

SIM 03/2007/08 Appendix 3 - Control and management of noise risks in PLASTICS

Table 1. Established noise control methods for high-risk activities

High risk activity / process	Example noise levels, dB*	Established noise control methods	Further information (links)
Granulators (and other size reduction machines e.g. agglomerators, crumbers, shredders, pelletisers)	100 (granulators)	<p>Methods include:</p> <ul style="list-style-type: none"> • use feed conveyor to remove operator from higher noise areas • situate size reduction machines in separate rooms or buildings – provide for remote or automated feeding • lag or damp the machine casing • form sound trap in feed aperture or hopper • enclose the machine • fit segmental or helical cutters • use tangential feed • fit resilient backing to knives • reduce rotor speed 	<p>Example: Rubber granulator (<i>see HSE noise web pages</i>)</p> <p>Example: Enclosure for rubber grinding machine http://www.casestudy.mom.gov.sg/casestudy/case-study-detail.jsp?id=199</p> <p>Example: Strand pelletisers (HSG138 #39) (<i>see HSE noise web pages</i>)</p> <p>Example: Enclosure for pelletiser http://www.casestudy.mom.gov.sg/casestudy/case-study-detail.jsp?id=294</p> <p>Generally useful: “Noise in the plastics processing industry” (RAPRA 1985, out of print, the HSE Sector have a reference copy)</p>
	90 (agglomerators etc.)		
Injection moulding machines	97 – 100	<p>Methods include:</p> <ul style="list-style-type: none"> • use slow speed pumps • control release of exhaust air • mount pumps and motors on anti-vibration mounts and incorporate flexible hoses in pipe lines • enclose hydraulic power packs • convert injector guards to acoustic guards • fit low noise nozzles to blow guns etc. 	<p>Example: Controlling release of exhaust air http://www.casestudy.mom.gov.sg/casestudy/case-study-detail.jsp?id=200</p>
Extruders	90	<p>Methods include:</p> <ul style="list-style-type: none"> • specify low noise design • for hydraulic systems see injection moulding machines above • fit silencers to drive motor air intakes and exhausts • enclose drive motor. 	
Mould cleaning guns	105	<p>Replace nozzles with low-noise types (e.g. those which generate an induced secondary air flow). Reduction of up to 10 dB.</p>	<p>Example: Reduced noise from mould cleaning gun (HSG138 #16) (<i>see HSE noise web pages</i>)</p>

* Sample L_{Aeq} . The noise levels are indicative only and will vary depending on equipment type and conditions of use.

SIM 03/2007/08 Appendix 3 - Control and management of noise risks in PLASTICS

High risk activity / process	Example noise levels, dB*	Established noise control methods	Further information (links)
Extrusion line cut off saws	100	Methods include: <ul style="list-style-type: none"> • replace guards with solid panels lined with acoustically absorptive material • fit acoustic strip curtain at product out-feed 	Example: Extrusion line cut-off saws (HSG138 #53) (see <i>HSE noise web pages</i>)
Ultrasonic welding machines	96 (typical)	Enclose with sound reducing material	Example: Enclosure of welding machine http://www.casestudy.mom.gov.sg/casestudy/case-study-detail.jsp?id=228

SIM 03/2007/08 Appendix 3 - Control and management of noise risks in PLASTICS

Table 2: Management of noise risks

(see L108 “Controlling noise at work”, ISBN 0-7176-6164-4, available from HSE Books at www.hsebooks.co.uk)

Issue	Expectation	References and related guidance
Workplace design for reduced noise exposure	<p>Table 1 deals with established technical and organisational noise control measures for a range of high noise risk activities or processes. In addition to these measures, in general there will always be benefits to be gained in considering and applying general principles of workplace design for reducing noise exposure. For example:</p> <ul style="list-style-type: none"> • appropriate use of acoustic absorption within buildings can reduce or limit the effects of reflected sound (specialist help will be needed to put this in to effect); • careful planning could segregate noisy machines from other areas where quiet operations are carried out; • the number of employees working in noisy areas should be kept to a minimum; • screens, barriers or walls can be placed between the source of the noise and the people to stop or reduce the direct sound; • noise refuges can be a practical solution in situations where noise control is very difficult, or where only occasional attendance in noisy areas is necessary; • increasing the distance between a person and the noise source can reduce noise exposure considerably. 	<p>Workplace design (L108 paragraphs 198-200, 212-219, 234) (see <i>HSE noise web pages</i>)</p> <p>Example: Coating pans (see <i>HSE noise web pages</i>)</p> <p>Example: Flexible acoustic screening material (HSG138 #4) (see <i>HSE noise web pages</i>)</p> <p>Example: Acoustic refuges (HSG138 #11) (see <i>HSE noise web pages</i>)</p> <p>Example: Use of absorption in a noise control programme - http://www.hse.gov.uk/noise/soundsolutions/ss10.htm</p>
Selection of tools and machinery	<p>Employers should demonstrate a positive purchasing policy which makes sure noise is taken into account when selecting machinery.</p> <p>For many types of equipment there will be models designed to be less noisy. When selecting equipment to buy or hire, besides ensuring that the tool or equipment is generally suitable for the job, employers should:</p> <ul style="list-style-type: none"> • ask about likely noise levels for the intended use(s); • check that manufacturers’ noise data is representative of likely noise levels for the intended use(s); • use the noise information to compare machines before making the final choice; • look for warnings in the instruction book to see if particular uses of the tool or machines are likely to cause unusually high noise; • be aware that even where manufacturers declare that their tools or machines produce less than 70 dB, levels may sometimes be much greater in your workplace. 	<p>Low noise machines (L108 paragraphs 72-74, 201-202) (see <i>HSE noise web pages</i>)</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>L108 Part 4: Selecting Quieter Tools and Machinery</p>
Limiting exposure duration	<p>Restriction of the time spent in noisy areas, or doing noisy tasks, can be effective in reducing noise exposures, as can ensuring that noisy devices are only used when they are actually needed.</p> <p>Where some employees do noisy jobs all day or week, and others do quieter ones, job rotation should be considered. This might need you to train employees to carry out other jobs. This system will reduce the noise exposure of some employees while increasing that of others, so care and judgement is needed. Employees will need to be rotated away from noisy jobs for a significant proportion of time to make an appreciable difference to their daily exposure.</p> <p>The noise exposure ready-reckoner and exposure calculators can be used to indicate the reductions in exposure that can be achieved by reducing the duration of exposure to noise.</p>	<p>HSE Noise exposure ready-reckoner (see <i>HSE noise web pages</i>)</p> <p>HSE noise exposure calculators - http://www.hse.gov.uk/noise/calculator.htm</p>

SIM 03/2007/08 Appendix 3 - Control and management of noise risks in PLASTICS

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Health surveillance (audiometry)	<p>Health surveillance for noise-induced hearing damage should be in place for employees whose daily personal noise exposure is frequently above 85 dB, or who are frequently exposed to peak sound pressure levels above 137 dB. Health surveillance should also be provided where exposures are lower, but where the employee may be particularly sensitive to noise. As a minimum, a programme of health surveillance should include:</p> <ul style="list-style-type: none"> • audiometric testing (baseline assessment on first entering a job involving noise exposure, annual testing for two years, then three yearly testing) • arrangements to receive medical advice on management of affected employees • arrangements to receive anonymised information to demonstrate effectiveness of controls 	<p>Health surveillance – http://www.hse.gov.uk/noise/healthsurveillance.htm</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>Protect your hearing or lose it (advice for employees) - http://www.hse.gov.uk/pubns/indg363.pdf</p> <p>L108 Part 6: Health Surveillance for Hearing Damage</p>
Hearing Protection	<p>Providing personal hearing protection should be one of the first considerations on discovering a risk to the health of your employees due to noise. It should 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 there is a need to provide additional protection beyond what has been achieved through noise control.</p> <p>Hearing protection use should be targeted at particular noisy jobs and activities. Personal hearing protection must be supplied by the employer to any employee whose daily personal noise exposure is likely to exceed 85 dB, or who are likely to be exposed to peak sound pressure levels above 137 dB. The employee must use the protection provided. The employer should ensure that, through the use of hearing protection, the employee's effective noise exposure is reduced to at least below the above levels.</p> <p>Important factors to consider in the selection and use of hearing protection include:</p> <ul style="list-style-type: none"> • Types of protector, and suitability for the work being carried out; • Noise reduction (attenuation) offered by the protector, including taking account of 'real-world' factors, and also ensuring that not too much protection is provided; • Compatibility with other safety equipment; • Pattern of the noise exposure; • The need to communicate and hear warning sounds; • Environmental factors such as heat, humidity, dust and dirt; • Cost of maintenance or replacement; • Comfort and user preference; • Medical disorders suffered by the wearer. <p>The use of personal hearing protection should be managed through the provision of appropriate information, instruction and training for employees, supervision and the use of appropriately defined and demarcated Hearing Protection Zones.</p>	<p>Hearing protection – general advice - http://www.hse.gov.uk/noise/hearingprotection.htm</p> <p>HSE hearing protection calculator - http://www.hse.gov.uk/noise/hearingcalc.xls</p> <p>Hearing protection – Over-protection (L108 paragraphs 287 – 288)</p> <p>Hearing protection – real-world factors (L108 paragraphs 282 – 286) (<i>see HSE noise web pages</i>)</p> <p>Hearing protection – advice on issuing (L108 paragraphs 301 – 305) (<i>see HSE noise web pages</i>)</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>Protect your hearing or lose it (advice for employees) - http://www.hse.gov.uk/pubns/indg363.pdf</p> <p>L108 Part 5: Hearing Protection – Selection, Use, Care and Maintenance</p>

SIM 03/2007/08 Appendix 3 - Control and management of noise risks in PLASTICS

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Information, instruction and training	<p>It is important that employees understand the risks they may be exposed to. Where they are at risk from noise their employer should at least tell them:</p> <ul style="list-style-type: none"> • the likely noise exposure and the risk to hearing this noise creates; • what their employer is doing to control risks and exposures; • where and how people can obtain hearing protection; • how to report defects in hearing protection and noise-control equipment • what their duties are under the Control of Noise at Work Regulations 2005; • what they should do to minimise the risk, such as the proper way to use hearing protection and other noise-control equipment, how to look after it and store it, and where to use it; • the health surveillance systems. <p>This information should be given in a way the employee can be expected to understand (for example special arrangements might need to be made if the employee does not understand English or cannot read).</p> <p>To establish whether information, instruction and training has been carried out effectively, look for evidence that personal hearing protection is being fully and properly used, that noise control equipment is being used, and that procedures for low noise working are being followed.</p>	<p>What do I need to tell my employees? - http://www.hse.gov.uk/noise/tell.htm</p> <p>Employee and safety representatives - http://www.hse.gov.uk/noise/safetyrep.htm</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>Protect your hearing or lose it (advice for employees) - http://www.hse.gov.uk/pubns/indg363.pdf</p>