

# Reducing noise at woodworking machines

## HSE information sheet

### Woodworking Information Sheet No 13 (Revision 2)

### Introduction

This information sheet is aimed at employers in the woodworking industry and gives advice on controlling the risks from noise. It supplements the leaflet INDG362 *Noise at work: A brief guide to controlling the risks*.<sup>1</sup>

Further practical advice on noise can be found on the HSE noise website [www.hse.gov.uk/noise](http://www.hse.gov.uk/noise).

### The harm noise can cause

Loud noise at work can cause hearing damage as well as causing other safety risks such as difficulties with communication and not being able to hear warning signals, or approaching plant or machinery.

The woodworking industry is one of the noisiest working environments. Noise levels can vary widely between machines depending on their use. Typical examples of machines with no noise reduction measures are shown in Table 1. Exposure to these levels of noise, even for a short period, can be harmful.

**Table 1** Typical noise levels at woodworking machines

Machine	Typical noise data for machines with no noise-reduction measures
	Noise level (dB)
Beam panel saws and sanding machines	97
Boring machines	98
Band re-saws, panel planers and vertical spindle moulders	100
Portable woodworking tools	101
Bench saws and multiple rip-saws	102
High-speed routers	103

Machine	Typical noise data for machines with no noise-reduction measures
Thicknessers	104
Edge banders and multi-cutter moulding machines	105
Double-end tenoners	107

Table 1 gives details of the potential noise levels produced by various woodworking machines. You can use this information, together with the length of time employees spend working at the machines to establish a likely daily exposure. This will help you to decide on priorities for taking noise control measures.

Calculation tools are available to help you on HSE's noise website.

### What is expected of employers?

The Control of Noise at Work Regulations 2005 requires employers to take action to prevent or reduce risks to health and safety from noise at work. Employees have duties under the Regulations too.

Employers are required to eliminate or reduce the risks to health from noise. This involves eliminating noise at source or, where this is not reasonably practical, reducing the level so far as reasonably practicable.

The Regulations set two exposure action values:

- a lower exposure action value of 80 decibels (dB) at which workers need to be informed about risks to their hearing and be provided with hearing protectors, if they want them;
- an upper exposure action value of 85 dB at which noise exposure has to be controlled by doing all that is reasonably practicable other than by hearing protection, for example by making machinery quieter or sound proofing it.

Where it is not possible to reduce the exposure to below the upper exposure action value after installing noise controls, employees should be provided with

hearing protection and be trained to use it whenever it is needed and to fit/insert it correctly. Hearing protection zones should also be marked in the areas of the workplace where hearing protection is compulsory for all people entering the zone. Health surveillance is also required where a worker is at risk.

For further information about the legal requirements visit HSE's noise website: [www.hse.gov.uk/noise/employers.htm](http://www.hse.gov.uk/noise/employers.htm)

There are many practical, cost-effective ways that you can use to control noise and protect workers. For woodworking machinery, noise-control measures are likely to include:

- using appropriate systems and working practices;
- using the most appropriate machine for the task;
- engineering noise-control at source;
- effective maintenance of equipment, which can have immediate noise-reduction benefits;
- limiting the time people spend in noisy areas.

Employees have duties to use the noise-control equipment provided and to report any defects in it.

## Engineering controls to reduce noise exposures

Engineering control measures are likely to be necessary to reduce noise, eg:

- change to quieter tooling;
- modify dust-extraction systems; or
- provide a noise enclosure.

## Controlling noise from woodworking machines

Some of the factors that can affect noise levels when using woodworking machines are set out in Table 2. You should consider these factors when designing your working practices, aiming to ensure that your employees' noise exposure is as low as reasonably practicable. Make supervisors and employees aware of these issues, particularly when reducing noise exposure depends on following proper systems of work. Training will be required in setting, operating and maintaining equipment for low-noise working and in the correct use of any noise control equipment.

**Table 2** Factors affecting noise levels when using woodworking machinery

Variable	Relevant factor	Effect
<b>Timber</b>	Species	Hard, stiff timbers mean more noise (eg 2 dB difference when cutting oak and pine at a band re-saw) and more noise transmission.
	Width	Wide workpieces radiate noise over a greater area (eg a working width of 200 mm is likely to cause an increase of 2 dB over a working width of 100 mm).
	Thickness	Thinner workpieces generally vibrate more. Planing under 20 mm thicknesses can greatly increase the noise level.
	Length	Long workpieces radiate more noise than short workpieces.
	Moisture content	Dry timber is brittle and a good transmitter of noise.
<b>Tooling</b>	Width of cut	Unless helical or segmental cutters are used, the noise level immediately above the cutter increases roughly in proportion to the width of the cut (eg doubling the cutter length increases the noise by 3 dB).
	Cutter sharpness	Dull knives and worn blades and bands exert more force on the timber therefore make more noise.
	Cutter projection	Increases in knife projection mean that more air is trapped during rotation and so more noise is produced (typically 2 to 3 dB more for each millimetre projection above 1.5 mm).
	Speed	Noise increases with tool speed (typically just under 1 dB for every m/s change in peripheral speed in the range 20 to 35 m/s).
	Balance	Out-of-balance tools means vibration and changes in cutting conditions, increasing noise.
<b>Machine setting</b>	Timber control	The freer the timber is to vibrate, the greater the noise level (eg poorly set chip breakers and pressures at multi-cutter moulders lead to more transmitted noise).
	Timber support	Noise is increased if fences, bed plates, chip breakers etc which support the timber close to the cutting circle are not in line and as close as possible to the cutting point.
<b>Extraction</b>	Air velocity/system design	In a system with turbulent airflow, wood chips strike the ducting more and, without damping, this can increase noise levels.

You should also follow the manufacturer's or supplier's advice to ensure that the installation and operation of woodworking machines results in the lowest noise levels possible.

## Buying new machinery

Manufacturers of woodworking machines are legally obliged to design and manufacture them so they produce as little noise in use as possible. Information about the noise produced by a machine should be provided in the manufacturer's instructions. These should also tell you how to operate the machine as quietly as possible.

When buying new woodworking machinery you should include noise emission in the specification. This will allow you to make informed judgements about the noise risks for particular machines before buying them. You can then identify the machine that will introduce the least noise into your workplace.

### Low-noise features

Manufacturers and suppliers of woodworking machinery should be able to describe the low-noise features of their machinery. Appropriate design measures vary depending on the machine type, but will in general include:

- the machine structure being designed to minimise direct noise radiation, eg flexible panels should be avoided or treated;
- anti-vibration mountings;
- acoustic absorbents, shields or enclosures for control of unavoidable noise sources;
- use of advances in cutter design, eg damped or low-noise blades for sawing machines, segmental cutters for moulders and helical cutters for planers;
- machine tables with slotted lips to reduce noise when air gets trapped between revolving cutters and fixed surfaces;
- systems for minimising noise from workpieces;
- design of waste extraction to reduce noise generated by woodchips;
- silencers to reduce noise at compressed air exhausts and jets;
- optimised spindle speeds, tooling diameters and feed rates.

For more advice on buying new machinery, see 'Further information'.

## Personal hearing protection

Hearing protection should not be used as an alternative to controlling noise. However, you should issue it to employees for short-term protection, or where extra protection is needed above what has been achieved using noise control. You need to train employees on how, when and where to use hearing protection and appropriate information and instruction will need to be provided. Where English is not their first language, this should be taken into account.

In woodworking, noise-reduction measures may not completely remove the need for employees to wear personal hearing protection. However, making noise-reduction measures will reduce your reliance on hearing protection being used to prevent damaging your workers' hearing. You may be able to use a protector with a lower rating (which may also be more comfortable to wear).

## Health surveillance

Employees who are at risk of noise induced hearing damage should be placed under suitable health surveillance (regular hearing checks). If hearing damage is found you should take action to prevent further harm to the individuals concerned, and review the actions you are taking to control risks from noise.

For further information, visit the HSE's noise website.

## References

- 1 *Noise at work: A brief guide to controlling the risks* Leaflet INDG362(rev2) HSE Books 2012 [www.hse.gov.uk/pubns/indg362.htm](http://www.hse.gov.uk/pubns/indg362.htm)

## Further reading

*Controlling noise at work. The Control of Noise at Work Regulations 2005. Guidance on Regulations* L108 (Second edition) HSE Books 2005 ISBN 978 0 7176 6164 0 [www.hse.gov.uk/pubns/books/l108.htm](http://www.hse.gov.uk/pubns/books/l108.htm)

*Noise reduction at band re-saws* Woodworking Information Sheet WIS4(rev2) HSE 2014 [www.hse.gov.uk/pubns/wis4.htm](http://www.hse.gov.uk/pubns/wis4.htm)

*Four-sided moulding machines: Safe working practices* Woodworking Information Sheet WIS40(rev1) HSE 2007 [www.hse.gov.uk/pubns/wis40.pdf](http://www.hse.gov.uk/pubns/wis40.pdf)

*Buying new machinery: A short guide to the law and your responsibilities when buying new machinery for use at work* Leaflet INDG271(rev1) HSE Books 2011  
[www.hse.gov.uk/pubns/indg271.pdf](http://www.hse.gov.uk/pubns/indg271.pdf)

More information on noise in the woodworking industry can be found HSE's Woodworking website  
<http://www.hse.gov.uk/woodworking/noise.htm>

Further information for suppliers, installers and users of new and second hand machinery can be found on HSE's Work equipment and machinery website:  
<http://www.hse.gov.uk/work-equipment-machinery/index.htm>

## **Further information**

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit [www.hse.gov.uk/](http://www.hse.gov.uk/). You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

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