'BUY QUIET' GUIDE FOR PURCHASING QUIETER EQUIPMENT

Purpose

The purpose of this guide is to provide advice to employers on what to consider when buying quieter equipment for your workplace.

The advice should be used particularly when buying equipment or parts such as compressed air nozzles, compressors, generators, motors, saw blades, grinders, fans, vehicles, purpose built process plant, presses, power tools, and various types of pneumatic tools and equipment for use in workplaces.

Before buying new equipment

Before looking at purchasing quieter equipment, it is worth looking at the job carefully and seeing if the job needs to be done at all or whether there is a quieter way of doing it. For example, if you are bending metal bars you should use a hydraulic process rather than a large hammer to bend them into shape. Alternatively make improvements in the production process to avoid the need to have to grind off any rough bits. These alternatives may prove to be a more cost effective option both in terms of expense and the level of noise reduction achieved. That is, in some cases the quietest equipment available may still be very noisy.

Getting noise information on plant/equipment

By law, you must ask manufacturers or suppliers of equipment for sound power level data when considering buying equipment, if the equipment will be used in a work environment. The 'sound power level' is a measure (in decibels) of the sound energy of the equipment. Think of sound power as a bit like the power or capacity of an engine.

In Victoria, manufacturers of equipment that may cause employees' exposure to exceed the noise exposure standard when it is properly used, are required to test that equipment and provide a record of the sound power level. Suppliers (including importers) of that equipment must then provide the 'sound power level' information from the manufacturer.

Why buy quieter equipment?

Buying quieter equipment is one of the most effective ways of reducing noise. Even equipment that is 3 decibels quieter might not seem like a big difference but can reduce noise exposure levels by half.

Buying quieter equipment is generally cheaper than buying noisier equipment when all factors are considered. Noisier equipment usually needs to be modified later in some way because it's too loud. Hearing protection often needs to be provided also with the use of noisy equipment which means hearing tests need to be performed regularly. Such subsequent measures can often be quite costly so any alternatives that potentially avoid them are usually more cost effective. While it is not always possible to buy 'quiet' equipment it is always possible to buy the 'quietest' equipment available.
Questions to ask suppliers or manufacturers when buying equipment

- Ask potential suppliers/manufacturers for noise emission data (sound power levels) and compare the options.
- If plant is to be supplied through a tender process, specify a maximum acceptable noise level. Refer to boxed section one page 21 for advice on “What to include in a noise specification”.

It may also be useful to ask suppliers the following questions:

1. Are there quieter models of the same machine?
2. Does the quieter equipment have any additional safety features? If so, what are they?
3. Are there any specific maintenance and service requirements?
4. Are there any optional extras that can be purchased to further reduce noise?
5. What costs are involved?

Even though quieter equipment generally tends to be more expensive to purchase, the equipment is usually better built and has noise reducing features included.

Features to look for are:
- higher manufacturing tolerances;
- insulation or damping material included;
- gears that mesh together better;
- fans that are quieter;
- better mountings;
- more secure parts to reduce vibration;
- less reverberation within the unit itself;
- tolerance for greater loads;
- less impact noises produced in operation;
- the use of quieter processes (eg hydraulic processes that often dampen noise);
- sound enclosures for noisy parts or operators;
- parts or attachments constructed of noise absorbing material (eg rubber or polyethylene); and
- remote controls that allow operators to remain a safe distance from the source of the noise.

What if the information is not available?

The information may not be available where the supplier is dealing with an overseas or interstate manufacturer that has not determined the sound power level and refuses to do so.

If the plant or equipment to be purchased is manufactured by a Victorian manufacturer, it should be brought to their attention that they are legally required to provide the information. That is, if the use of their plant or equipment is likely to cause employees to exceed the noise exposure standard when the plant or equipment is used properly. If there is no success in obtaining such information then the matter may be referred to WorkSafe Victoria.

If a supplier cannot provide noise information because it is not available from an overseas or interstate manufacturer, you may be able to arrange for noise measurements to be made on the same machine being used elsewhere or at the supplier’s premises. The supplier may have already done such measurements. If not, you could ask the supplier to meet or share the costs of getting the measurements as the information may be useful for other potential purchasers and for promotional purposes. Whether you need to go to this length will depend on the cost of the machine, how many you intend to buy and whether the machine is likely to be a major noise source.

Alternatively, if you know someone else that is using the machine that you are interested in, you could ask them if they could provide you with any noise information they may have. You could also ask them if you can arrange for noise measurements to be taken.

If a supplier or manufacturer is not providing you with the information required, you could also look at the same or similar equipment from other suppliers or manufacturers.
How can information on noise [sound power levels] be used?

Comparing different brands of equipment or plant

Sound power level data can be used to compare different brands of machines to enable you to buy the quietest machine as long as other safety aspects are at least equivalent. However, you need to have the right information so that you know you are comparing “apples with apples”.

- What standard (if any) was it tested against?
  For some types of equipment there may be specific International or Australian Standards that specify a particular test procedure for certain types of plant/equipment. Testing in different ways may give different results which cannot be compared.
- Are the levels sound power levels or sound pressure levels at some distance away or at the operator position?
- What work was being undertaken during the testing (including materials handled etc)?
- Test conditions (inc. whether free running or under load)?

Estimating noise levels in the workplace

When introducing new machines, you need to consider the impact they will have in your workplace. To be able to determine this impact you need to take into account such things as;
- the number of machines to be introduced;
- where the machine(s) is to be used;
- how it is to be used (eg, operating speed, what is to be processed or cut etc);
- how long it is to be used for;
- whether employees work close to the plant or some distance away;
- the number of employees likely to be affected;
- whether employees are exposed to it for a few minutes a day or 8 hours a day; and
- existing background noise levels.

This may become complex and expert advice may be required.

The sound power level can be used to predict or estimate the noise levels likely to be generated in a particular environment. In some circumstances, the sound power level may give you a rough estimate of the noise level when the machine is used in your workplace. However, as a general rule, you probably need to add approximately 6 decibels to get an estimate of what the noise levels may be in your workplace. When two equally loud noise sources are positioned near each other, it normally causes an increase of 3 decibels. For example, two machines producing 88 dBA each would be expected to produce a combined noise level of 91 dBA. The resulting noise levels will be even higher if there are more than two machines operating next to each other or there are other noise sources in the vicinity that produce similar noise levels.

The distance of employees to the machine can make quite a difference to their noise exposure. Obviously the closer employees are to the machine generating the noise, the higher their exposure. As a rough guide, there will be an increase of 6 decibels as you halve the distance between the person and the noise source.

For example: if the noise level (sound pressure level) is 91 dBA 4 metres from the machine, then the noise level is likely to be 97 dBA at 2 metres from the machine.

Even if new plant will produce noise levels above the exposure standard when used in your workplace, the plant is still worth considering if it is the quietest available.
WHAT SHOULD BE INCLUDED IN A NOISE SPECIFICATION

The following is a guide to assist you in putting together noise specifications when purchasing equipment through a tender process. This process can become complex and expertise may be required to assist you in:

- determining the actual specifications;
- providing guidance on what is available and what is technically possible; and
- assisting in interpreting any data received.

Noise levels:
Tenders should:
- specify the acceptable sound power level;
- specify noise levels (sound pressure levels (dB(A)) at a particular position(s) measured over an appropriate number of operating cycles;
- specify peak noise levels $L_p(C)$ if appropriate (eg for impulse or impact type noise generated by such devices as pneumatic tools, explosive-powered tools and impact devices such as presses). The Victorian Occupational Health and Safety (Noise) Regulations specify a peak sound pressure level of 140 dB(C).

Position of measurements:
The position usually specified for noise measurements is the operator’s position. However, for some machines (such as a machine for which there is no fixed operator position or a machine with a built-in operator’s enclosure) it may be important to know the noise levels at other points around the machine so that exposure of the operator, and the effects on others in the workplace, can be properly assessed. In these cases, specify that noise should be measured at points around the machine at a height of 1.5 metres above the floor and/or access platform(s) and 1.0 metre from the machine itself, ignoring small projections.

Operating conditions:
The operating conditions to be specified depend on the nature of the machine and its intended use and include such factors as speed, load, tooling, material being processed and feed rate. Specify whatever conditions are likely to result in the highest noise emission. If it is not known what these might be, specify a range of typical operating conditions and base decisions on the highest level.

Acoustical conditions:
The acoustical conditions may be specified in three ways:

1) The first option is to specify that the noise of the machine is to be measured under agreed conditions in an environment similar to the proposed installation site. In practice, the manufacturer’s or supplier’s workplace will often meet this requirement.

2) A second option, appropriate for major purchases by tender, is to specify that the maximum acceptable noise level is not to be exceeded when the machine is installed and operating in your workplace. This puts the onus on the manufacturer to take the acoustical characteristics of your workplace into account when responding to the tender invitation. In order to do this, the tenderer should inspect the installation site. If unable to do so, the tenderer would need to ask for relevant details such as the dimensions of the installation site, the size and placement of nearby machines, benches and other fittings and the nature of floor, wall and ceiling materials. If a tenderer neither inspects nor requests details, treat the tender with caution.

3) A third option is to specify that the noise of the machine is to be measured in a standard acoustical environment, such as one of those defined in a relevant Australian, New Zealand or International Standard for machine noise measurement.

Acknowledgements
This ‘Buy Quiet’ Guide has been adapted from the following sources:
1. WorkSafe Western Australia’s ‘Buying Quiet 1’ module, and
2. New Zealand’s, Occupational Health and Safety, Department of Labour, ‘Module 8: Buy quiet’.