circumstances i.e. where there the University Occupational Health Service has particular cause for concern of an individual's susceptibility. Wherever possible, audiometry for new staff (or those newly exposed to noise within the University) should be carried out prior to any noise exposure, ostensibly to give baseline data.

Health surveillance will be managed by the University Occupational Health Service. All individual records will be held in confidence. Where appropriate, a summary of results for groups of staff will be reported back to a relevant manager to indicate the effectiveness of noise management systems.

Noise at Work Glossary

Noise Survey

A survey of noise levels at specified locations (operator positions or within areas), before completing a full noise assessment.

Noise Assessment

The determination of the noise exposure of a person or a group of people exposed to high noise levels, so that action can be taken to manage and control the noise to prevent or minimise the risk of hearing damage.

Noise Level

The term 'noise level' refers to the sound pressure level, re 20µPa measured in decibels dB and often A-weighted.

Common abbreviations

L_1	LA_1	LC_1	LZ_1	$LAeq_1$	LCeq
$Lpeak_1$	$LCpeak_1$	$LZpeak_1$	LEP_1	$LEPd_1$	LEX

Decibel, dB

The unit of sound level and noise exposure measurement. Please note that a noise level. LAeq = 85 dB may also be seen written as 85 dB(A) Leq. Similarly, a peak noise level LCpeak of 110 dB may also be seen written as 110 dB(C)peak.

A-weighting, dB(A)

The A-weighting unit is designed to reflect the response of the human ear, which is not equally sensitive to sound at all frequencies. It is most sensitive to noise at frequencies in the middle of the audible range and its sensitivity falls at low frequencies and very high frequencies. This performance characteristic is closely associated with vulnerability to damage from high noise levels. Noise at frequencies to which the ear is most sensitive is most likely to cause damage.

The A-weighting is a standard electronic filter designed to mimic the response of the ear to noise. Thus A-

weighted decibel provides a good estimate of how damaging a particular noise is likely to be.

Equivalent continuous A-weighted noise level LAeq

Equivalent continuous A-weighted noise level LAeq is sometimes written as dB(A) Leq. Apart from the frequency content and amplitude of noise, the duration is also a major factor in determining the likelihood of damage to hearing. The A-weighted noise exposure or dose represents the total amount of sound energy received over a period of time. The equivalent continuous 'A' weighted noise level LAeq) is the unit used to assess the noise 'dose' associated with a fluctuating noise level over a given time period. It is the constant noise level that would result in the same total sound energy received over the given period of time as the fluctuating noise.

Daily personal noise exposure, LEP,d

Daily personal noise exposure Leq, expressed in dB, although based on A-weighted noise levels and exposure duration. A measure of the average noise energy a person is exposed to in a working day, which is directly related to the risk of hearing damage. Exposure to a noise level LAeq of 85dB for 8 hours during a working day gives a daily personal exposure, LEP,d of 85 dB. This corresponds to the Upper Exposure Action Value (UEAV), in 'The Control of Noise at Work Regulations 2005'.

Weekly personal noise exposure, LEP,w

The noise exposure for the days whilst exposed to noise averaged over a 5-day working week.

The 3 dB Rule

An increase in noise level of 3 decibels (+ 3 dB), represents a doubling of noise energy. So, a noise exposure of 85 dB for 8 hours represents the same noise exposure as 88 dB for 4 hours.

C-weighting, dB(C)

The weighting of audible frequencies often used for the measurement of peak sound pressure level (LCpeak). As the noise level increases, the ear is better able to hear low and high frequency sounds. The C-weighting has a flat (or linear), response across the audible frequency range, so is better than the A-weighting to represent high noise levels for peak measurements.

Impulsive noise

Any type of single or repeated noise event of short duration with an impulsive character i.e. an explosion of impact noise, bang, crack etc.

Peak noise level, LCpeak

Peak noise level, LCpeak is sometimes written as dB(C) peak. The maximum value reached by the sound

pressure at any instance during a measurement period usually measured with the C-weighting and very rapid meter response time (on the 'peak' setting).

Equivalent continuous C-weighted level, LCeq

Equivalent continuous C-weighted level, LCeq is used only for simplified hearing protection calculations. The C-weighted noise exposure or dose represents the total amount of sound energy received over a period of time with the C-weighting filter selected on the sound level meter. The LCeq value is only used for basic hearing protection calculation methods known as HML or SNR. Not to be confused with this value with the peak level described above.

Octave bands

An international agreed set of filters that can be used to determine the amount of noise in each band across the frequency range. Used for more detailed hearing protection assessments or investigating noise problems.

Maximum Recommended Noise Dose Exposure Levels

The table below gives guidance on how long it is safe for someone to be exposed to different noise levels.

Noise Level dB(A)	Maximum Exposure Time (in an 8-hour working day)
85	8 Hours (Wearing hearing protection in the area is mandatory)
88	4 Hours
91	2 Hours
94	1 Hour
97	30 Minutes
100	15 Minutes
103	7.5 Minutes
106	3.7 Minutes

109	112 Seconds
112	56 Seconds
115	28 Seconds
118	14 Seconds
121	7 Seconds
124	3 Seconds
127	1 Second
130 -135	Less than 1 second
140	No exposure – Human pain threshold