

**WEST LOTHIAN COUNCIL****NOISE****Guidance**

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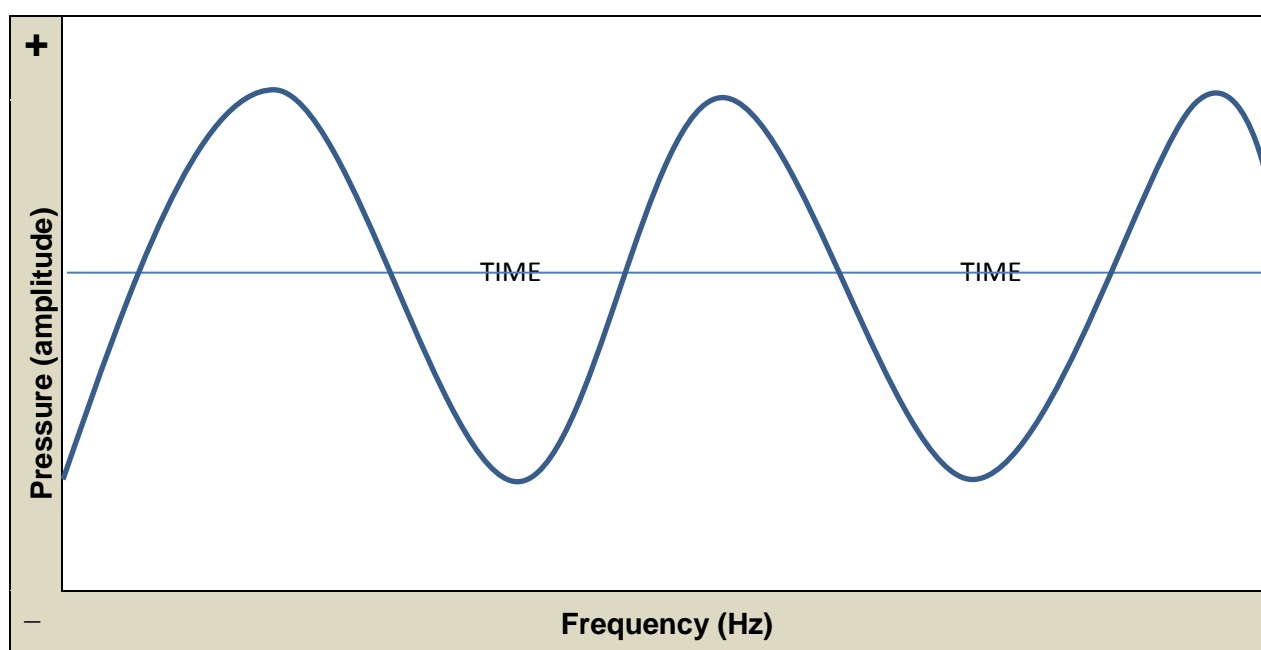
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AIM

01. The purpose of this document is to provide guidance on the effects of workplace noise and the control measures to prevent noise related hearing conditions to West Lothian Council (WLC) employees. The guidance is designed for managers, Head Teachers and heads of service to fulfil their responsibilities and duties that may be required under The Control of Noise at Work Regulations 2005.

NOISE

02. Noise is fluctuations in air pressure which gives rise to pressure waves that travel through the atmosphere at 343 meters per second. This pressure is described as amplitude and equates to loudness (the higher the amplitude waves the louder the noise). The frequency of noise is described in hertz (Hz) which means times per second (1 Hz per second). The closer the frequency waves are together, the higher the pitch of noise.



03. Noise is measured in units called 'decibels' normally written as 'dB'. As the decibels scale is logarithmic, the calculations can be difficult to understand but as an example every 3 decibels (dB) added, doubles the noise level. The scale below demonstrates that when 40 dB (10000 PR), which is the noise level of an average office environment is doubled to 80 dB, the power ratio does not double to 20000PR but increases to 100 000 000PR.

Decibel (dB)	Power Ratio (PR)	Number in writing
100	10000000000	Ten Billion
90	1000000000	One Billion
80	100000000	One Hundred Million
70	10000000	Ten Million
60	1000000	One Million
50	100000	One Hundred Thousand
40	10000	Ten Thousand
30	1000	One Thousand
20	100	One Hundred
10	10	Ten
0	1	One

04. Because the human ear is not equally sensitive to sounds at all frequencies, occupational noise is measured in a way which simulates the response of a healthy human ear. This is generally referred to as decibels with 'A' weighting, written dB(A). For higher peak sounds i.e. hammer blows against metal, a 'C' rating is used.

05. Within West Lothian Council, noise must be controlled to an acceptable level. If not, it can cause physical injury. Any damage to hearing caused by workplace activities can be permanent. Both peak sounds and continuous noise created by workplace activities are averaged out over an 8 hour working period. This average is referred to as the 'L_{EP,D}'.

Causes and effects of noise

06. Within the council there may be many sources of noise. For most of the noise exposure there will be no requirement to consider the consequences but if that exposure reaches a level that could cause harm, an assessment must be made. Some of the sources of noise (and approximate noise levels) that would probably require a noise assessment are listed below.

Chainsaw – 100dB

Circular saw – 100dB

Petrol driven grass mower – 96dB

Hammering steel – 95dB

Tractor cab – 90dB

Electric drill – 87dB

Musical instruments – 85dB

Emptying glass bottles – 80dB

07. The possible effects of exposure to uncontrolled noise are listed below.

Noise Induced Hearing Loss (NIHL) – physical damage to the ears

Tinnitus - ringing in the ears

Permanent Threshold Shift (PTS) – a reduction in the ability to hear a certain frequency

Headaches

Stress

Fatigue and tiredness

Reduced efficiency and performance

Digestive disorders

EXPOSURE LIMITS

08. The Control of Noise at Work regulations describe the council's legal obligations to their workers to protect them from noise and the permitted levels that employees should be exposed to. These personal noise exposure levels for employees are described below and in each case specific actions must be carried out. In most cases the measurement should be calculated on a daily (8 hour average) basis but where sporadic exposure to noise occurs, weekly measurements can be used.

Lower Exposure Action Values (LEV) - 80 dB (A-weighted) and 135 dB (C-weighted)

Upper Exposure Action Values (UEV) - 85 dB (A-weighted) and 137 dB (C-weighted)

Exposure Limit Values (ELV) - 87 dB (A-weighted) and 140 dB (C-weighted)

Lower exposure action values

09. Where it is likely that 80 dB (A-weighted) and 135 dB (C-weighted) will be breached, the following actions must be applied.

A suitable risk assessment should be carried out

Information and training on the effects of noise and preventative measures should be provided to those exposed

Make ear protection available to staff if the employee requests them

Provide adequate health surveillance

Upper exposure action values

10. Where it is likely that 85 dB (A-weighted) and 137 dB (C-weighted) will be breached, the following actions must be applied on top of the lower exposure action values.

This noise level must be reduced to a level as low as reasonably practicable

Mandatory hearing protection should only be considered when there is no other reasonable option to reducing the noise

If hearing protection is the only option, areas exposed to this level of noise must be made a mandatory hearing protection zone, restricted and signed as such

Exposure limit values

11. Where it is likely that 87 dB (A-weighted) and 140 dB (C-weighted) will be breached, the following actions must be carried out.

Work involving exposure to this level of noise must be stopped

If staff are exposed to noise levels over the exposure limit, an investigation should be carried out with preventative measures introduced.

RISK ASSESSMENT

12. As West Lothian Council has a duty to protect workers from noise to a level that is reasonable practicable, when any employee is exposed to noise levels above the lower exposure action value, a suitable risk assessment must be completed on the source of the noise.

13. The risk assessment should be carried out by a competent person with reasonable knowledge, training and experience to provide a suitable assessment. In many cases this may involve the use of a third party contractor. As with any risk assessment the following procedure should take place.

Identify the hazard (noise). This could be through manufacturer's information or observing work practices i.e. the use of personal dosimeters

Identify who could be harmed and how. This includes identifying the length of exposure and anyone with pre-existing audio impairments

Evaluate the risk and assign control measures

Record the significant findings

Review the assessment if health surveillance suggests that there is an issue with employees exposed to noise or the circumstances change i.e. new people or equipment is introduced

14. A formal assessment should be done if the noise level is expected to be at or above the lower action value limit. Some ways that may provide a clue as to whether a formal assessment is required are listed below. For further guidance on risk assessment, a guidance document has been published on 'My Toolkit', 'Health and Safety'.

If the noise is intrusive but normal conversation is possible, the noise level is probably around 80dB

If you have to shout to talk to someone 2 m away the noise level is probably around 85dB

If you have to shout to talk to someone 1 m away the noise level is probably around 90dB

Employee responsibilities

15. Employees also have a responsibility in protecting themselves and others that could be affected by workplace noise. Employees have the following responsibilities.

Every employee has a general duty to protect themselves and others through their acts and omissions i.e. by reporting work activities that are considered noisy

Employees must use protective equipment (hearing protectors) in accordance with the training provided

Any defects or issues with safety measures provide in the reduction of noise or hearing protection must be reported as soon as practicable

CONTROL MEASURES

Noise pathways

16. Before any control measures are identified and introduced it is worth understanding how noise travels. There are three routes for noise to be heard.

Direct – the noise moves from the source of transmission to the receiver

Transmitted – Residual noise will be transmitted through material i.e. floors as vibration and then be returned to noise

Reflected – This noise will be reflected off other structures and then received

Hierarchy of noise control

17. The following hierarchy should be used in order when applying control measures to any workplace noise created at or above the lower exposure action level.

Remove or reduce the noise at source – this can be achieved by replacing machinery or changing work practices to reduce noise

Attenuate by using barriers – The use of barriers placed in between the source and receiver will reduce the level of exposure

Receiver protection – this is the last method that should be considered and can be achieved by issuing the appropriate hearing protection.

18. Other methods of controlling noise exposure are identified below. Engineering methods should be considered before administrative ones.

Engineering controls

Enclosures around the source of noise

Sound barriers placed between the source and receiver

If sound proof cabs and control rooms have been identified periodic testing should take place

Mufflers can be used to prevent older machinery and equipment creating noise

Considering noise emissions through procurement for newer equipment

Administrative controls

Arranging a work roster system to decrease the exposure time. Annex 1 shows a table if exposure points are used to control the time of exposure

Limiting the number of personnel exposed to the noise

Creating and marking hearing protection zones

Calculating exposure time

19. Exposure to noise can be calculated in several ways once the noise level has been identified. The HSE has provided calculation tools and the links to these can be found in additional information. An exposure chart can also be used (Annex 1).

Training information and instruction

20. If the noise is assessed to be at or above the lower exposure action value, information, instruction and training must be provided. Some of the topics that should be covered are listed below.

The level of noise that they will be exposed to

The measures identified in the risk assessment to protect them from the noise, including hearing protection

Any safe systems of work, procedures or hearing protection zones that will be applied

The entitlement to health surveillance and what will be required from them

Hearing protection

21. If the noise risk assessment identifies the requirement for hearing protection the correct type and Assigned Protection Factor (APF) should be provided. Consideration for the collective use of other types of Personal Protective Equipment should be considered such as eye and head protection.

22. Employees that are issued hearing protection must be instructed on its use. Training could cover aspects such as;

A description of the equipment and the reason why they must wear it

How to fit and wear ear protectors

The maintenance and inspection of the equipment. They should also be aware of the reporting and exchange procedures.

HEALTH SURVEILLANCE

23. If the risk assessment indicates that the noise level will breach the lower exposure action value, and there is no other reasonable way to reduce the level, health surveillance must be provided.

Audiometric testing

24. Audiometric 'hearing tests' are a useful method of establishing a baseline of a person's hearing. Subsequent testing can detect changes in hearing that could indicate that the risk assessment requires to be reviewed.

ADDITIONAL INFORMATION

The HSE noise calculators – [Link](#)

The Control of Noise at Work Regulations 2005 – [Link](#)

ANNEX 1 to
Noise guidance – Exposure points

Sound pressure level, L_{Aeq} (dB)	Duration of exposure (hours)							
	1/4	1/2	1	2	4	8	10	12
105	320	625	1250					
100	100	200	400	800				
97	50	100	200	400	800			
95	32	65	125	250	500	1000		
94	25	50	100	200	400	800		
93	20	40	80	160	320	630		
92	16	32	65	125	250	500	625	
91	12	25	50	100	200	400	500	600
90	10	20	40	80	160	320	400	470
89	8	16	32	65	130	250	310	380
88	6	12	25	50	100	200	250	300
87	5	10	20	40	80	160	200	240
86	4	8	16	32	65	130	160	190
85		6	12	25	50	100	125	150
84		5	10	20	40	80	100	120
83		4	8	16	32	65	80	95
82			6	12	25	50	65	75
81			5	10	20	40	50	60
80			4	8	16	32	40	48
79				6	13	25	32	38
78				5	10	20	25	30
75					5	10	13	15

Total exposure points	Noise exposure $L_{EP,d}$ (dB)
3200	100
1600	97
1000	95
800	94
630	93
500	92
400	91
320	90
250	89
200	88
160	87
130	86
100	85
80	84
65	83
50	82
40	81
32	80
25	79
20	78
16	77