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Issue 1.1

Thermal & Acoustic Insulation

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3M AU3002 Thinsulate Acoustic Insulation

This non-woven mat has excellent sound absorbing properties useful in many interior applications, for example inside door panels, instrument panels, pillar stuffers, and package trays. It is compressible, non-linting, lightweight, and can be easily cut with scissors and/ or a knife. A black polyolefin scrim on one side protects the fibres. The product has been calendered to improve the attachment of the scrim and abrasion resistance of the fibrous surface.

Product Codes:

19mm x 152.4cm x 1M Black	3M-AU3002-M
19mm x 152.4cm x 160M Black	3M-AU3002

3M AU3020 Thinsulate Acoustic Insulation

This non-woven mat has excellent sound absorbing properties useful in many automotive interior applications, for example inside door panels, instrument panels, pillar stuffers, and package trays. It is compressible, non-linting, lightweight, and can be easily die-cut. A polyolefin scrim on one side protects the fibres. The product has been calendered to improve the attachment of the scrim.

Product Codes:

19mm x 152.4cm x 135M White	3M-AU3020

3M MA4700 High Performance Acoustic Insulation

3M High Performance Insulation is specifically designed for a wide variety of marine interior applications including overheads, bulkboards, shipboard hulls, area separation panels and more for excellent sound absorbing properties. It is supplied with a white or black cover and is compressible, lightweight, conformable, and can easily scissors and/ or a knife, heat sealed, and thermally or sonically bonded to many other substrates.

Product Codes:

25mm x 76.2cm x 1M Black	3M-MA4710-M
25mm x 76.2cm x M Black	3M-MA4710

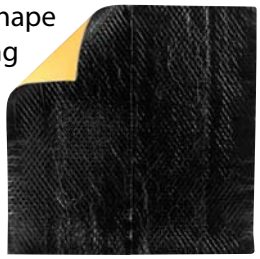
3M MA6700 High Performance Acoustic Insulation

3M High Performance Insulation is specifically designed for a wide variety of marine interior applications including overheads, bulkboards, shipboard hulls, area separation panels and more for excellent sound absorbing properties. It is supplied with a white or black cover and is compressible, lightweight, conformable, and can easily be die-cut, heat sealed, and thermally or sonically bonded to many other substrates. The metalised version is ideal for use in engine bays.

Product Codes:

44mm x 152.4cm x 1M Black	3M-MA6710-M
44mm x 152.4cm x 1M Metalised	3M-MA6720-M
44mm x 152.4cm x 27.43M Black	3M-MA6710
44mm x 152.4cm x 27.43M Metalised	3M-MA6720

3M Sound Deadening Pads



A self adhesive, easy to shape and apply sound absorbing pad. Ideal for round engine bays and other noisy areas to help reduce unwanted sounds. The pads can be over-painted if required or 3M's Thinsulate can be bonded on top of them to reduce noise levels even further.

Product Code:

500 x 500mm Pack of 10	3M-08840

3M 1436 Aluminum Foil Tape

Aluminium foil combined with high tack rubber adhesive and easy release liner. Holds and seals on a variety of surfaces. Offers excellent flame, moisture, weather and chemical resistance for a variety of demanding applications in aerospace, automotive, marine and many other segments.

Product Code:

50mm x 50M	3M-1436-50

3M Scotch-Weld Spray 77

A lightweight, multipurpose spray adhesive which will bond almost anything to anything! This product can be used on expanded polyurethane and lightweight substrates.

Product Codes:

Spray 77 500ml	3M-SPRAY77

3M Scotch-Weld Spray 90

A fast setting, multipurpose, high strength contact adhesive with a variable valve for a precise spray pattern. Suitable for most substrates including polyethylene and polypropylene.

Product Codes:

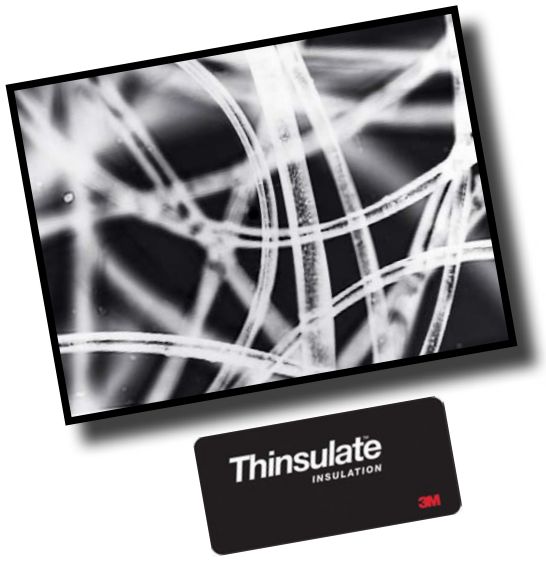
Spray 90 500ml	3M-SPRAY90

3M Fastbond 49

This insulation adhesive is a water-based, high solids, fast tacking, pressure sensitive adhesive for bonding lightweight materials like fibreglass insulation, felt, paper and other materials to metal and many other surfaces.

Product Codes:

Fastbond 49 2L	3M-FB49-2



3M Thinsulate

The Technology of Warmth and Peace & Quiet - What makes Thinsulate insulation so effective? It's all in the fibres. Insulations work in two ways: first, by trapping air. The more air trapped, the more efficient the insulation. Second, by reflecting back the radiant heat.

The unique microfibres on Thinsulate insulation are about ten times smaller than the fibres of other synthetic insulations, which means they are much more efficient at trapping air…and more effective at maintaining your vessel's temperature. It also means more fibres can be packed into the same space, where they can reflect back more of the radiant warmth.

Thinsulate is the most advanced insulation on the market for sound control. Lightweight, flexible and hydrophobic makes it the most sensible choice for sound absorption in a variety of applications. The non-woven fibres create a 'tortuous path' to quickly silence irritating and intrusive noises at a variety of frequency ranges

Description:

Thinsulate Acoustic Insulation is a polymer microfibre sound absorber that decreases noise and improves thermal efficiency with minimal additional weight

- **Superior sound absorption** per pound to optimise your noise control
- **High thermal insulation** this is the same technology found in lightweight ski jackets and winter wear
- **Lightweight** to help meet weight targets up to four times lighter than most typical acoustic materials
- **Hydrophobic** repels water which helps reduce chance for mould mildew corrosion and odours
- **Compressible and flexible** to fit irregular or tight spaces, increasing your design possibilities
- **Easily attached** with spray adhesive, pressure sensitive tape, sonic welding, thermal bonding or push pins

Thermal Insulation:

"Thermal comfort" is composed of several things

- A sustained comfortable temperature. You don't want big temperature swings in different areas of your boat
- No drafts. You don't want to be in the salon, dining area or bedroom with a lot of uncomfortable air flowing across your body
- Less Noise. You don't want the heating system or air conditioner running constantly or at frequent intervals, especially when entertaining, dining or sleeping

What is temperature?

Temperature is the movement of air. Whenever there is a temperature difference between outside and inside, there will be heat flow. Heat flows easily from warm areas to cold areas if there is nothing present to stop it or slow it down.

What is thermal insulation?

Thermal insulation is the material that provides resistance to heat flow via small air pockets inside the insulating material.

What is R-Value?

R-Value is a term that refers to the heat transmission properties of an insulation material. It is most commonly used un the housing industry. Yachts and houseboats are constructed somewhat similar to houses, so R-value should be a term that most people will relate to instead of the mumbo-jumbo terms we technical people like to use (clo, thermal resistivity, etc). *The higher the R-Value of an insulating material, the better it is at preventing heat flow*

Remember....

Heat flow is AC/DC; it goes either way. If it is cold outside, the heat from your warm house or boat will try to move outside. If it is hot outside and you are running your air conditioner, the heat outside will try to move inside.

Polymer Microfibre:

Thinsulate Acoustic Insulation is a sound absorber made up of a network of polymer microfibres. As a sound wave passes through it the fibres can easily vibrate to help dissipate sound energy. As these photomicrographs show, foam and fibreglass have larger structures, therefore have less surface area for the sound energy to pass over and dissipate the noise energy.

Thinsulate Thermal properties

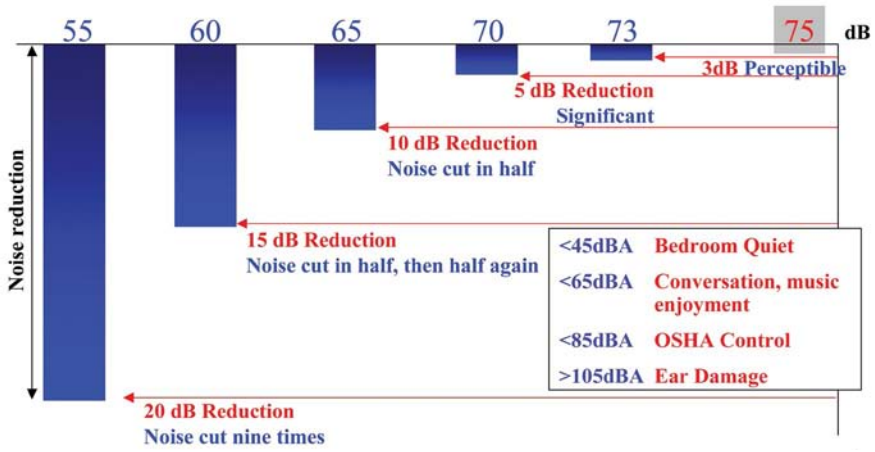
Thermal properties of the marine grade products:

	"U" Value	"K" Value	"R" Value
MA6700 (2")	0.98m2K/W	0.043W/mK	5.8
MA4710 (1")	1.49m2K/W	0.039W/mK	3.8

All marine grade Thinsulate™ meet the requirements of ISO 4598-3 and ISO 9094-2, as required by the Recreational Craft Directive. The metalised scrim product has an oxygen burn index of 34.2, it also outperforms most other noise absorbers especially in the mid frequency ranges, e.g. turbo noise, generator whine, Air-con, wave slap, conversation, etc.

Sound Level - Noise Reduction

The relationship between sound level and noise reduction is non-linear, meaning even a small reduction in decibels can create a dramatic reduction in noise levels.



3M Thinsulate Acoustic Insulation AU3002

The web is composed of 30% polyester staple fibres, and 70% polypropylene fibres. The polypropylene fibres are extremely fine, producing the high energy absorption characteristic with the low weight. The polyester fibres are added to strengthen the web. The black scrim attached to one side is a 100% polypropylene non-woven fabric.

Suitable for application in vehicle cabin and luggage compartment interiors, especially vertical surfaces. As the material compresses easily, it is not recommended for applications under the carpet (or other flooring) but its lightweight makes it ideal for other horizontal applications like combining with headliners for example.

Attaching to trim panels is recommended, preferably using ultrasonic or heat spot welding, but adhesives (transfer tapes or hot melt) may also be used. Not recommended for applications where temperatures will be above 90°C. As the fibres are hydrophobic, this material will not absorb water. Therefore the risk of mildew and odours developing are minimal allowing this product to be used in humid or moist conditions.

General Properties

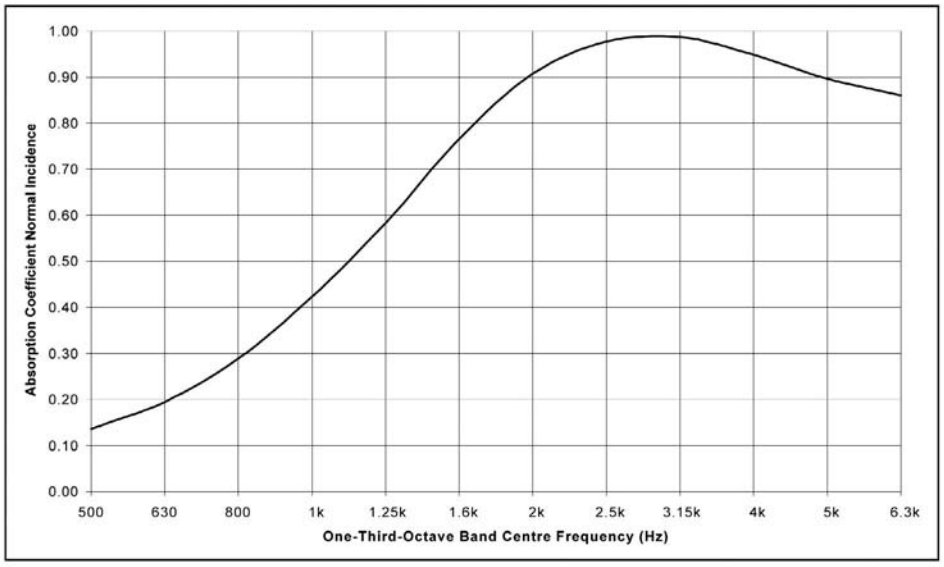
Composition	70% polypropylene, 30% polyester (Web) 100% polypropylene (Scrim)
Colour	White web with black scrim.

Physical Properties (Typical values)

Thickness	19mm (Tested to 3M procedure OTM20005)
Surface Weight	345g/m2 (tested to 3M procedure OTM 115)
Density	18.2 kg/m3
Flammability	Meets FMVSS 302 (DIN75 200, ISO 3795 (1976))

Acoustical Properties

Sound Absorption Properties measured according to ASTM E1050 Dual Microphone Impedance Tube Method that measures Normal Incidence Sound. Tested with the scrim facing away from the microphones.



3M Thinsulate Acoustic Insulation AU3020

The web is composed of 33% polyester staple fibres, and 67% polypropylene fibres. The polypropylene fibres are extremely fine, producing the high-energy absorption characteristic with the low weight. The polyester fibres are added to strengthen the web. The white scrim attached to one side is a 100% polypropylene non-woven fabric.

Suitable for application in vehicle cabin and luggage compartment interiors, especially vertical surfaces. As the material compresses easily, it is not recommended for applications under the carpet (or other flooring) but its lightweight makes it ideal for other horizontal applications like combining with headliners for example.

Attaching to trim panels is recommended, preferably using ultrasonic or heat spot welding, but adhesives (transfer tapes or hot melt) may also be used. Not recommended for applications where temperatures will be above 120°C. As the fibres are hydrophobic, this material will not absorb water. Therefore the risk of mildew and odours developing are minimal allowing this product to be used in humid or moist conditions.

General Properties

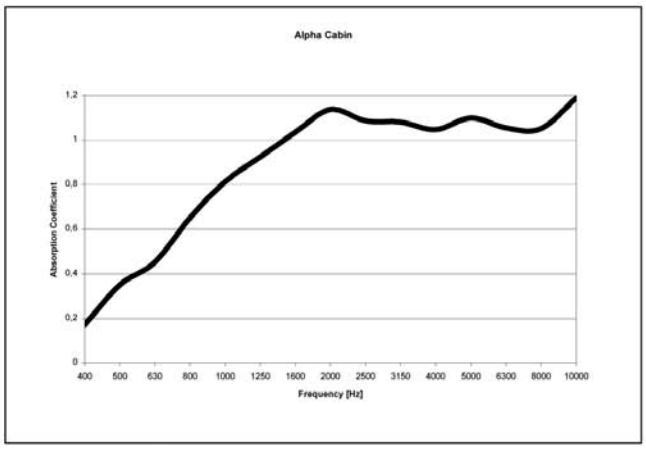
Composition	67% polypropylene, 33% polyester (Web) 100% polypropylene (Scrim)
Colour	White web with white scrim.

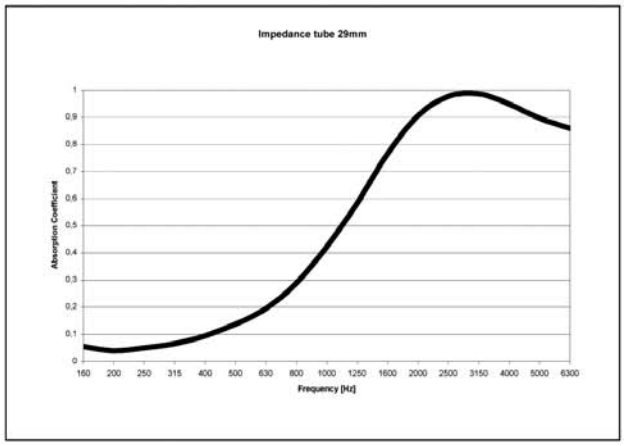
Physical Properties (Typical values)

Thickness	19mm (SAE J1355 @ 0,002 psi, 14 N/m^2)
Surface Weight	317g/m2
Density	16.7 kg/m3
Flammability	0mm/min as per FMVSS 302 (DIN75200, ISO 3795 (1976))
Temperature Stability	120° Celsius for 2000 Hours

Acoustical Properties

1. Alpha Cabin Measurement with 1,2m^2 sample measuring Random Incidence Sound. Tested with scrim facing away from the microphones.
2. Dual Microphone Impedance Tube Method that measures Normal Incidence Sound. Tested with the scrim facing away from the microphones. (ASTM E1050)

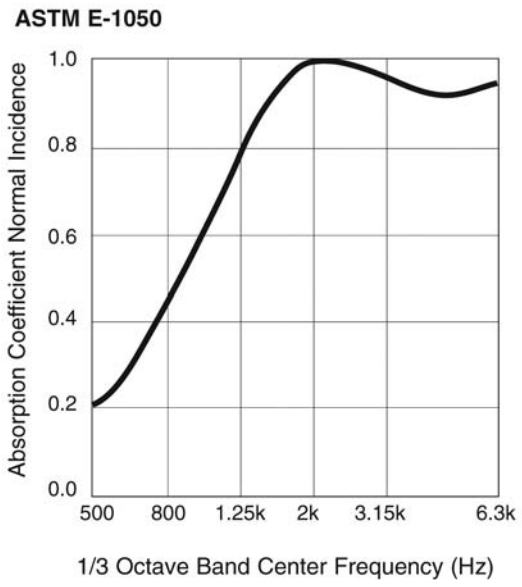


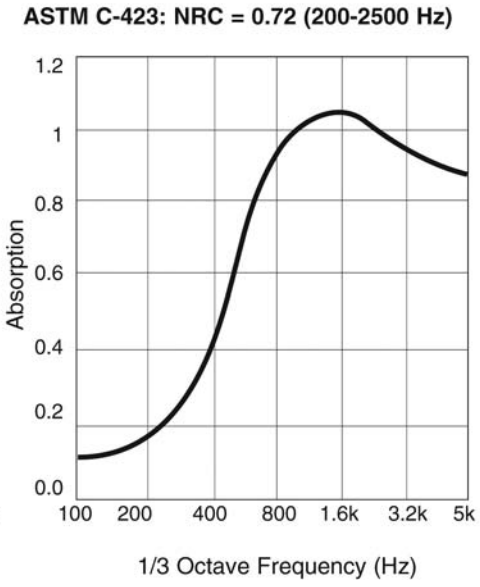


3M MA 4700 Series High Performance Acoustic Insulation

High Performance Insulation is specifically designed for a wide variety of marine interior applications including overheads, bulkboards, shipboard hulls, area separation panels and more for excellent sound absorbing properties.

It is supplied with a white or black cover and is compressible, lightweight, conformable, and can easily be die-cut, heat sealed, and thermally or sonically bonded to many other substrates.





Physical Properties

Weight:	440 g/m2	(1.4 oz/ft2)	(13 oz/yd2)
Density:	17 kg/m3	(1.0 lb/ft3)	(28 lb/yd3)
Thickness:	26 mm	(1.0 inch)	

Air Flow - ASTM C-522

Resistance:	900 Rayls MKS
Resistivity:	34,000 Rayls MKS/meter

Thermal Properties

R value 3.8 at 26 mm thickness

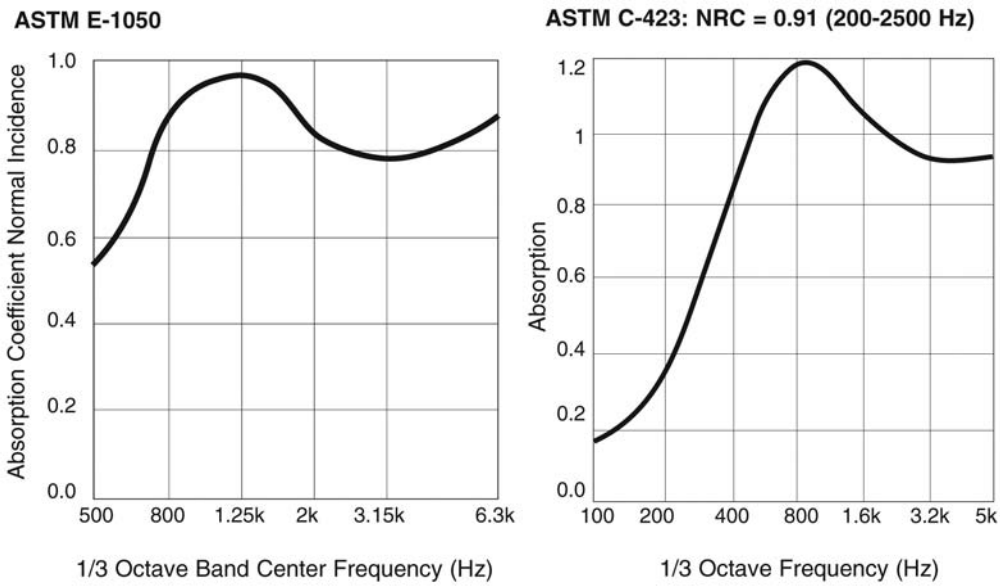
Flammability Results

Test Method	Classification
FMVSS	302 Pass
UL 94 sec. 7	94HB
UL 94 sec. 12	94HBF and 94HF-2

3M MA 6700 Series High Performance Acoustic Insulation

3M High Performance Insulation is specifically designed for a wide variety of marine interior applications including overheads, bulkboards, shipboard hulls, area separation panels and more for excellent sound absorbing properties.

It is supplied with a white or black cover and is compressible, lightweight, conformable, and can easily be die-cut, heat sealed, and thermally or sonically bonded to many other substrates.



Physical Preoperties

Weight:	640 g/m2	(2.1 oz/ft2)	(19 oz/yd2)
Density:	14 kg/m3	(0.9 lb/ft3)	(24 lb/yd3)
Thickness:	44 mm	(1.7 inch)	

Air Flow-ASTM C522

Resistance:	1000 Rayls MKS
Resistivity:	23,000 Rayls MKS/meter

Thermal Properties

R value 5.8 at 44 mm thickness

Flammability Results

Test Method	Classification
FMVSS 302	Pass
UL 94 sec. 7	94HB
UL 94 sec. 12	94HBF and 94HF-2

3M Spray 77

Performance Characteristics

Service Temperature Range	-30°C to 60°C
Water Resistance	Very Good
Weathering Resistance	Fair
Fuel and Oil Resistance	Poor
UV Light Resistance	Fair

Coverage

Approximately 12m^2 (140 square feet) per container, depending on porosity of substrate.

3M Spray 90

Performance Characteristics

Service Temperature Range	-32°C to +80°C
Water Resistance	Good
Weathering Resistance	Good
Fuel and Oil Resistance	Poor

Coverage

Approximately 3.7 square metres per container.

3M Spray 90

Performance Characteristics

Service Temperature Range	-32°C to +80°C
Water Resistance	Good
Weathering Resistance	Good
Fuel and Oil Resistance	Poor

Coverage

Approximately 3.7 square metres per container.

3M Spray 77

Performance Characteristics

180° Peel and Overlap :
Adhesive was tested in 180° (angle) peel and overlap shear by first applying a 0.15mm (wet thickness) coating of adhesive to a primed polyester film. After drying, bonds were made to various substrates. Test results after 48 hours at 23° were as follows

Substrate	Peel Strength N/10mm	Overlap Shear (Mpa)
Glass	2.8	0.37
Cold Rolled Steel	5.2	0.40
2024 T3 Aluminium	4.0	0.36
Clad Aluminium	4.9	0.36
Stainless Steel	5.6	0.36
High Density Polyethylene	0.9	0.24
Polypropylene	3.8	0.27
High Impact Polystyrene	9.8	0.37
PVC	7.9	0.39
ABS	8.2	0.35
Polycarbonate	9.1	0.40
Acrylic	6.8	0.36
Neoprene Rubber	2.3	0.08
EPDM	1.8	0.10

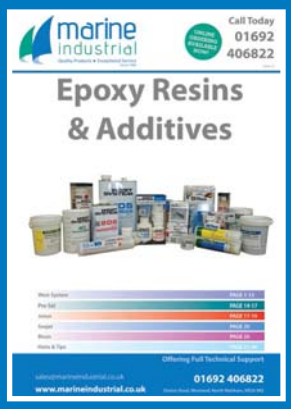
Wet Strength

Adhesive was spray applied on 150 x 300 x 25 mm pieces of 24 kg/m^3 density glass fibre insulation at the recommended coverage level. After 1 minute of drying at room temperature, the glass fibre was bonded (using hand pressure) to 150 x 300 mm galvanised steel panels pre-bent to form a 90° angle. The wet strength of the adhesive was sufficient to hold the glass fibre in place.

Coverage

Coverage is dependent upon porosity of the substrate and the method by which the adhesive is applied. To bond glass fibre insulation, apply the adhesive to the insulation in a uniform pattern at a coverage rate of approx. 50 g/m2, which allows to cover 20 m2/l.

Available Catalogues.....



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