Pyrotek noise control

acoustop multigrade product guide

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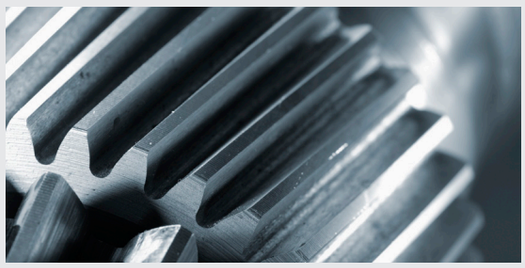
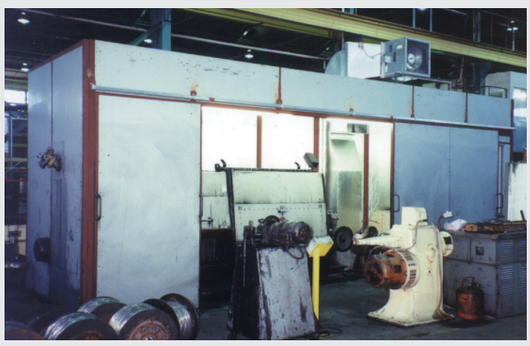
This brochure describes the control of general machinery noise using Acoustop Multigrade noise insulation from Pyrotek. It covers the principles, design considerations and installation methods for controlling machinery noise within buildings.



Noise Problem Defined

The most effective form of noise control is to treat the noise problem at source, especially for small plant items such as pumps, compressors etc. Acoustop MultiGrade allows for this by providing a highly effective lining for localised enclosures.

When controlling noise coming from an enclosed space, a two-part treatment is required. The product used must contain a heavy mass-loaded barrier, which acts to reduce noise, deflecting it back into the enclosure and preventing it from being transmitted to the external environment. Once the noise has been trapped within the enclosure, an absorbent layer is required to soak up excess noise energy and reduce noise levels within the enclosure. Acoustop Composites provide these two acoustic functions in a single product, reducing noise and absorbing the excess noise energy.



Large localised enclosure constructed in-situ in cable making factory

Note: Information contained in this brochure may be subject to change. When specifying Acoustop MultiGrade it is important to follow the most recent advice and recommendations.

Product Solution

Acoustop MultiGrade combines the benefits of a high performance flexible noise barrier and acoustic foam to achieve maximum noise reduction from an enclosure. Manufactured as an easily installed composite lining, Acoustop MultiGrade allows for simple application into small and difficult-to-line spaces.

- Reduces noise levels to plant and machinery operators, providing improved working conditions, communication safety and decreased likelihood of industrial deafness
- High performance noise insulation with good low and medium frequency transmission loss
- Noise barrier maximises the reduction of noise transmission and the acoustic foam absorbs reflected noise energy, further reducing transmitted noise
- Ideal for localised noise control which reduces costs from having to treat entire plant rooms
- Provides noise reduction for mechanical services in residential areas
- Unique flexibility allows for easy installation in tight corners and complex fit-out, providing a noise-tight seal. Easy sealing of joins and edges prevents deterioration
- Low maintenance Bonded Foil facing provides a robust surface finish, ensuring protection from damage and giving maximum AS1530 Part 3 Early Fire Hazard properties
- Moisture proof, dust proof and chemical resistant
- No specialist tools or equipment required for installation. Simple fixing system with Pre-Spray adhesive already applied to product, easily fitted with standard adhesives and tapes.

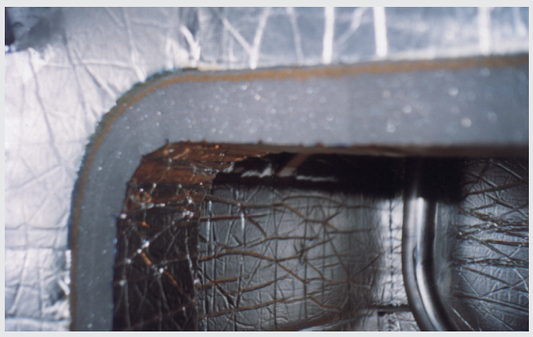
Product Introduction

Acoustop MultiGrade products are composite materials providing sound transmission loss and noise energy absorption through the multi-layer construction. Acoustop MultiGrade has been designed to be used primarily in machinery enclosures or other enclosed spaces. Acoustop MultiGrade is engineered to give a high degree of flexibility, making it easy to install.

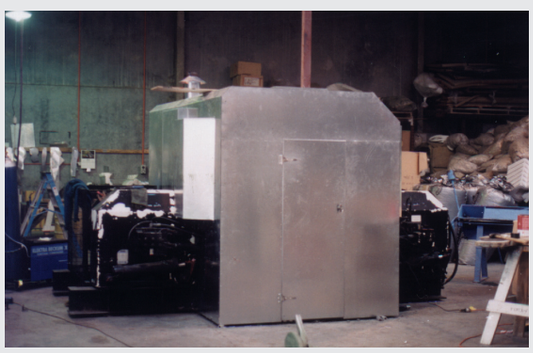
Product Construction

FACING • SURFACE COVERING

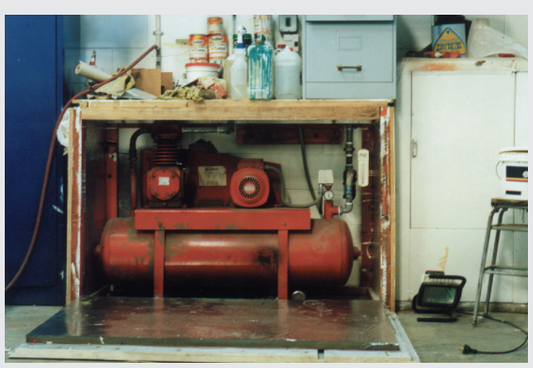
Acoustop MultiGrade products are supplied with a reinforced foil surface covering that maintains acoustic performance while providing an impermeable protective facing and improved fire properties. The reinforced foil facing is laminated using specialised adhesives to give a permanent bond.



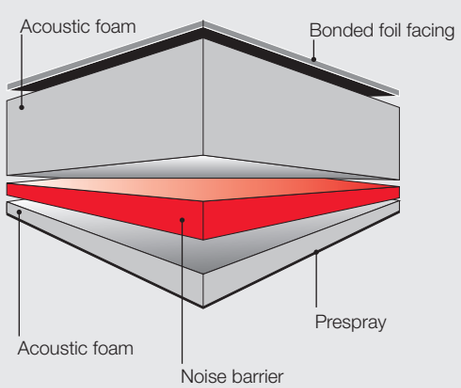
MultiGrade's flexibility allows for a noise tight fit out with the noise barrier conforming to difficult surfaces



Existing enclosures can be improved substantially using MultiGrade's absorption and barrier construction. With up to 45% perceived improvement over the use of plain foam.



DIY enclosure can be made effective simply with MultiGrade as the internal lining



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ACOUSTIC FOAM • 24MM

Acoustop Acoustic Foam absorbs both direct and reflected noise energy, reducing noise levels. Acoustop foam is a hydrolysis resistant fire retardant polyether foam, with natural resistance to humidity. Acoustop foam is fibre free and engineered to maximise acoustic performance.

NOISE BARRIER • 4.5KG/M2 STANDARD BARRIER

The Acoustop Noise Barrier reduces noise through its unique construction. The specialist fillers create a heavy flexible mass barrier, maximising noise reduction. Acoustop's uniquely flexible and naturally inert nature allows effective, easy installation, essential in achieving a noise-tight seal.

ACOUSTIC FOAM • 6MM

Acoustop Acoustic Foam provides a 6mm decoupling layer. This layer breaks the vibration path allowing the noise barrier to continue to perform in a limp non-constrained manner, giving extra flexibility, maximising the noise barrier's performance and installation ease.

Easily retro fitted when existing equipment is to be used in noise sensitive areas

Polyester foam breaks down from hydrolysis, polyether foam should always be used in areas subject to heat and humidity

Enviromental Impact

Acoustop products have long been renowned for their longevity and superior resilience, even in high-stress environments, where high humidity levels and heat combine to rapidly break down other foam-based products. Polyether polyurethane foams, rather than the traditional polyester polyurethane foams, are used to manufacture Acoustop products. The two types of foam produce a similar acoustic performance, however the polyether foam displays far superior characteristics when considering the length of serviceable life that can be attained.

Polyester foams tend to degrade in environments with high humidity and elevated temperatures, through a process called hydrolysis which causes the foam to degrade and eventually crumble and break down.

The effects of hydrolysis are considerable when the foam is used in an acoustic application. As hydrolysis takes hold and the foam begins to degrade, its acoustic qualities are significantly reduced. This continues until the foam has broken down and all acoustic performance is lost.

Product Application

Acoustop MultiGrade is designed for enclosure or coverlining in automotive, marine, industrial and architecturalapplications. Ideal for engine-rooms and compartments;machine, pump, compressor, generator, lift or plant enclosures;hatches, access covers, general plant rooms and industrialenclosures. Acoustop MultiGrade offers 45% more perceivablenoise reduction than plain foam.

The first step in noise reduction is to consider treating the noise problem at source. This has the advantage of reducing costs and being more practical where process considerations prevent full enclosures. Acoustop MultiGrade lining allows for effective small localised enclosures

Product Properties

PHYSICAL CHARACTERISTICS

AM6/24BF	ACOUSTOP MULTIGRADE, 6mm acoustic foam, 4.5kg/m^2 noise barrier, 24mm acoustic foam, Bonded Foil facing, 1300mm x 2300mm sheet total thickness 32mm
Fire testing	AS1530, Part 3 - 0.0.0.0 UL94 - 94HB MV SS302 - self extinguishing
D2863-91 - Oxygen Index	27.3%
Operating Temperature	Max 70°C

FOAM PROPERTIES

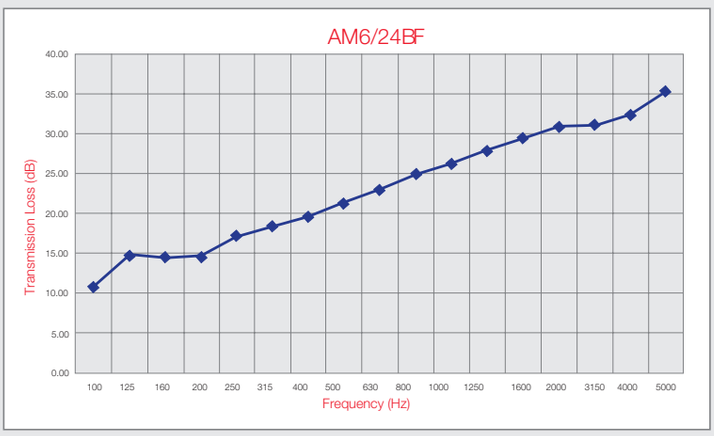
Description	ACS foam is an open cell flexible polyurethane foam of the polyether type, having 35-40 cells/25mm
Density (BS 4443: 1969) (AS 2281)	27 - 29 kgs/m^3
Hardness (Indentation) @ 50% (BS 3667 Pt2)	16 - 19 kgs Grade 130 Newtons
Flammability (FMVSS302)	Specification requirement: - burn rate max of 100mm/min Typical result = burn rate of less than 80mm/min

FACING PROPERTIES

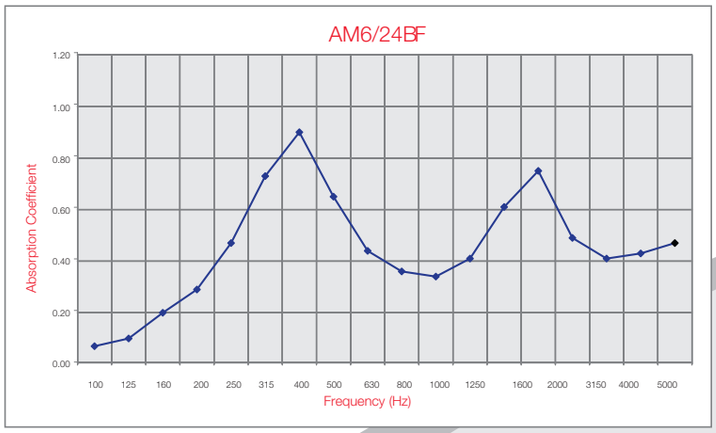
Facing	Thickness	Tensile Strength	AS1530	Bursting Strength	Water Vapour Transmission Rate
BF Bonded Foil	120 micron	4.5kN/m max (CD)	4 zero	43 N max 34 N min	0.33 gm/m^2 24 hr

Acoustic Performance

Acoustic performance	Rw 26 @ 4.5kg/m2 Rw 30 @ 8kg/m2 N.R.C. of foam facing available on request
Test standard	I.S.O. 140 Part 2
Date of test	Jun-83
Test performed by	Acoustics Institute, University of Auckland
Test ID	83T05



Frequency (Hz)	Transmission Loss (dB)
100	10.70
125	14.70
160	14.40
200	14.60
250	17.10
315	18.60
400	19.60
500	21.30
630	22.80
800	24.80
1000	26.20
1250	27.80
1600	29.30
2000	30.70
2500	31.70
3150	32.30
S.T.C.	26.00



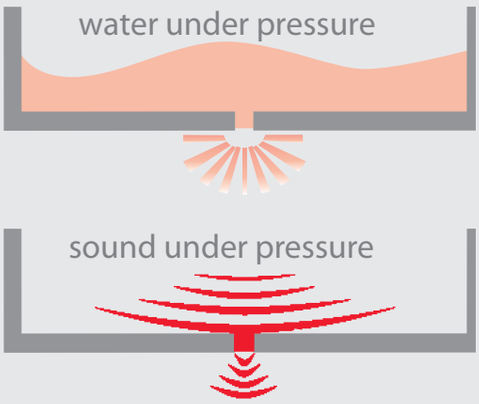
Frequency (Hz)	Absorbtion
100	0.07
125	0.10
160	0.20
200	0.29
250	0.47
315	0.73
400	0.90
500	0.63
630	0.44
800	0.63
1000	0.34
1250	0.41
1600	0.61
2000	0.75
3150	0.41
4000	0.43
5000	0.47
N.R.C.	0.55

Durability

Acoustop has excellent durability and there are no known limitations on the serviceable life of the products, provided the material is used for its designed purpose, and installed and maintained according to the specification provided by the manufacturer.

Specification Guide

The noise insulation shall be “Acoustop MultiGrade”, made from flexible natural rubber with a barrier weight of 4.5kg/m^2 with a minimum Rw of 26. The absorbing layer shall be made of 24mm polyether polyurethane foam, the surface facing shall be Bonded Foil. It shall have a 6mm decoupling layer with Prespray adhesive or equivalent.



Product Installation

To achieve the maximum result from Acoustop products, care and attention must be paid to installation.

A noise tight seal is critical for both design and installation, as any noise control system will only perform as well as the weakest part of the whole system. Imagine a pipe that has a tiny hole in it, filled with pressurised water. Despite the small size of the hole, water will surge through with considerable force. As sound is created by pressure waves, noise acts in the same way as water under pressure, forcing its way through even the smallest hole or gap.

For example, a gap in noise insulation equal in size to only 2% of the total area, can reduce the acoustic performance by as much as 50%. A noise tight seal is essential for noise control to be effective, as any gaps will degrade the system’s performance.

CUTTING

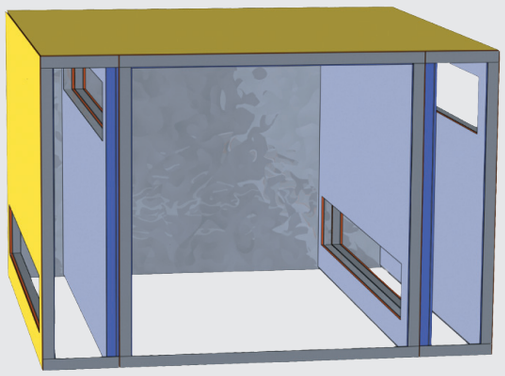
To cut Acoustop, a craft knife with disposable blades is best suited. If using a knife, a straight cutting edge is recommended. Acoustop products should be cut with covering side facing up. When marking out for cutting, an allowance of 2mm will ensure a tight fit.

BONDING/PRESPRAY

Acoustop products are easily installed with good quality contact adhesive. As the nature of Acoustic Foam is open cell, applying a contact adhesive other than by spray is time consuming with a tendency to over apply and waste adhesive. This in turn may give an uneven bond and a build up of glue, which can cause bubbling. Prespray Adhesive will overcome this problem. Acoustop MultiGrade products come standard with a pre-spray backing. With Prespray, it is only necessary to coat the surface you are bonding to, not the Acoustop surface. The wet adhesive applied to the substrate will reactivate the dry adhesive on the back of the Prespray sheet. As contact adhesives are solvent based, and therefore highly flammable, their usage should be in strict accordance with the manufacturer's instructions and good Health & Safety practices.

SEALING EDGES AND JOINS

To achieve the best aesthetic and protective finish, all joins and edges should be sealed. All raw edges coming into contact with contaminants can be coated with a silicon sealant for greater protection before edging.



Typical enclosure construction showing air inlet/outlet

Site Handling

Acoustop is produced in 1300mm x 2300mm sheets (unless stated) which can be handled by one person.

Storage

Acoustop MultiGrade should be stored in a clean and dry area, protected from possible damage from impacts or abrasions. When supplied in sheets the material should be stored on a flat level floor with a protective layer between the material and the floor.

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