

0745P FANTECH ATTENUATORS AND ACOUSTIC LOUVRES

Branded worksection

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Worksection abstract

This branded worksection *Template* is applicable to FANTECH duct mounted sound attenuators and wall mounted acoustic louvres including the following:

- Silencers - CC Series Circular, C and CP (non-podded & podded) Circular, RT and RS Rectangular, Q Seal Circular and rectangular.
- Cross-talk Attenuators - CTS, CTL, CTU, CTZ.
- Acoustic louvres - SBL1 (300 mm thick) and SBL2 (600 mm thick).

Guidance text

All text within these boxes is provided as guidance for developing this worksection and should not form part of the final specification. This *Guidance* text may be hidden or deleted from the document using the NATSPEC Toolbar or the hidden text *Hide* and *Delete* functions of your word processing system. For additional information visit FAQs at www.natspec.com.au.

Optional style text

Text in this font (blue with a grey background) covers items specified less frequently. It is provided for incorporation into *Normal* style text where it is applicable to a project.

Related material located elsewhere in NATSPEC

Related material may be found in other worksections. See for example:

- *0731p FANTECH fans.*
- *0744 Ductwork insulation.*

Documenting this and related work

You may document this and related work as follows:

- In some cases (for example VAV/terminals) attenuation may be documented integral to the item (in *0747 Variable air volume terminals*), in which case this worksection may not be required.
- Attenuators may need to be removable for cleaning or may be cleaned in situ via access doors on either side. If so, detail on the drawings.
- Installation of acoustic louvres may require coordination and/or detailing on architectural drawings. Coordinate acoustic louvres with other worksections such as *0451 Windows and glazed doors* which covers other types of architectural louvres.
- Installation details for cross-talk attenuators including required grille types. Detail installation on drawings including building into walls, if required. See NATSPEC TECHnote DES 032 for information on airborne sound insulation.
- This worksection contains text, including *Optional* style text, which may be changed to *Normal* style text for use in Design and Construct projects. See NATSPEC TECHreport TR 03 for information on specifying Design and Construct for mechanical services.

The *Normal* style text of this worksection may refer to items as being documented elsewhere in the contract documentation. Make sure they are documented.

Specifying ESD

The following may be specified by using included options:

- Durable components, particularly for corrosion resistance.

Refer to the NATSPEC TECHreport TR 01 on specifying ESD.

1 GENERAL

FANTECH has been at the forefront of fan and acoustics technology by developing and implementing new and innovative products of virtually every air movement and ventilation need, as well as noise attenuation. With ISO 9002 accreditation since 1994 and more recently, ISO 9001:2008 accreditation, FANTECH maintains high standards of manufacturing and a continuous improvement culture. With modern manufacturing plants in Melbourne, Sydney and Brisbane and warehouses throughout Australia and New Zealand, FANTECH provides unmatched delivery performance and customer service.

1.1 RESPONSIBILITIES

General

Requirement: Provide FANTECH attenuators and acoustic louvres, as documented.

Documented is defined in 0171 General requirements as meaning contained in the contract documents.

Edit to suit the project (e.g. omit acoustic louvres if there are none).

The Fans by Fantech catalogue and website provide detailed attenuator and acoustic louvre product information. The Fans by Fantech Product Selection Suite CD has Acoustic and Silencer modules that enable acoustic analysis and selection of suitable products.

DESIGN

The *Optional* text in this clause may be used when the contractor is to design and select the attenuators and acoustic louvres. Use the 0701 Mechanical systems worksection to describe design parameters for mechanical systems, as a whole, including the basis for calculating the attenuators and acoustic louvres, and definition of areas to be served by the documented types of attenuators and acoustic louvres.

General

Requirement: Design attenuators and acoustic louvers, as documented.

Attenuator and acoustic louvre selection

Selection parameters included in the **SELECTIONS, schedules** should not be repeated here. The schedules' *Guidance text* includes suggestions for modification to suit Design and Construct projects.

General: Select attenuators, acoustic louvres and cross-talk attenuators to achieve the documented space noise levels, ambient noise levels and noise attenuation.

Attenuator and acoustic louvre design, application and calculations

Standards: Conform to the recommendations of one or more of the following:

- AIRAH Design Application Manuals.
- ASHRAE Handbooks.
- CIBSE Guides.

Methods of calculation: Manual or software that employs the data and methods in the applicable standard.

Documentation

This is a partial list of items only. Edit to suit the project. Requirements relating to whole systems should be included in the Mechanical systems worksection.

Drawings: Show the following on the drawings:

- Installation including provisions to prevent flanking transmission.
- If attenuators require cleaning, provisions for doing so.
- Coordination details between acoustic louvres and building elements.
- Installation details for cross-talk attenuators including grille types.
- [complete/delete]

1.2 COMPANY CONTACTS

FANTECH technical contacts

Website: www.fantech.com.au.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

0171 General requirements contains umbrella requirements for all building and services worksections.

List the worksections cross referenced by this worksection. 0171 General requirements references the 018 Common requirements subgroup of worksections. It is not necessary to repeat them here. However, you may also wish to direct the contractor to other worksections where there may be work that is closely associated with this work.

NATSPEC uses generic worksection titles, whether or not there are branded equivalents. If you use a branded worksection, change the cross reference here.

- 0741 Ductwork.

1.4 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: www.fantech.com.au

Catalogue: www.fantech.com.au/Content.aspx?ContentID=D3

Product selection: www.fantech.com.au/SelectFan.aspx

Copies of the catalogue and CD Selector software may be requested from FANTECH or downloaded from the FANTECH website.

1.5 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformance to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Products and materials

0171 *General requirements* covers tests in **Definitions** and calls for an inspection and testing plan under **SUBMISSIONS, Tests**.

Type tests: Submit type test results from an Accredited Testing Laboratory as follows:

An Accredited Testing Laboratory is defined in 0171 *General requirements* which aligns with the same term in the BCA. It includes National Association of Testing Authorities (NATA) members and overseas authorities recognised by NATA.

Type tests are carried out off-site. However, submission of evidence of a successful type test may be called up here for requirements specified in **SELECTIONS** or **PRODUCTS**, if there are no **SELECTIONS**.

- Acoustic louvres: Sound reduction index to AS 1191 and AS/NZS ISO 717.1. Include air flow resistance.

The BCA cites ISO 717-1:1996 and AS/NZS 1276.1 for testing of construction required to have a certain R_w rating.

- Duct attenuators: Broadband sound insertion loss and generated noise level to EN ISO 7235. Include air flow resistance.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in 0171 *General requirements*.

The 0171 *General requirements* clause sets out the submissions required if the contractor proposes alternative products. Refer also to NATSPEC TECHnote GEN 006 for more information on proprietary specification.

2.2 FIRE PERFORMANCE

Fire hazard properties

Insulation materials: Tested to AS/NZS 1530.3. Fire hazards indices as follows:

- Spread-of-Flame Index: 0.
- Smoke-Developed Index: ≤ 3 .

Facing materials: Tested to AS 1530.2: Flammability index ≤ 5 .

Materials with reflective facing: Tested to AS/NZS 1530.3 and the recommendations of Appendix A6.

Assembled duct systems: Pass the UL 181 burning test.

See NATSPEC TECHnote DES 003 for more information on fire hazard properties of insulation and pliable membranes.

The requirements above are consistent with the NCC and AS 4254.2.

AS/NZS 1530.3 is a mandatory standard in the NCC. Smoke-Developed Index and Spread-of-Flame Index are determined under AS/NZS 1530.3. Flammability index is determined under AS 1530.2. See BCA C1.10. The NCC does not directly address insulation materials although for Class 2 to 9 buildings, it does reference AS 4254.2 which specifies the index values above (for duct liners, see AS 4254.2 clause 2.7.1 for externally applied duct insulation. See AS 4254.1 clause 2.6 for flexible ductwork. There has been some debate about the adequacy of the test procedure in predicting performance of material in real fire situations.

AS/NZS 1530.3 Informative Appendix A6, recommends that reflective surfaces of test specimens (which would otherwise generally pass this test) be blackened and diagonally scored in order to simulate soot deposition onto reflective surfaces in a

real fire situation. Note also that AS/NZS 1530.3 clause 4.12.2(c) requires three test specimens of laminated reflective surface materials to incorporate a vertical joint. For flexible ducting see also clause 4.9.2(a).

Note that BCA C1.10(b) states 'Paint or fire-retardant coatings must not be used to make a material or assembly comply with a required fire hazard properties.'

For more stringent fire performance, consider requiring that both insulation material and facing individually meet the fire hazard indices, not just as a composite material.

This above list does not include combustibility. That is, in keeping with the NCC, this clause does not prohibit the use of combustible insulation materials provided they meet the other fire hazard properties. If combustible insulation is to be excluded, consider including the following *Optional* style text by changing to *Normal* style text.

Combustibility of insulation materials: Not deemed combustible as determined to AS 1530.1.

2.3 FANTECH DUCT ATTENUATORS

Selection

Proprietary item: Provide FANTECH products as follows:

- Circular: CC, circular or Q-Seal series, as documented.
- Rectangular: RS, RT or Q-Seal series, as documented.

Features: If documented, provide Q-Seal silencers.

FANTECH Q-Seal has been designed and tested using a unique combination of insulation and perforated sheet steel and impervious lining between the acoustic infill and air stream to maximise acoustic performance.

Construction

Type: Rectangular or circular, with or without internal pod.

Casing: Metallic-coated sheet steel case stiffened to meet the functional criteria of AS 4254.2 Section 4. Provide welded end flanges conforming to the *0741 Ductwork* worksection or proprietary riveted flanges as appropriate to the size of the silencer.

Splitters: Conform to the following:

- Fill: Heavy density non-hygroscopic acoustic infill with factory applied tissue facing.
- Waterproofing: Wrap insulation with polyester film. Seal edges with aluminium foil laminate tape.

Delete if not required. In some applications (e.g. health facilities and cooling towers) the sound absorbent material may need to be wrapped to prevent microbial growth.

- Sheathing: Provide perforated metallic-coated sheet steel sheathing over the fill, 0.6 mm thick on the sides and 1.0 mm thick at bull-nose ends.

Finish: Clean weld areas and touch up with a zinc rich primer, wire brush generally and prime.

Infill sealing

Delete this subclause if not required. In some applications (e.g. health facilities and cooling towers) the sound absorbent material may need to be wrapped to prevent microbial growth.

Requirement: If attenuators are provided in the following situations, seal the infill:

- Operating theatre supply ducts.
- Clean room supply ducts.
- Ducts carrying saturated air.
- If rain may enter the duct.
- Kitchen exhaust ducts.

Edit the list to suit the project. Infill sealing is normally required where microbial growth within the fill of fill erosion may be hazardous to occupants or processes.

Sealing: Wrap the whole of the infill in impervious film to prevent the entry of moisture or grease. Seal edges with aluminium foil laminate tape.

Acoustic performance: Provide attenuators that meet the documented acoustic performance when tested with fill sealing in place.

Sealing the fill may reduce acoustic performance so make sure selections are for performance with sealed fill.

2.4 FANTECH ACOUSTIC LOUVRES

Selection

Proprietary item: Provide FANTECH Sound Bar louvres SBL1 and SBL2 series.

Features: Provide acoustic louvres having acoustic performance based on tests conducted in Australia to AS 1191.

Construction

General: Folded sheet steel or channel frame fully welded at each corner, with acoustic perforated blades filled with inert non-combustible acoustic material. Provide factory applied tissue facing to acoustic fill.

Fixing: If louvre is exposed to weather, provide stainless steel fasteners.

Sealing: Provide a raised lip on the louvre elements to prevent the ingress of water.

Impervious lining: If documented, provide FANTECH Q-Seal acoustic louvres.

Materials:

- Steel: 1.2 mm metallic-coated sheet steel.

Optionally, FANTECH can provide powder coated metallic-coated sheet steel.

- Aluminium: 2 mm grade 5005 aluminium sheet, powder coated.

Alternatives are unfinished metallic coated sheet steel and stainless steel.

Screens: Provide metallic coated steel wire or PVC mesh screens behind louvres to prevent the entry of vermin, birds, rodents and wind blown extraneous material such as leaves and papers.

AS/NZS 3666.1 clause 2.2.1 requires screens behind air intake louvres.

2.5 FANTECH CROSS-TALK ATTENUATORS

Selection

Proprietary item: Provide FANTECH Cross-talk attenuators types CTS, CTL, CTU or CTZ.

General

Features: Provide silencers with performance quoted as airborne sound transmission loss to AS 1191.

Casing: Metallic-coated sheet steel case stiffened to AS 4254.2 Section 4.

Installation

General: Provide an airtight acoustic seal between the attenuator and the wall or ceiling in which it is mounted.

Grilles: Provide grilles over visible openings conforming to 0746 Air grilles.

For higher performance, either consider building the attenuator into the wall or ceiling during construction or providing additional mass lagging on the exterior.

3 SELECTIONS

Schedules are a way of documenting a selection of proprietary or generic products or systems by their properties. Indicate their locations here and/or on the drawings. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

The FANTECH Product Selection Program has a facility that allows direct output of attenuator and acoustic louvre schedules. Use the Print to Excel and Clipboard buttons in the software to transfer schedules to the specification. If using schedules created by the FANTECH Product Selection Program, the schedules below should be deleted and replaced by the imported schedules.

3.1 SOUND ATTENUATOR

FANTECH duct attenuator schedule

Property	SA 1	SA 2	SA 3
System			
Make	FANTECH	FANTECH	FANTECH
FANTECH model			
FANTECH Q-Seal required (yes/no)			
Air quantity (L/s)			
Maximum pressure drop (Pa)			

Property	SA 1	SA 2	SA 3
Type			
Approximate diameter x length or width x height x length (mm)			
Insertion loss* at 63 Hz			
Insertion loss* at 125 Hz			
Insertion loss* at 250 Hz			
Insertion loss* at 500 Hz			
Insertion loss* at 1000 Hz			
Insertion loss* at 2000 Hz			
Insertion loss* at 4000 Hz			
Insertion loss* at 8000 Hz			
*Insertion loss (dB) at the above airflow.			

SA 1, SA 2, SA 3: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Adapt the Duct attenuator schedule for Design and Construct projects

If the contractor is to calculate the required performance and to select the equipment, the **SELECTIONS schedules** can be used to set generic selection parameters. Note that the documents should include sufficient information for items to be determined by the contractor, for example from documented performance parameters and drawing information. For these items, insert suitable text such as, *To the documented requirements*. The **Duct attenuator schedule** can then form the basis of the contractor's submission with the text replaced by design values.

FANTECH acoustic louvre schedule

Property	SA 1	SA 2	SA 3
System			
Make	FANTECH	FANTECH	FANTECH
FANTECH model			
FANTECH Q-Seal required (yes/no)			
Air quantity (L/s)			
Maximum pressure drop (Pa)			
Type			
Approximate diameter x length or width x height x depth (mm)			
Insertion loss* at 63 Hz			
Insertion loss* at 125 Hz			
Insertion loss* at 250 Hz			
Insertion loss* at 500 Hz			
Insertion loss* at 1000 Hz			

Property	SA 1	SA 2	SA 3
Insertion loss* at 2000 Hz			
Insertion loss* at 4000 Hz			
Insertion loss* at 8000 Hz			
* Insertion loss (dB) at the above air flow.			

SA 1, SA 2, SA 3: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Adapting the Acoustic louvre schedule for design and construct projects

If the contractor is to calculate the required performance and to select the equipment, the **SELECTIONS** schedules can be used to set generic selection parameters. Note that the documents should include sufficient information for items to be determined by the contractor, for example from documented performance parameters and drawing information. For these items, insert suitable text such as, *To the documented requirements*. The **Acoustic louvre schedule** can then form the basis of the contractor's submissions with the text replaced by design values.

FANTECH cross-talk attenuator schedule

Property	CTA 1	CTA 2	CTA 3
Location			
Make	FANTECH	FANTECH	FANTECH
FANTECH model			
Air quantity (L/s)			
Maximum pressure drop (Pa)			
Approximate width x depth x length (excluding spigots) (mm)			
Transmission loss* at 125 Hz			
Transmission loss* at 250 Hz			
Transmission loss* at 500 Hz			
Transmission loss* at 1000 Hz			
Transmission loss* at 2000 Hz			
Transmission loss* at 4000 Hz			
Transmission loss*(dB) at above air flow			

CTA 1, CTA 2, CTA 3: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Adapting the Cross-talk attenuator schedule for design and construct projects

If the contractor is to calculate the required performance and to select the equipment, the **SELECTIONS** schedules can be used to set generic selection parameters. Note that the documents should include sufficient information for items to be determined by the contractor, for example from documented performance parameters and drawing information. For these items, insert suitable text such as, *To the documented requirements*. The **Cross-talk attenuator schedule** can then form the basis of the contractor's submission with the text replaced by design values.

REFERENCED DOCUMENTS**The following documents are incorporated into this worksection by reference:**

AS ISO 717		Acoustics - Rating of sound insulation in buildings and of building elements
AS/NZS ISO 717.1	2004	Airborne sound insulation
AS 1191	2002	Acoustics - Method for laboratory measurement of airborne sound transmission insulation of building elements
AS 1530		Methods for fire tests on building materials, components and structures
AS 1530.2	1993	Test for flammability of materials
AS/NZS 1530.3	1999	Simultaneous determination of ignitability, flame propagation, heat release and smoke release
AS 4254		Ductwork for air-handling systems in buildings
AS 4254.2	2012	Rigid duct
UL 181	2013	Factory-made air ducts and air connectors
EN ISO 7235	2009	Acoustics. Laboratory measurement procedures for ducted silencers and air-terminal units. Insertion loss, flow noise and total pressure loss

The following documents are mentioned only in the *Guidance text*:

AS/NZS 1276		Acoustics - Rating of sound insulation in buildings and of building element
AS/NZS 1276.1	1999	Airborne sound insulation
AS 1530		Methods for fire tests on building materials, components and structures
AS 1530.1	1994	Combustibility test for materials
AS/NZS 3666		Air-handling and water systems of buildings - Microbial control
AS/NZS 3666.1	2011	Design, installation and commissioning
AS 4254		Ductwork for air-handling systems in buildings
AS 4254.1	2012	Flexible duct
BCA C1.10	2016	Fire resistance - Fire resistance and stability - Fire hazard properties
BCA C1.10(b)	2016	Fire resistance - Fire resistance and stability - Fire hazard properties
NATSPEC DES 003	2006	Fire hazard properties of insulation and pliable membranes
NATSPEC DES 032	2014	Airborne sound insulation
NATSPEC GEN 006	2007	Product specifying and substitution
NATSPEC GEN 024	2015	Using NATSPEC selections schedules
NATSPEC TR 01	2018	Specifying ESD
NATSPEC TR 03	2018	Specifying Design and Construct for Mechanical services
ISO 717		Acoustics - Rating of sound insulation in buildings and of building elements
ISO 717-1	1996	Airborne sound insulation