

MECHANICAL PLANT FOR COMMERCIAL BUILDINGS

Excessive noise from the operation of mechanical plant can disturb residents, disrupt sleep, interfere with normal daily activities and significantly impact on people's health.

Mechanical plant refers to equipment such as commercial air conditioning units, ventilation and refrigeration systems.

The acoustic terminology used in this fact sheet is explained in *Fact Sheet 11: Acoustic Terminology*.

Maximum Allowable Noise Levels

Noise from the operation of commercial mechanical plant (such as air conditioners, ventilation and refrigeration systems) is regulated by the *Environment Protection (Industrial Noise) Policy 1994*. These maximum permissible noise levels at a noise sensitive receptor (such as a residence) are reflected in the Adelaide (City) Development Plan (Consolidated – 7 January 2010) in principle 91. As such, all mechanical plant of new developments within the City of Adelaide region will have to be designed, sited and screened such that the maximum permissible noise levels within the policy are met. The maximum noise levels are shown in the table below.

City of Adelaide Zone	Maximum Noise Level dB(A)	
	Daytime 7 am to 10 pm	Night time 10 pm to 7 am
In or adjacent to a Residential Zone, the North Adelaide Historic (Conservation) Zone or the Park Lands Zone	50	40
In or adjacent all other zones	55	45

* Note: the maximum noise levels as specified in the above table are subject to penalties to compensate for any 'annoying' characteristics of the noise and for planning purposes.



If you are experiencing excessive noise from a commercial air conditioner, contact management of the premises to advise them of the problem. If the business does not respond, contact the City of Adelaide or your local council to investigate.

See the South Australian Environment Protection Agency (EPA) website (www.epa.sa.gov.au/noise.html) for more information.

Installation and Maintenance

The correct installation and maintenance of mechanical plant will significantly reduce potential noise impacts on sensitive receivers.

Air handling systems should be installed with good quality workmanship as air flow efficiency helps reduce noise impacts. All mechanical plant should be well fastened to the building as poor attachment can result in an increase in the noise level. Where the vibration of equipment is resulting in an increased noise level, isolation springs or feet can be installed to reduce vibration.

Regular maintenance to ensure that all equipment is operating correctly is an important factor in reducing noise levels. Noisy equipment should be regularly serviced to ensure all fixtures and fittings are safe, secure and do not rattle or vibrate excessively.

Energy Efficiency

It is best to select mechanical plant and design systems that are more energy efficient. Tests conducted by the Australian Consumers' Association show that energy efficient models aren't always more expensive than those with higher energy consumption. Even if the upfront cost of more energy efficient equipment is slightly higher, the lower running costs will compensate the initial outlay.

General Acoustic Design

The correct design of mechanical plant systems will help reduce the noise impact on sensitive receivers and can offer improved efficiency, performance and value for money. When choosing and designing mechanical plant systems, the following should be considered with regards to reducing noise emission:

- plant selection
- plant location
- mitigation measures.

Plant Selection

The appropriate selection of mechanical plant is an important factor in the reduction of noise levels. Premium quality machines designed for quiet operation should be considered. It is often cheaper to replace noisy equipment rather than applying noise mitigation treatments to existing equipment.

It is also important to consider the capacity of the equipment and not to oversize or undersize equipment. Larger capacity units will generally produce more noise while equipment that is undersized will have to work harder and run for longer.

Plant Location

It is important to consider the location of both internal and external mechanical plant systems.

External mechanical plant should be located as far away as possible from residential areas as the noise level at the receiver will decrease as the distance increases. Noisy equipment should not be located in a corner which is open to neighbouring sensitive receivers as reflections off surfaces can cause noise to be amplified. When locating external plant, consider shielding that could be provided by existing features of the building such as parapets and roof ridge lines. Try to block the line of sight between noise source and noise receiver.

Ventilation openings for internal mechanical plant should be located away from residential areas. Any external walls of plant rooms should provide sufficient noise reduction so that noise emission from the plant room does not impact on sensitive receivers. For more information on wall construction refer to *Fact Sheet 5: Sound Insulation for Exterior Walls and Roof-Ceiling Systems*.

Mitigation Measures

If the noise from mechanical plant is excessive, there are a number of noise mitigation treatments that can be applied.

Acoustic Barriers or Screens

Acoustic barriers or screens installed around external mechanical plant can reduce the noise impact on others. The acoustic barriers should be constructed of material that has sufficient sound reduction properties. 'Colorbond' steel and fibre cement are commonly used materials.

NOISE TECHNICAL FACT SHEET

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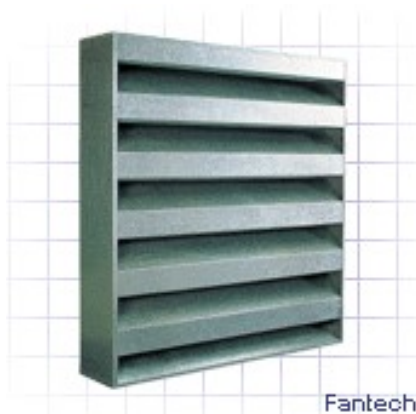
Acoustic barrier around rooftop plant

When designing an acoustic barrier or screen, it is important to consider the effect of reflections from the barrier. Reflections off the surface of the barrier may cause noise to be amplified at other locations. Where reflections may cause a noise problem, the barrier can be lined with weatherproof sound absorptive acoustic insulation to reduce reflected noise.

*Note: acoustic barriers and screens must not be allowed to restrict necessary airflow to mechanical plant as this can affect the system's efficiency. The minimum distance required around a unit for sufficient airflow can often be determined through the manufacturer.

Acoustic Louvres

In many buildings the internal mechanical plant requires openings in the external walls to allow for sufficient air flow. To reduce the noise emission to sensitive receivers through these openings, acoustic louvres can be installed. An example of an acoustic louvre is the 'Sound Bar' louvre from Fantech.



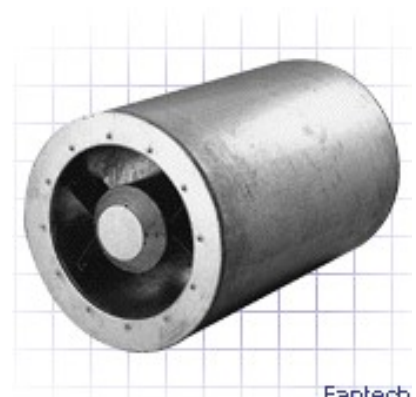
Fantech 'Sound Bar' Louvre
Source: Fantech Pty Ltd

It should be noted that acoustic louvres do not stop all noise passing through an opening and will still represent an acoustic weakness in the façade of a building. The selection of a louvre should consider the required noise reduction through the opening, as well as the required air flow for the equipment.

Attenuators

Attenuators (or silencers) can be installed in ductwork to reduce the noise level through commercial ventilation systems. The reduction in noise through the system can result in significant reductions in noise emission to neighbouring sensitive receivers.

It is important to determine the noise reduction and air flow required through the system, and select the appropriate attenuator based on these requirements. Attenuators are manufactured in a range of shapes and sizes to fit any ductwork system.



Fantech 'Q-Seal' Circular Duct Attenuator
Source: Fantech Pty Ltd

Acoustic Consultant

If you are considering sound insulation, the City of Adelaide recommends you verify any sound insulation specifications with your developer and/or employ the services of an acoustic consultant to ensure the proposed changes provide sufficient noise reduction

To contact an acoustic consultant visit the Yellow Pages Directory (under Acoustical Consultants) or for an acoustic consultant who is part of the Association of Australian Acoustical Consultants (AAAC) visit www.aaac.org.au.

Other Fact Sheets

A number of other fact sheets complement the information in this document. These can be downloaded from the City of Adelaide website: www.cityofadelaide.com.au/noise

Fact Sheet 1: Sound Insulation Guidelines

Fact Sheet 2: Gaps and Flanking Paths

Fact Sheet 3: Sound Insulation for Windows

Fact Sheet 4: Sound Insulation for Glazed Doors and Standard Doors

Fact Sheet 5: Sound Insulation for Exterior Walls and Facade Systems

Fact Sheet 6: Ventilation

Fact Sheet 7: Sound Insulation for Air Conditioners and Other External Mechanical Plant

Fact Sheet 8: Sounds in the City

Fact Sheet 9: Adelaide City Road Traffic Noise Map

Fact Sheet 10: Noise Ready Reckoner

Fact Sheet 11: Acoustic Terminology

Fact Sheet 12: Frequently Asked Questions

Fact Sheet 13: Sound Insulation for Internal/Common Walls

Fact Sheet 14: Sound Insulation of Floors

Fact Sheet 15: Mechanical Plant for Commercial Buildings

Fact Sheet 16: AAAC Star Rating

The Building Code of Australia Compliance

The Building Code of Australia (BCA) should be consulted to ensure that any sound insulation upgrades comply with the requirements of the BCA. It should be noted that although the upgrade of a building element may be acoustically beneficial, it may not comply with the requirements of the BCA.

Australian Building Codes Board

The Acoustic Design Resource fact sheets contain content sourced from the Building Code of Australia and Guidelines on Sound Insulation, published by the Australian Building Codes Board (ABCB). These documents can be purchased from the ABCB website: www.abcb.gov.au

Standards

The standards which apply in the Development plan are:

- World Health Organisation, Guidelines For Community Noise, Edited by B Berglund et al, 1999) (<http://www.who.int/docstore/peh/noise/guidelines2.html>)
- Recognised liquor licensing noise limits (www.olgc.sa.gov.au). These are modified to apply within bedroom and living areas.

Contacts / Additional Information

Additional information can be obtained from:

- Australian Association of Acoustic Consultants (www.aaac.org.au)
- Australian Acoustical Society (www.acoustics.asn.au)
- Office of the Liquor and Gambling Commissioner (www.olgc.sa.gov.au)
- South Australian EPA (www.epa.sa.gov.au/noise.html)
- South Australian Police (www.sapolice.sa.gov.au)
- Yellow Pages (www.yellowpages.com.au search “acoustic”)
- Australian Window Association (www.awa.org.au)

Acknowledgements

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Contact Us

For further information call the City of Adelaide on (08) 8203 7203 or email city@cityofadelaide.com or visit www.cityofadelaide.com/noise.au

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