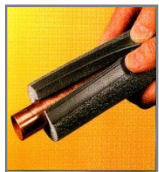


PIPE

INSULATION



THERMOTEC
PIPE
INSULATION

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4-zero Specification

The pipe insulation shall be Thermotec 4-Zero, fire retardant, closed cell polyethylene foam, having a density of not less than 50kg/m³. The pipe insulation shall have a wall thickness of 15mm, 20mm, 25mm, 30mm (delete thicknesses that are not required) and incorporate a factory applied aluminium foil. The foil overlap shall incorporate a self adhesive strip. The pipe insulation shall have an Ignitability Index of zero (0), a Spread of Flame Index of zero (0), and a Heat Developed Index of zero (0) and a Smoke Developed Index of zero-one (0-1), when tested in accordance with AS1530.3.

All insulation shall be installed around the pipe work surface as tightly as possible without gaps. The edges and ends shall be tightly butted together. All joints shall be taped using a 48mm pressure sensitive aluminium tape.

Where necessary, the preformed sections shall be cut (using a sharp knife or scissors) and mitred, to ensure a tight fit around elbows and at tees.

Where pipe size exceeds 101.6mm outside diameter, the insulation shall be Thermotec Thermalag, foam sheet with factory applied aluminium foil, cut to predetermine width to exactly fit the pipe. The Thermalag shall be grooved on the inside to eliminate tension and facilitate quick and easy application.

Where supports and spacer blocks are used to support the pipe work, the pipe insulation shall be butted tightly up to the spacer blocks and sealed using a silicon sealant.

Service penetration areas shall be designed to meet a four (4) hour fire rating as per AS 1530.4.

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4-zero Underground Specification

The pipe insulation shall be Thermotec 4-Zero, fire retardant, closed cell Polyethylene foam, having a density of not less than 50kg/m³. The pipe insulation shall have a wall thickness that should comply with Thermons requirement (when using heat trace) or indicated requirement and incorporate a factory applied aluminium foil. The pipe insulation shall have an Ignitability Index of zero (0), a Spread of Flame Index of zero (0), and a Heat Developed Index of zero (0) and a Smoke Developed Index of zero-one (0-1), when tested in accordance with AS1530.3.

All insulation shall be installed around the pipe work surface as tightly as possible without gaps. The edges and ends shall be tightly butted together. All joints shall be taped using a 48mm pressure sensitive aluminium tape and pressure should be applied with the supplied squeegee to eliminate heat loss and gaps. All taped joints should face towards the installer after taped. All end pieces should be sealed with silicone and taped once dried.

Where necessary, the preformed sections shall be cut (using a sharp knife or scissors) and mitred, to ensure a tight fit around elbows and at tees.

All pipe work and insulation needs to be laid on level ground consisting of stabiliser sand. When backfilling the in ground insulation, a requirement of an extra 200mm min cover of stabilising sand must be filled around and on top of all insulation. At any stage no sharp, large and corrosive backfill should be used. All backfill should be sealed to eliminate excess water build up in trench

4-Zero Product Data

<u>DESCRIPTION</u>	:	Pre-formed closed cell Low Density Polyethylene foam pipe with reinforced aluminium foil covering incorporating overlap.								
<u>STANDARDS LENGTH</u>	:	1 metre								
<u>STANDARD WALL THICKNESS</u>	:	15, 20, 25 and 30mm								
<u>SIZE RANGE</u>	:	13mm to 102mm diameter								
<u>FIRE PERFORMANCE</u>	:	<table> <tr> <td>Ignitability</td> <td>0</td> </tr> <tr> <td>Spread of Flame</td> <td>0</td> </tr> <tr> <td>Heat Evolved</td> <td>0</td> </tr> <tr> <td>Smoke Development</td> <td>0/1</td> </tr> </table>	Ignitability	0	Spread of Flame	0	Heat Evolved	0	Smoke Development	0/1
Ignitability	0									
Spread of Flame	0									
Heat Evolved	0									
Smoke Development	0/1									
		<p>Note: The above represents the optimum achievable fire performance results per AS 1530.3 and is often referred to as “Four Zero” performance.</p>								
<u>CELL STRUCTURE OF FOAM</u>	:	Closed								
<u>WEATHERABILITY</u>	:	Excellent, due to closed cell structure of foam combined with aluminium foil ‘skin’.								
<u>OPERATING TEMPERATURE RANGE</u>	:	-40 ⁰ C to +90 ⁰ C								
<u>THERMAL CONDUCTIVITY</u>	:	.031 to .045 W/mK over the – 50 ⁰ C to +50 ⁰ C temperature range.								
<u>WATER ABSORPTION</u>	:	< 2% after 28 days immersion								
<u>OZONE RESISTANCE</u>	:	Excellent per ASTM D1171								

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4-Zero Properties

Physical State		Solid	
Density Kg/M³		± 60 Kg/M ³	
Cell Structure		Closed Cell	
Colour		Grey (other colours also available)	
Operating Temperature Range		-40 ⁰ C to 90 ⁰ C	
Water Vapour Diffusion	DIN52615	H>3.5%	
Resistance	ASTME96	0.0022G/M ² HMM H6	
Water Absorption after 28 Days	DIN53434	<2%	
U.V. Resistance		Requires P.V.A. coating	
Weatherability		Withstands all elements except U.V.	
Odour		None	
Chemical Resistance	ASTM543.56T	Excellent will resist most common acids/chemicals including oils – see attached schedule	
Ozone Resistance	ASTMD1171	Excellent	
Fire Performance per AS1530.3		Ignitability	0
		Spread of Flame	0
		Head Evolved	0
		Smoke Development	0/1
		Complies with Para 16.19 of Victorian Fire Requirements and Ordinance 70 of N.S.W. plus equivalent legislation elsewhere.	
Toxicity in Fire		99% CO ₂ H ₂ O	
Sound absorption	DIN4109	Complies the Norm-20% Reduction	
Rodent/Pest		Contains no food source or nutrients	

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Quickseal Specification

The pipe insulation shall be Thermotec Quick Seal, fire retardant, closed cell polyethylene foam, having a density of not less than 50kg/m³, and shall incorporate a press seal fastener system. The pipe insulation shall have a wall thickness of 10mm, 15mm, 20mm (delete thicknesses not required). The pipe insulation shall have a Spread of Flame Index of zero (0) and a Smoke Developed Index of four (4) (maximum) when tested in accordance with AS1530.3.

All insulation shall be installed around the pipe work surface as tightly as possible without gaps. The edges and ends shall be tightly butted together. Butt joints shall be taped using a 50mm adhesive backed PVC tape.

Where necessary, the preformed sections shall be cut (using a sharp knife or scissors) and mitred, to ensure a tight fit around elbows and at tees.

Metal sheathing is required for areas where the product is subject to mechanical damage.

Where supports and spacer blocks are used to support the pipe work, the pipe insulation shall be butted tightly up to the spacer blocks and sealed using a silicon sealant.

Where pipe size exceeds 101.6mm outside diameter, the insulation shall be Thermotec Thermalag, foam sheet cut to predetermined width to exactly fit the pipe. The Thermalag shall be grooved on the inside to eliminate tension and facilitate quick and easy application.

If pipe work is scheduled to be painted for protection from UV and/or identification purposes the pipe insulation shall be coated using an acrylic based paint in accordance with the paint manufactures' recommendations.

Service penetration areas shall be designed to meet a four (4) hour fire rating per AS 1530.4.

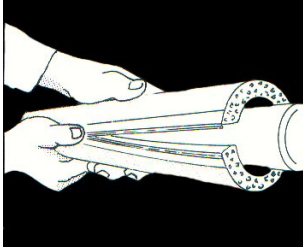
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Quickseal Product Data Sheet



<u>BASE MATERIAL</u>	: Low Density Polyethylene Foam
<u>CELL STRUCTURE</u>	: Closed
<u>THERMAL CONDUCTIVITY</u>	: .031 to .045 W/mK over the – 50°C to + 50°C temperature range.
<u>OPERATING TEMPERATURE</u>	: -40°C to +90°C Not suitable for applications above 90°C. Can however be used below –40°C by utilising additional layers of Thermotec, staggering joints and incorporating a vapour barrier.
<u>FIRE PERFORMANCE</u>	: Spread of Flame 0 Heat Evolved 1 Smoke Development 3 Above per AS1530.3 - Smoke given off is non-toxic
<u>OZONE RESISTANCE</u>	: Excellent per ASTM D1171
<u>WATER ABSORPTION</u>	: < 2% after 28 days – DIN 53434
<u>WEATHERABILITY</u>	: Very good. Does however require coating of exterior acrylic paint for protection against U.V. degradation.
<u>CHEMICAL RESISTANCE</u>	: Resists most common acids and chemicals
<u>ODOUR</u>	: None
<u>STANDARD LENGTH</u>	: 2 metres
<u>WALL THICKNESSES</u>	: 10, 15 and 20mm
<u>SIZE RANGE</u>	: 10mm to 102mm diameter
<u>STANDARD COLOUR</u>	: Grey/Black

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Sealed Tube Specification

The pipe insulation shall be Thermotec Sealed Tube, fire retardant, closed cell polyethylene foam, having a density of not less than 50kg/m³. The pipe insulation shall have a wall thickness of 10mm, 15mm, 20mm, 25mm (delete thickness not required). The pipe insulation shall have a Spread of Flame Index of zero (0) and a Smoke Developed Index of four (4) (maximum) when tested in accordance with AS1530.3.

All insulation shall be installed around the pipe work surface as tightly as possible without gaps. The edges and ends shall be tightly butted together. All joints shall be taped using a 50mm adhesive backed PVC tape.

Where necessary, the preformed sections shall be cut (using a sharp knife or scissors) and mitred, to ensure a tight fit around elbows and at tees.

Metal sheathing is required for areas where the product is subject to mechanical damage.

Where supports and spacer blocks are used to support the pipe work, the pipe insulation shall be butted tightly up to the spacer blocks and sealed using a silicon sealant.

Where pipe size exceeds 89mm outside diameter, the insulation shall be Thermotec Thermalag, foam sheet cut to predetermined width to exactly fit the pipe. The Thermalag shall be grooved on the inside to eliminate tees.

Metal sheathing is required for areas where the product is subject to mechanical damage.

Where supports and spacer blocks are used to support the pipe work, the pipe insulation shall be butted tightly up to the spacer blocks and sealed using a silicon sealant.

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Sealed Tube Product Data Sheet

<u>BASE MATERIAL</u>	:	Pre-formed closed cell Low Density Polyethylene foam pipe insulation						
<u>CELL STRUCTURE</u>	:	Closed						
<u>THERMAL CONDUCTIVITY</u>	:	.031 to .045 W/mK over the – 50 ⁰ C to + 50 ⁰ C temperature range.						
<u>OPERATING TEMPERATURE</u>	:	-40 ⁰ C to +90 ⁰ C						
<u>FIRE PERFORMANCE</u>	:	<table> <tr> <td>Spread of Flame</td> <td>0</td> </tr> <tr> <td>Heat Evolved</td> <td>1</td> </tr> <tr> <td>Smoke Development</td> <td>3</td> </tr> </table> Above per AS1530.3 Smoke given off is non-toxic	Spread of Flame	0	Heat Evolved	1	Smoke Development	3
Spread of Flame	0							
Heat Evolved	1							
Smoke Development	3							
<u>OZONE RESISTANCE</u>	:	Excellent per ASTM D1171						
<u>WATER ABSORPTION</u>	:	< 2% after 28 days immersion – DIN 53434						
<u>WEATHERABILITY</u>	:	Excellent, due to closed cell structure of foam. Must however be coated with exterior paint for protection against U.V. degradation.						
<u>CHEMICAL RESISTANCE</u>	:	Resists most common acids and chemicals.						
<u>ODOUR</u>	:	None						
<u>STANDARD LENGTH</u>	:	2 metres						
<u>WALL THICKNESSES</u>	:	10, 15, 20 and 25mm						
<u>SIZE RANGE</u>	:	10mm to 89mm diameter						
<u>STANDARD COLOUR</u>	:	Grey/Black						

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Quick Seal & Sealed Tube Properties

- QUICK SEAL 'ZIP' FASTENER : Easier and more economical to apply especially where pipe being insulated is already installed.
- SEALED TUBE : Even more economical to use on new work where pipes insulated prior to insulation.
- AUSTRALIAN MADE : Support Australia. Readily available. No container load orders required.
- LOW DENSITY : Light, flexible and food compatible
- POLYETHYLENE : Non absorbent
- CLOSED CELL : Non absorbent
- NO SYNTHETIC MINERAL FIBRES : Safe to work with
- FLEXIBLE : Easy to handle and apply
- WIDE TEMPERATURE RANGE : -40°C to 90°C. Covers large range of applications in refrigeration and heating areas.
- GREATER WALL THICKNESS : Provides 10-15% more insulation at no extra cost.
- + 60KG/M³ DENSITY : Provides good impact resistance while remaining flexible and maintaining a low thermal conductivity.
- CHEMICAL RESISTANCE : Resists most common acids/chemicals PH3/13.
- LARGE RANGE OF SIZES : From 10 to 102mm I.D. pipe sizes available.
- REQUIRES NO LUBRICANTS : Quicker and easier to apply to pipe.
- LOWER OPERATING TEMPERATURE OF -40°C : No change in mechanical and chemical properties.
- WEATHERABILITY : Withstand all elements except U.V. (protect with exterior P.V.A./Acrylic paint or aluminium foil cladding).
- RODENT/PEST RESISTANCE : Contains no food source or nutrients.
- FIRE RETARDANT : Meets fire performance requirements of Building Code for Class II to VIII Buildings. Also available in 4-zero fire performance grade.

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ADHESIVE USE (Butt welding of T pieces)

No waiting 36 hours to conduct hot water test runs.

Polytube Specification

The pipe insulation shall be Thermotec Polytube, fire retardant, closed cell polyethylene foam, having a density of not less than 50kg/m³. The pipe insulation shall have a wall thickness of 6mm.

All insulation shall be installed around the pipe work surface as tightly as possible without gaps. The edges and ends shall be tightly butted together. All joints shall be taped using a 50mm adhesive backed PVC tape.

Where necessary, the preformed sections shall be cut (using a sharp knife or scissors) and mitred, to ensure a tight fit around elbows and at tees.

Where supports and spacer blocks are used to support the pipework, the pipe insulation shall be butted tightly up to the spacer blocks and sealed using a silicon sealant.

Service penetration areas shall be designed to meet a four (4) hour fire rating as per AS1530.4.

NB

Polytube available to suit 1/2", 5/8" & 3/4" Copper.

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Polytube Product Data Sheet

<u>BASE RAW MATERIAL</u>	:	Low Density Polyethylene
<u>CELL STRUCTURE</u>	:	Closed
<u>THERMAL CONDUCTIVITY</u>	:	0.034 W/mK
<u>WATER ABSORPTION</u>	:	< 2% after 28 days complete submersion.
<u>COLOUR</u>	:	Green
<u>STANDARD LENGTH</u>	:	2 metres
<u>DIAMETER NOMINAL SIZES</u>	:	DN15, DN18, DN20
<u>ACTUAL SIZES</u>	:	12.7mm, 15.88mm, 19.05mm
<u>IMPERIAL SIZES</u>	:	1/2", 5/8", 3/4"
<u>INSULATION WALL THICKNESS</u>	:	Nominal 6mm
<u>FIRE PERFORMANCE PER AS1530.3</u>	:	Spread of Flame 0 Smoke Developed 4
<u>OPERATING TEMP. RANGE</u>	:	-40°C to 90°C
<u>TOXICITY</u>	:	Non toxic constituting 99% CO ₂ and H ₂ O in the event of complete combustion.
<u>ACOUSTIC PROPERTIES</u>	:	Effective attenuation of structural borne sound.
<u>SYNTHETIC MINERAL FIBRE CONTENTS</u>	:	None
<u>RECYCABILITY</u>	:	Completely recyclable.
<u>CHEMICAL STABILITY</u>	:	Essentially inert and will not react with most acids, alkali, diesel, oil.

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F.P.I Technical Data Sheet



Product Description: High density fibreglass pipe insulation incorporating a factory applied reinforced aluminium covering for optimum fire performance in accordance with AS 1530.2. Each section is pre slit along one edge to facilitate easy application.

Product Usage: Insulation of service or process piping operating within Products designated temperature range.

Product Density: Nom: 64kg/m³ Tested to ASTM C302

Operating Temperature: -18°C to +450°C Tested to ASTM C411

Ph Value: Average 8 Tested to ASTM C871

Moisture Absorption: <2% by Weight Tested to ASTM C1104 (M)

Chemical Composition:

SiO ₂	62-63%
Al ₂ O ₃	3.7-4%
Fe ₂ O ₃	0.1-0.2%
CaO	7.5-7%
MgO	2.7%
Na ₂ O + K ₂ O	16.8-18.8%
B ₂ O ₃	6%

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F.P.I Technical Data Sheet

Fire Resistance Properties when Tested to AS/NZS 1530. Part 3 -1999

Ignitability Index: 0
Spread of Flame Index: 0
Heat Evolved Index: 0
Smoke Developed Index: 0-1 see note*

Refer to AWTA Textile Test no. 7-552130-CN Dated 04/05/2007

*Note: smoke developed index is reported as 0-1 due to the inability of the smoke measurement equipment to resolve an index of zero.

R-Value: From individual tests conducted by BRANZ (May 2007) the following R-Values were calculated

25mm Thickness	R 0.8
40mm Thickness	R 1.2
50mm Thickness	R 1.5

Dimensions: all sizes imperial and metric from 12.7mm OD to 219mm OD
Thicknesses from 25mm, 40mm & 50mm. Special sizes are available on request.

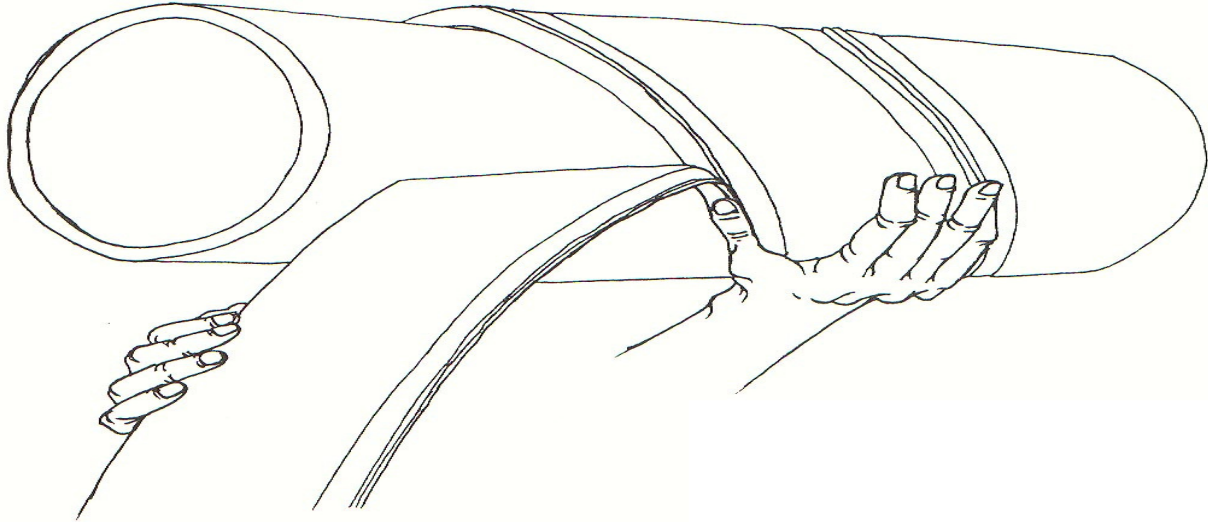
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Thermalag/Grooved Sheeting Data



thermotec

Grooved Sheeting polyethylene foam is suitable for insulation of large diameter piping and ducting nominal sizes from 114mm to 250mm. Grooved Sheeting is available in a range of widths to suit our customers' needs with a length of 1 meter and standard thicknesses of 10mm, 15mm, 20mm and 25mm. Grooved Sheeting is wound around the pipe and secured by means of tape.

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Thermalag/Grooved Sheeting Product Properties

Physical State		Solid								
Density Kg/M³		±60 Kg/M ³								
Cell Structure		Closed Cell								
Colour		Grey (other colours also available)								
Operating Temperature Range		-40 ⁰ C to 90 ⁰ C								
Water Vapour Diffusion	DIN52615	H>3.5%								
Resistance	ASTME96	0.0022G/M ² HMM H6								
Water Absorption after 28 Days	DIN53434	<2%								
U.V. Resistance		Requires P.V.A. coating								
Weatherability		Withstands all elements except U.V.								
Odour		None								
Chemical Resistance	ASTM543.56T	Excellent will resist most common acids/chemicals including oils – see attached schedule								
Ozone Resistance	ASTMD1171	Excellent								
Fire Performance per AS1530.3		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Ignitability</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Spread of Flame</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Head Evolved</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Smoke Development</td> <td style="text-align: center;">0/1</td> </tr> </table> <p>Complies with Para 16.19 of Victorian Fire Requirements and Ordinance 70 of N.S.W. plus equivalent legislation elsewhere.</p>	Ignitability	0	Spread of Flame	0	Head Evolved	0	Smoke Development	0/1
Ignitability	0									
Spread of Flame	0									
Head Evolved	0									
Smoke Development	0/1									
Toxicity in Fire		99% CO ₂ H ₂ O								
Sound absorption	DIN4109	Complies the Norm-20% Reduction								
Rodent/Pest		Contains no food source or nutrients								

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Thermotec Heatloss Tables 4-Zero/Quickseal/Sealed Tube Pipe Insulation in W/m

WATER TEMP °C		55				60				65			
AMBIENT TEMP °C		10	12	15	20	10	12	15	20	10	12	15	20
PIPE O.D. (mm)	INSULATION THICKNESS												
13	Nil	27.7	25.9	24.3	20.9	31.8	30.4	28.4	24.9	35.9	34.5	32.4	28.9
	15	7.7	7.4	6.9	6.1	8.7	8.6	8.4	7.0	9.7	9.4	8.8	7.9
	20	6.6	6.4	6.0	5.4	7.8	7.5	7.1	6.3	9.0	8.6	8.1	7.2
	25	6.1	5.9	5.7	5.3	7.2	7.0	6.6	5.9	8.3	7.7	6.8	6.4
	30	5.7	5.6	5.4	5.1	6.7	6.5	6.1	5.5	7.7	7.1	6.2	5.7
15	Nil	31.5	30.0	27.6	23.8	36.2	34.1	31.2	28.3	40.9	39.3	36.8	32.8
	15	8.5	7.9	7.0	6.4	9.6	9.3	8.6	7.7	10.7	10.5	10.2	9.8
	20	6.7	6.6	6.4	6.1	8.5	8.1	7.5	6.7	10.2	9.7	8.8	7.6
	25	6.6	6.4	6.2	5.9	7.8	7.4	7.1	6.2	9.6	8.5	7.0	6.7
	30	5.8	5.6	5.5	5.2	7.2	7.0	6.5	5.8	8.6	7.8	6.6	6.0
20	Nil	39.7	37.8	34.9	30.1	45.6	43.4	40.2	35.8	51.5	49.5	46.5	41.5
	15	9.8	9.4	8.8	7.7	11.1	10.7	10.0	8.9	12.4	11.9	11.2	10.1
	20	8.3	8.0	7.6	6.8	9.8	9.4	8.8	7.8	11.3	10.8	10.0	8.8
	25	7.9	7.7	7.3	6.5	9.0	8.6	8.1	7.2	10.1	9.5	8.7	7.5
	30	7.2	7.0	6.8	6.2	8.2	7.9	7.4	6.6	9.2	8.7	8.0	6.9
25	Nil	47.9	45.6	42.2	36.4	55.0	52.7	49.2	43.3	62.1	59.7	56.2	50.2
	15	11.1	10.9	10.6	10.0	12.6	12.1	11.4	10.1	14.1	13.3	12.2	10.2
	20	9.9	9.4	8.7	7.5	11.1	10.7	10.1	8.9	12.4	11.9	11.2	10.0
	25	9.2	9.0	8.0	6.8	10.2	9.8	9.1	8.2	10.6	10.5	10.4	9.8
	30	8.6	7.8	6.9	6.3	9.2	8.8	8.3	7.4	9.8	9.6	9.4	9.0
32	Nil	59.0	56.2	52.0	44.9	67.8	64.9	60.6	53.4	76.6	73.7	69.3	61.9
	15	13.1	12.5	11.6	10.1	14.8	14.2	13.3	11.8	16.5	15.5	14.1	13.5
	20	11.4	11.1	10.7	9.9	12.9	12.5	11.9	10.8	14.4	13.9	13.2	11.7
	25	10.3	10.0	9.6	8.9	11.7	11.3	10.7	9.7	13.1	12.5	11.6	10.5
	30	9.4	9.2	8.9	7.8	10.6	10.2	9.6	8.5	11.8	11.3	10.5	9.2

Thermotec Australia

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Postage Address: Po Box5085 Milperra NSW 1891

Thermotec Heatloss Tables 4-Zero/Quickseal/Sealed Tube Pipe Insulation in W/m

WATER TEMP °C		55				60				65			
AMBIENT TEMP °C		10	12	15	20	10	12	15	20	10	12	15	20
PIPE O.D. (mm)	INSULATION THICKNESS												
39	Nil	69.8	66.5	61.5	53.1	80.2	76.8	71.7	63.2	90.6	87.1	81.9	73.3
	15	13.6	13.2	12.6	11.7	16.9	16.3	15.3	13.6	23.2	21.2	18.3	15.5
	20	12.9	12.3	11.5	10.0	14.6	14.0	13.2	11.7	16.3	16.2	16.1	13.4
	25	11.8	11.3	10.6	9.3	13.3	12.8	12.0	10.7	14.8	14.5	14.1	12.1
	30	10.5	10.1	9.4	8.3	11.9	11.5	10.8	9.6	13.3	13.2	13.0	10.9
51	Nil	87.6	83.5	77.3	66.9	100.7	96.5	90.2	79.6	113.8	109.5	103.0	92.3
	15	18.1	17.3	16.0	13.9	20.5	19.7	18.4	16.3	22.9	21.5	19.5	18.7
	20	15.5	14.8	13.8	12.0	17.5	16.8	15.7	14.0	19.5	18.8	17.8	16.0
	25	14.0	13.4	12.5	10.9	15.8	15.2	14.3	12.7	17.6	17.0	16.1	14.5
	30	12.5	11.9	11.0	9.7	14.1	13.5	12.6	11.3	15.7	15.1	14.3	12.9
60	Nil	100.7	95.9	88.8	76.9	115.7	110.9	103.6	91.5	130.7	125.8	118.4	106.1
	15	20.4	19.5	18.1	15.8	23.1	22.2	20.8	18.4	25.8	24.2	21.8	21.0
	20	15.0	14.7	14.3	13.5	19.6	18.8	17.7	15.7	21.9	21.1	19.9	17.9
	25	14.7	14.4	14.0	12.2	17.1	16.7	16.0	14.2	19.7	19.0	17.9	16.2
	30	13.9	13.3	12.4	10.8	15.7	15.1	14.2	12.6	17.5	16.8	15.8	14.4
76	Nil	123.4	117.6	108.9	94.4	141.8	133.9	122.1	112.3	160.2	154.2	145.2	130.2
	15	24.4	23.1	21.2	18.0	27.6	26.5	24.8	22.0	30.8	29.7	28.0	25.2
	20	20.5	19.6	18.3	16.0	23.4	22.5	21.1	18.7	26.1	25.1	23.7	21.4
	25	18.5	17.7	16.5	14.5	20.9	20.1	18.9	16.8	23.3	22.5	21.2	19.1
	30	16.3	15.6	14.5	12.7	18.4	17.7	16.6	14.8	20.5	19.8	18.7	16.9
102	Nil	159.0	151.6	140.5	122.0	182.7	175.2	163.9	145.0	206.4	198.7	187.2	168.0
	15	30.7	27.1	21.6	19.8	34.8	32.0	27.7	20.6	38.9	37.5	35.3	31.7
	20	25.9	22.4	17.1	14.2	29.3	26.9	23.4	17.5	32.7	31.4	29.5	26.3
	25	24.2	20.8	15.8	8.5	26.1	24.0	20.9	15.7	26.5	25.8	24.7	22.9
	30	21.3	18.6	14.5	7.6	22.8	21.0	18.3	13.8	24.3	23.5	22.2	20.0

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N.B Outside air assumed still. Convection film coefficient calculated using standard laminar convection heat transfer formulae. For wind chill factor (Exposed Areas) add 10%.

Thermotec Heatloss Table 4-Zero/Quickseal/Sealed Tube in KJ/Hr/m

WATER TEMP °C		55				60				65			
AMBIENT TEMP °C		10	12	15	20	10	12	15	20	10	12	15	20
PIPE O.D. (mm)	INSULATION THICKNESS												
13	Nil	99.7	93.2	87.5	75.2	114.5	109.4	102.2	89.6	129.2	124.2	116.6	104.1
	15	27.7	26.6	24.8	21.9	31.3	31.0	30.2	25.2	34.9	33.8	31.7	28.4
	20	23.8	23.1	21.6	19.4	28.1	27.0	25.5	22.7	32.4	31.0	29.1	25.9
	25	22.0	21.2	20.5	19.1	25.9	25.2	23.8	21.2	29.9	27.7	24.5	23.1
	30	20.5	20.2	19.4	18.4	24.1	23.4	22.0	19.8	27.7	25.6	22.3	20.5
15	Nil	113.4	108.0	99.4	85.7	130.3	122.8	112.3	101.9	147.2	141.5	132.5	118.1
	15	30.6	28.4	25.2	23.1	34.6	33.5	31.0	27.7	38.5	37.8	36.7	35.3
	20	24.1	23.8	23.1	22.0	30.6	29.2	27.0	24.1	36.7	34.9	31.7	27.4
	25	23.8	23.1	22.3	21.2	28.1	26.6	25.6	22.3	34.6	30.6	25.2	24.1
	30	20.9	20.2	19.8	18.7	25.9	25.2	23.4	20.9	31.0	28.1	23.8	21.6
20	Nil	142.9	136.1	125.6	108.4	164.2	156.2	144.7	128.9	185.4	178.2	167.4	149.4
	15	33.1	33.8	31.7	27.7	40.1	38.5	36.0	32.0	44.6	42.8	40.3	36.4
	20	29.9	28.8	27.3	24.5	35.2	33.8	31.7	28.1	40.7	38.9	36.6	31.7
	25	28.4	27.7	26.3	23.4	32.4	31.0	29.2	25.9	36.4	34.2	31.3	27.0
	30	25.9	25.2	24.5	22.3	29.5	28.4	26.6	23.8	33.1	31.3	28.6	24.6
25	Nil	172.4	164.1	151.9	131.0	198.0	189.7	177.1	155.9	223.6	214.9	202.3	180.7
	15	40.0	39.2	38.2	36.0	45.4	43.6	41.0	36.4	50.8	47.9	43.9	36.7
	20	35.6	33.8	31.3	27.0	40.0	38.5	36.4	32.0	44.6	42.8	40.3	36.0
	25	33.1	32.4	28.8	24.5	36.7	35.2	32.8	29.5	38.2	37.8	37.4	35.3
	30	27.5	28.1	24.1	22.7	33.1	31.7	29.9	26.6	35.3	34.6	33.8	32.4
32	Nil	212.4	202.3	187.2	161.6	244.1	223.6	218.2	192.2	275.8	265.3	249.4	222.8
	15	47.2	45.0	41.8	36.4	53.3	51.1	47.9	42.5	59.4	55.8	50.8	48.6
	20	41.0	40.0	38.5	35.6	46.4	45.0	42.8	38.9	51.8	50.1	47.5	42.1
	25	37.1	36.0	34.6	32.0	42.1	40.7	38.5	35.0	47.9	45.0	41.8	37.8
	30	33.8	33.1	32.0	28.1	38.2	36.7	34.6	30.6	42.5	40.7	37.8	33.1

Thermotec Heatloss Table 4-Zero/Quickseal/Sealed Tube in KJ/Hr/m

WATER TEMP °C		55				60				65			
AMBIENT TEMP °C		10	12	15	20	10	12	15	20	10	12	15	20
PIPE O.D. (mm)	INSULATION THICKNESS												
39	Nil	251.3	239.4	221.4	191.2	288.7	276.5	258.1	227.5	326.2	313.6	294.8	263.8
	15	49.0	47.5	45.4	42.1	60.8	58.7	55.1	49.0	83.5	76.3	65.9	55.8
	20	46.4	44.3	41.4	36.0	52.6	50.4	47.5	42.1	58.7	58.3	58.0	48.2
	25	42.5	40.7	38.2	33.5	47.9	46.1	43.2	38.5	53.3	52.2	50.8	43.6
	30	37.8	36.4	33.8	29.9	42.8	41.4	38.9	34.6	47.9	47.5	46.8	39.2
51	Nil	315.3	300.6	278.3	240.8	362.5	347.4	324.7	287.3	409.7	394.2	370.8	332.3
	15	65.1	62.3	57.6	50.0	73.8	70.9	66.2	58.7	82.4	77.4	70.2	67.3
	20	55.8	53.6	49.7	43.2	63.0	60.5	56.5	50.4	70.2	67.7	64.1	57.6
	25	50.4	48.2	54.0	39.2	56.9	54.7	51.5	45.7	63.4	61.2	58.0	52.2
	30	45.0	42.6	39.6	34.9	50.8	48.6	43.4	40.7	56.5	54.4	51.5	46.4
60	Nil	362.5	345.2	319.7	276.8	416.5	399.2	372.9	329.4	470.5	452.9	426.4	382.0
	15	73.4	70.2	65.2	56.8	83.1	79.9	75.2	66.2	92.9	87.1	78.5	75.6
	20	54.0	52.9	51.5	48.6	70.6	67.7	63.7	56.5	78.8	76.0	71.6	64.4
	25	52.9	51.8	50.4	43.9	61.6	60.1	57.6	51.1	70.9	68.4	64.4	58.3
	30	50.0	47.9	44.6	38.9	56.5	54.3	51.1	45.3	63.0	60.5	56.9	51.8
76	Nil	444.2	423.4	392.0	339.8	510.5	482.1	439.6	404.3	576.7	555.1	522.7	468.7
	15	87.8	83.2	76.3	64.8	99.4	95.4	89.3	79.2	110.9	106.9	100.8	90.7
	20	73.8	70.6	65.9	57.6	84.2	81.0	76.0	67.3	94.0	90.4	85.3	77.0
	25	66.6	63.7	59.4	52.2	75.2	72.4	68.0	60.5	83.9	81.0	76.3	68.8
	30	58.7	56.2	52.9	45.7	66.2	63.7	59.8	53.3	73.8	71.3	67.3	60.8
102	Nil	572.4	545.8	505.8	439.2	657.7	630.7	590.1	522.0	743.1	715.3	673.9	604.8
	15	110.5	97.6	77.8	71.2	125.3	115.2	99.7	74.1	140.1	135.0	127.1	114.1
	20	93.2	80.6	61.6	51.2	105.5	96.8	84.2	63.0	117.2	113.1	106.2	94.7
	25	87.1	74.9	56.9	30.6	94.0	86.4	75.2	56.5	95.4	92.9	88.9	82.4
	30	76.7	67.0	52.2	27.6	82.1	75.6	65.8	49.7	87.5	84.6	79.9	72.0

Thermotec Australia
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N.B Outside air assumed still. Convection film coefficient calculated using standard laminar convection heat transfer formulae. For wind chill factor (Exposed Areas) add 10%.

Table 2 of

Thermotec Pipe Insulation Energy

Savings

Example A : Domestic Hot Water Supply

Ambient temperature = 15°C

Pipe diameter = 22 mm

Pipe temperature = 70°C

Heat loss if pipe un-insulated = 44 watts per metre per hour

Heat loss if insulated with 15mm

Wall thickness Thermotec = 11.1 watts per metre per hour

Saving in watts per metre per hour = 32.9

If therefore we assume system is effectively "in use" 6 hours per day 365 days per year, the annual saving would be.

$$= \frac{32.9}{1000} \times 6 \times 365$$

$$= 72 \text{ Kw/h per metre per annum}$$

At energy cost of say 8c per Kw/h

$$\text{annual saving per metre} = 72 \times 8\text{c}$$

$$= \$5.76$$

$$\text{Price per metre} = \$3.48$$

$$\text{Therefore, effective payback period} = \pm 7 \text{ months}$$

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Thermotec Pipe Insulation Energy

Savings

Example B : Process Line in factory working 8 hours per day, 5 days per week, 48 weeks per annum

Ambient temperature 15°C
 Pipe diameter 76mm
 Line temperature 80°C
 Length of run 60 metres

Heat loss if pipe un-insulated = 182.4 watts per metre per hour

Heat loss if pipe insulated with
 15mm Wall thickness Thermotec = 27.7 watts per metre per hour

Savings per metre per hour 154.7 watts per metre per hour

Annual savings assuming energy

Cost of 8c per Kw/h = 154.7 $\frac{\text{watts}}{1000} \times 8 \times 5 \times 48 \times 8c \times 60$

= \$1,425.71

Cost of 60 metres ZG76 W/Z

Pipe insulation = \$ 520.80

Therefore, payback period = <5 months

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Resistance

Measured in accordance with ASTM 543-56T, test specimen 50 x 40 mm.
Submersion time: 4 weeks

THERMOTEC Polyethylene Foams are chemically resistance against, notably:

Medium	Visible Change	Length	Width	Thickness	Absorption vol. %	Retention of tensile strength %
Distilled water	None	+ 0.2	- 2.2	- 3.7	1.7	96
Sulphuric acid 30%	None	+ 0.2	+ 0.3	- 0.5	0.4	
Sulphuric acid 3%	None	- 0.4	0	- 1.7	0.4	100
Nitric acid 10%	None	- 0.2	+ 2.5	- 0.1	1.0	100
Hydrochloric acid 10%	None	+ 0.6	+ 0.5	- 1.7	0.8	98
Acetic acid 5%	None	+ 0.6	+ 1.0	- 3.9	1.6	
Oleic acid	None	+ 1.2	+ 2.3	- 4.4	4.3	100
Caustic soda solution 10%	None	+ 0.2	+ 0.8	- 0.9	0.9	
Caustic soda solution 1%	None	- 0.2	+ 0.8	- 1.5	0.4	
Ammonia 10%	None	+ 1.2	- 2.0	- 1.5	1.8	
Soda water 2%	None	+ 0.4	+ 1.0	- 1.5	1.8	99
Sodium chloride solution 10%	None	- 0.6	- 1.5	- 1.1	0.8	97
Aqueous phenol solution 5%	None	+ 0.4	+ 2.0	- 2.3	1.9	
Citric acid solution 5%	None	+ 0.4	+ 1.0	+ 2.0	1.3	100
Hydroperoxide 3%	None	0	+ 1.3	+ 3.8	0.9	99
Ethanol 95%	None	0	0	- 0.7	3.7	
Ethanol 50%	None	0	- 0.5	- 3.2	2.2	100
Acetone	None	+ 0.4	+ 1.2	- 3.0	5.5	100
Ethyl acetate	None	+ 1.0	+ 1.7	+ 0.8	6.1	100
Ethylene chloride	None	+ 2.0	+ 2.8	- 8.0	3.4	100
Carbon tetrachloride	None	+ 8.2	+ 7.7	+ 1.3	16.7	100
Toluene	None	+ 6.4	+ 7.3	+ 1.8	14.7	100
Heptane	None	+ 6.8	+ 7.3	- 5.7	11.3	

+ denotes expansion
- denotes shrinkage

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4-Zero AWTA Product Test Report

AWTA PRODUCT TESTING

Australian Wool Testing Authority Ltd – trading as AWTA Product Testing
A.B.N. 43 006 014 106

1st Floor, 191 Racecourse Road, Flemington, Victoria 3031
P.O. Box 240, North Melbourne, Victoria 3051
Phone (03) 9371 2400 Fax (03) 9371 2499

TEST REPORT

CLIENT : THERMOTEC AUSTRALIA P/L
168 CARRINGTON STREET
REVESBY NSW 2212

TEST NUMBER : 7-555500-CN
DATE : 09/10/2007
ORDER NUMBER : TC 10980

SAMPLE DESCRIPTION Clients Ref: "Thermotec 4-Zero (4Z)"
Foil faced thermal insulation in tube form installed over
nominally 25mm diameter copper pipe
Colour: Silver

**THESE RESULTS MUST BE CONSIDERED IN CONJUNCTION
WITH THE COMMENTS ON THE FOLLOWING PAGE(S)**

Material Specification provided by client:
Nominal composition: Reinforced aluminium foil covering low density
polyethylene foam
Nominal density: 65kg/m³
Nominal total thickness: 75mm

AS/NZS 1530.3 - 1999 Simultaneous determination of Ignitability, Flame
Propagation, Heat Release and Smoke Release

RESULTS:

Face tested: Face

Date tested: 08/10/2007

	Mean	min	Standard Error
Ignition time	Nil	min	Nil
Flame propagation time	Nil	s	Nil
Heat release integral	Nil	kJ/m ²	Nil
Smoke release, log d	Nil		Nil
Optical density, d	Nil	/m	

Number of specimens ignited: 0

Number of specimens tested: 6

REGULATORY INDICES:	Value	Range
Ignitability Index	0	Range 0-20
Spread of Flame Index	0	Range 0-10
Heat Evolved Index	0	Range 0-10
Smoke Developed Index	0-1	Range 0-10

163609 1

(CONTINUED NEXT PAGE)

PAGE 1

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This Laboratory is accredited by the National Association of Testing Authorities, Australia, for:
- Chemical Testing of Textiles & Related Products : Accreditation No. 983
- Mechanical Testing of Textiles & Related Products : Accreditation No. 985
- Heat & Temperature Measurement : Accreditation No. 1356

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0204/11/06

Sandolac
APPROVED SIGNATORY

Michael A. Jackson
MICHAEL A. JACKSON B.Sc.(Hons)
MANAGING DIRECTOR

Thermotec Australia

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Quickseal/Sealed Tube & Polytube AWTA Product Test Report

AWTA TEXTILE TESTING

26 Robertson Street, Kensington, Victoria 3031
 P.O. Box 240 North Melbourne, Victoria 3051
 Phone (03) 9371 2126 Fax (03) 9371 2102
 Australian Wool Testing Authority Ltd - A.C.N. 006 014 106
 trading as AWTA Textile Testing

TEST REPORT

CLIENT : THERMOTEC AUSTRALIA P/L
 PO BOX 221
 ALEXANDRIA NSW 2015

TEST NUMBER : 7-482119-CN
 DATE : 01/03/99
 ORDER NUMBER : 3912

SAMPLE DESCRIPTION CLIENTS REF: THERMOTEC FR PIPE INSULATION ZE 15 LZ
 FOAM TUBING ENCASING COPPER PIPE
 COLOUR: GREY
 APPROX THICKNESS: 35mm

THESE RESULTS MUST BE CONSIDERED IN CONJUNCTION
 WITH THE COMMENTS ON THE FOLLOWING PAGE(S)

MATERIAL SPECIFICATION PROVIDED BY CLIENT:
 NOMINAL COMPOSITION: LOW DENSITY POLYETHYLENE FOAM
 NOMINAL DENSITY: APPROX 50kg/m³

AS 1530.3.1989 SIMULTANEOUS DETERMINATION OF IGNITABILITY, FLAME
 AMDT NO 1 APR 92 PROPAGATION, HEAT RELEASE AND SMOKE RELEASE.

RESULTS:	MEAN		STANDARD ERROR
IGNITION TIME	7.69	min	0.24
FLAME PROPAGATION TIME	NIL	s	NIL
HEAT RELEASE INTEGRAL	53.9	kJ/m ²	7.8
SMOKE RELEASE, LOG D	-1.2343		0.0454
OPTICAL DENSITY, D	0.0607	/m	

NUMBER OF SPECIMENS IGNITED: 9
 NUMBER OF SPECIMENS TESTED: 9

REGULATORY INDICES:	IGNITABILITY INDEX	12	RANGE 0-20
	SPREAD OF FLAME INDEX	0	RANGE 0-10
	HEAT EVOLVED INDEX	2	RANGE 0-10
	SMOKE DEVELOPED INDEX	3	RANGE 0-10

COMMENTS:

THE RESULTS OF THIS FIRE TEST MAY BE USED TO DIRECTLY ASSESS
 FIRE HAZARD, BUT IT SHOULD BE RECOGNIZED THAT A SINGLE TEST
 METHOD WILL NOT PROVIDE A FULL ASSESSMENT OF FIRE HAZARD UNDER
 ALL FIRE CONDITIONS.

EACH TEST SPECIMEN HAD AN UNATTACHED BACKING OF 4.5mm THICK
 FIBRE REINFORCED CEMENT BOARD.

Thermotec Australia

Plant Location: 168 Carrington St Revesby NSW Australia Ph: +61 2 9771 6400 Fax: +61 2 9771 6466

Email: info@thermotec.com.au Web: www.thermotec.com.au

Postage Address: Po Box5085 Miloerra NSW 1891

MATERIAL SAFETY DATA SHEET, Pipe Insulation

Date of Issue: 11 September 2007

PRODUCT and COMPANY IDENTIFICATION

Manufacturer/Supplier:

THERMOTEC AUSTRALIA PTY LTD

168 Carrington Street,
REVESBY, NSW, 221
AUSTRALIA

Tel: +612 9771 6400

Fax: +612 9771 6466

Emergency tel no. 0419 257 079

www.thermotec.com.au

U.N. Number:	None
Dangerous goods class & subsidiary risk	None
Hazchem code	None
Poisons schedule group	None
Packaging group	None

Product Name: Thermotec Pipe Insulation
Other Name: Sealed Tube, Quickseal, 4-zero

Manufacturer's codes:

L/Z

W/Z

4/Z

Product use: Thermal Pipe Insulation.

COMPOSITION and INGREDIENTS

Physical description/properties

Appearance: Black Low Density Direct Extruded Polyethylene Foam material. 4-Zero products incorporates aluminium covering for AS/NZS1530.3 Fire Performance.
Product is manufactured article.

COMPOSITION and INGREDIENTS cont...

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Physical and Chemical Properties

Melting/decomposition range:	90 Degrees Celsius (Softening) (Decomposition @ >300C)
Vapour pressure:	NA
Per cent volatile:	Nil when fully degassed
SG:	50Kg/m ³
Flash point:	over 150C

Ingredients:

Chemical entity:	CAS No.	Proportion
Polyethylene	9002-88-4	>95%

HEALTH HAZARD INFORMATION**Health effects and odours:**

The material does not contain any ingredient which under any normal installation conditions should lead to health hazards such as skin irritations, mucous irritation or breathing difficulties.

Swallowed: Not normally a hazard due to physical form of product.

Eye: Not normally a hazard due to physical form, mechanical injury possible from particulate matter.

Skin: Overexposure is unlikely in this form of product.

Inhaled: Not normally a hazard due to non-volatile nature of product when fully degassed. If not fully degassed it should not be inhaled as contains blowing agent (Propane).

It is not recommended that the material be taken orally.

First Aid:

Swallowed: If swallowed do not induce vomiting, seek medical advice

Eye: If particulate comes in contact with eyes wash affected area with cold water, irritation continues seek Medical advice.

Skin: In the event of abrasion or irritation of skin seek medical advice.

Inhaled: If fumes or combustion inhaled, remove from contaminated area and seek medical advice.

Advice to Physician: Treat symptomatically.

PRECAUTIONS FOR USE

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Exposure limits:	Not applicable
Ventilation:	Must be stored in a well ventilated area. Refer to manufactures "Safety when using Thermotec Closed Cell Polyethylene Foam"

Personal protection:

Respiratory protection:	Dust respirator recommended when material is being cut or ground
Protective gloves:	None required
Eye protection:	Glasses with side shields in dusty conditions

Flammability:

Material should be kept away from excessive heat sources and sources of ignition.

The Foam and Foam backed products may burn with high heat and evolution of black smoke.

Foil faced products (e.g. 4zero) comply with AS1530.3.1989 four zero fire performance.

Test report available on request.

Test report on foams available on request.

SAFE HANDLING INFORMATION

Storage & Transport:

Although shipment in properly ventilated vehicles should prevent the accumulation of a flammable concentration of blowing agent (Propane) during transport, the following additional precautions should be taken when opening shipments of foam.

(I) Extinguish any sources of ignition including smoking.

(II) Allow air to circulate for at least 5 minutes after opening closed vehicles and containers.

All Thermotec foam products must be stored in a well ventilated area. Smoking and all other ignition sources must not be allowed.

Handling

When cutting, skiving, routing or grinding, cells are destroyed accelerating the release of any retained blowing agent. Therefore it is possible for explosive concentrations of the blowing agent to accumulate in localized areas. It is vital that there be adequate ventilation to enable blowing agent to dissipate.

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