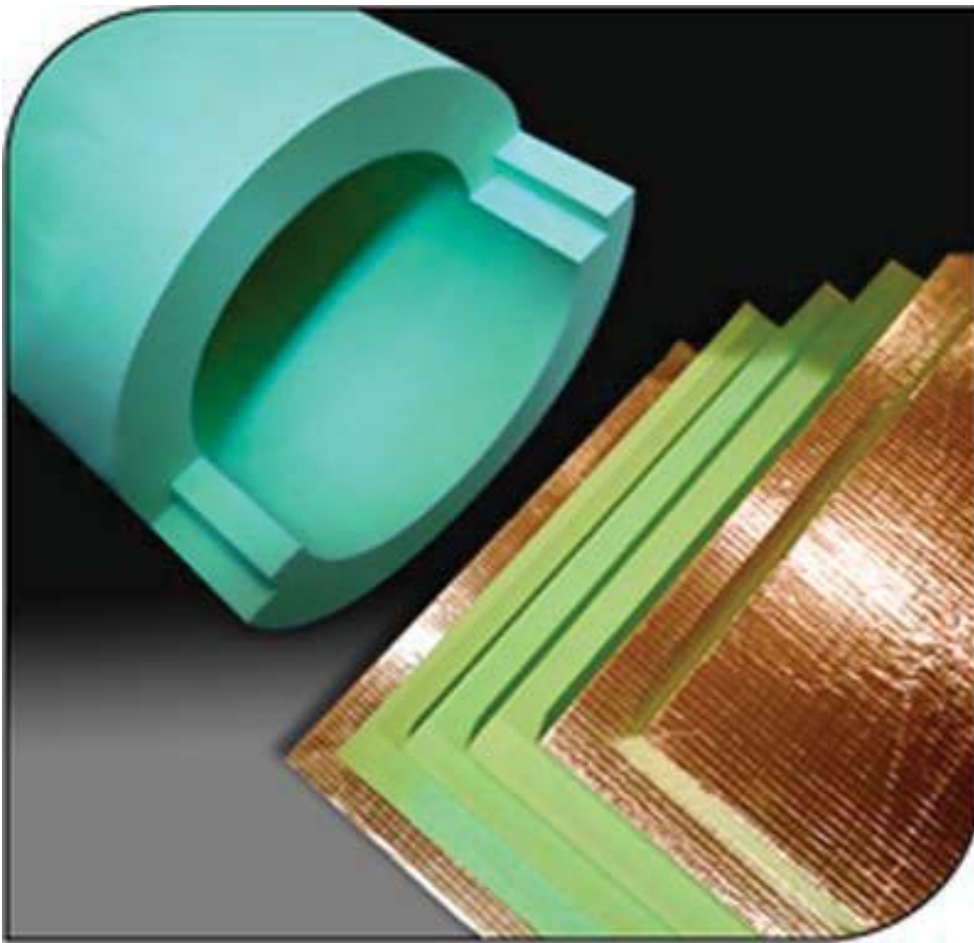


Polyurethane (PUR) Insulation

- Cold Insulation for Oil, Gas and Refinery Industries
- Cryogenic Insulation
- Pipe, Slabs and Board Insulation

*The Quality Insulation
Products for Many Diverse
Application*



- Continuous PUR Foam Block Production
- Equipment / Tank / Vessel Insulation
- High Density Thermal Pipe Support Inserts
- High Density Thermal Duct Support Inserts
- High Density Support Spacer



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P.O.BOX: 62799, Abu Dhabi – UNITED ARAB
EMIRATES

Email : info@tijara-g.com

www.tijarame.com

ABOUT US

We are pleased to introduce ourselves as a leader supplier in United Arab Emirates, where by we supply an ISO 9001:2008 certified products under UKAS of united kingdom.

Tijara Middle East is a leading suppliers of high quality:

Thermal Insulation Materials

- **Pre-insulated Pipes and Fittings for District Cooling Application**
- **Polyisocyanurate Pipe, Duct, Slab and Vessel/Equipment Insulation**
- **Polyurethane Pipe, Slab and Vessel/Equipment Insulation**
- **Class 'O' CFC & HCFC Free Phenolic Foam Pipe, Duct, Wall and Roof Insulation**
- **Continuous PIR/PUR Foam Block Production**
- **Cold Insulation Materials for LNG, Oil and Gas Industries**
- **Foam Glass Insulation**
- **Phenolic Foam / Polyisocyanurate Pre-insulated Air Duct Panels**
- **Roof and Wall Insulation**
- **Polyurethane Spray Applied Foam**
- **High Density Thermal Support Inserts for piping and Ducting**
- **Heat Exchanger Insulated Box and Tray**
- **Field Joint Insulation and Application**

With many CNC Foam cutting machineries and production process units in the field with quality material available, highly qualified technical and commercial staff. We are confident that our product will comply with all international standard and definitely will meet your requirements.

In order to facilitate our client with best service and respect to quality, prompt delivery, respective elements of production and marketing were provided and enhanced under a tight quality control.

INSULATION MATERIAL

General Description

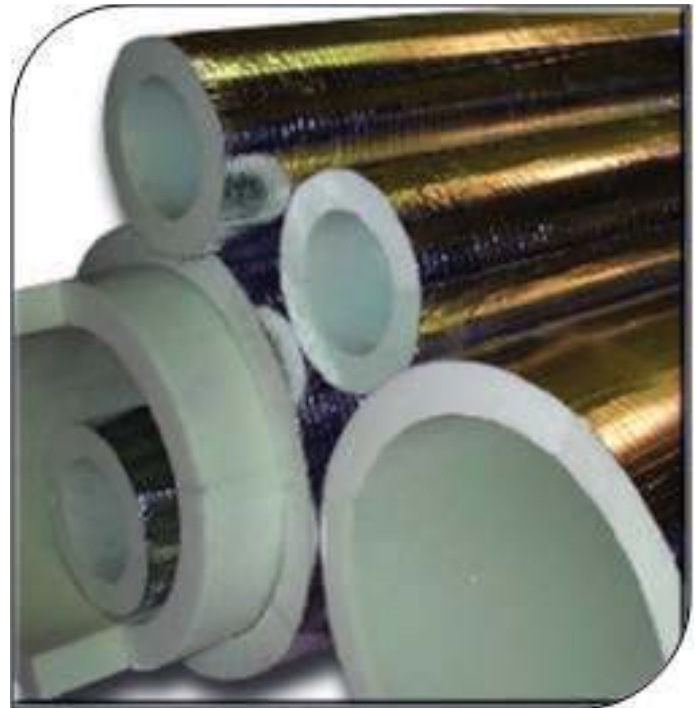
Polyurethane CFC Free Rigid Foam (PUR) is one of the most efficient, high performance insulation material, enabling very effective energy savings with minimal occupation of space.

Manufacturers CFC free rigid closed cell foam in a wide range of densities for different applications.

Density 35 to 65Kg/m³ for Pipe, Slab, Equipment, Vessel and Tank Insulation.

Density 80 to 120Kg/m³ for use in thermal Supports.

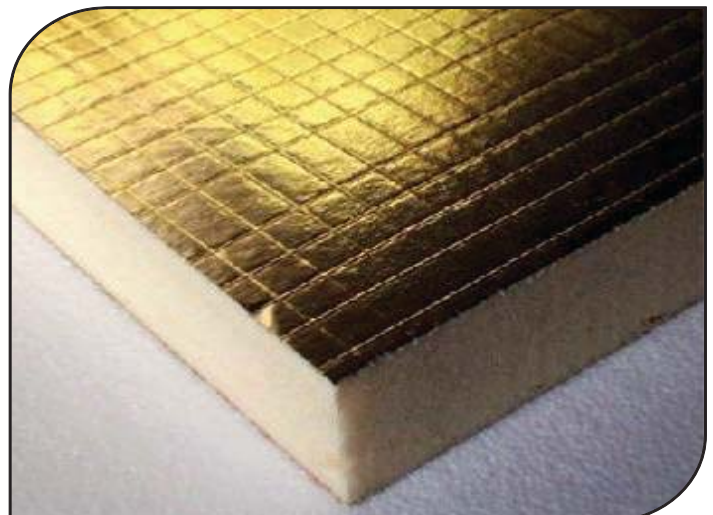
Polyurethane CFC Free Rigid Insulation is 95% closed cell and provides a long end satisfactory service life.



Polyurethane Foam can be used in many different applications in the process plant, Oil, Gas, refinery, Cold, Cryogenic and Air-conditioning industries. Standard foam meets the requirements of the German specification DIN 4102, Class B2/B3. If a higher performance level is required we can supply foam meet DIN 4012 Class B1.

Where higher temperature and/or better fire performance is required we recommend to use the **Polyisocyanurate** Insulations.

Polyisocyanurate meet the requirement of BS 476 part 6 & 7, Class 1 and ASTM E-84.



DENSITY

35 Kg/m³ to 65Kg/m³-Density for Pipe, Slabs, Board, Vessel, Tank, Equipment, Cryogenic Insulation.

80Kg/m³ to 360Kg/m³-Density for Thermal Supports. Other densities are available upon request.

SIZES

Pipe Sections up to 125 MM OD supplied in two half section. Sizes over 150 MM OD can be supplied in segments or two half sections as required.

Board/Slabs 1000 MM x 1000 MM OR 2000 MM x 1000 MM, Other sizes are available upon request.

AVAILABILITY

Slabs / Board, Pipe Sections, Pipe Fittings, Including Elbows, Tees, Reducers etc...



FINISHING

PIPE SECTION with reinforced Aluminium Class '1' foil faced.

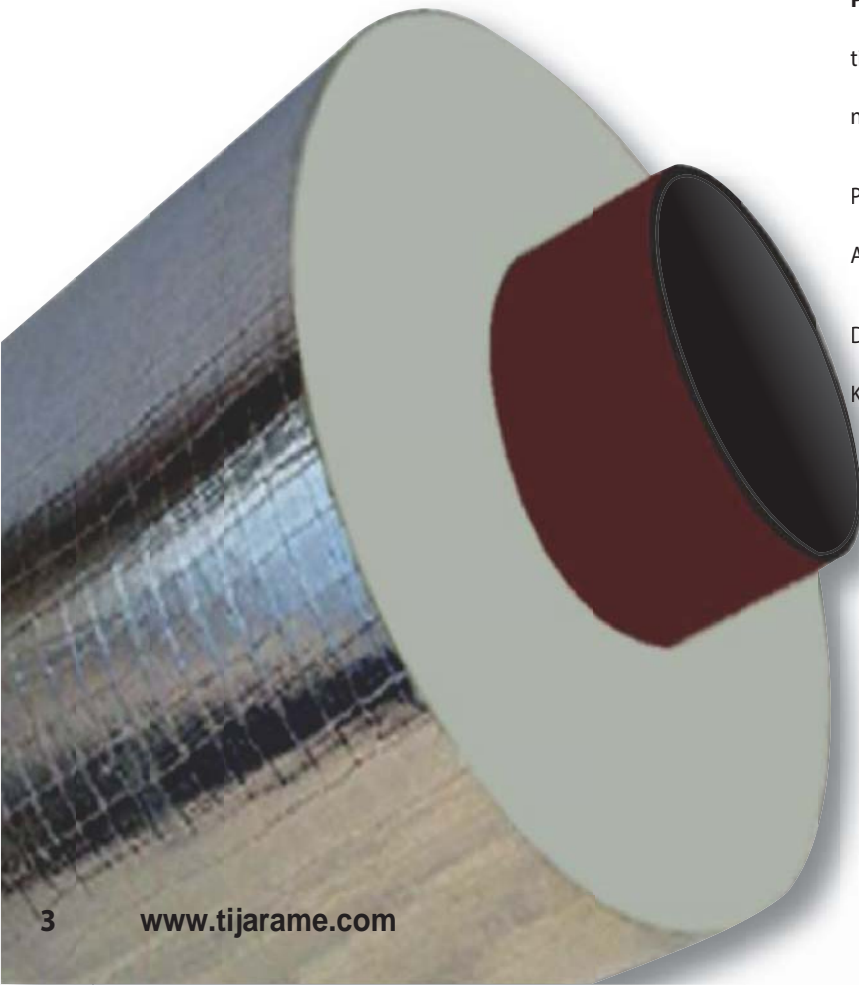
PIPE SECTION with reinforced aluminium Class 'O' foil faced.

PIPE SECTION with Aluglass foil faced (Aluminized glass Cloth)./

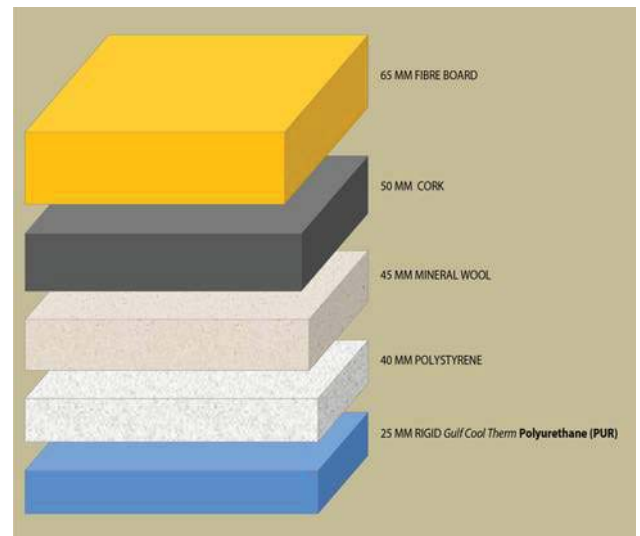
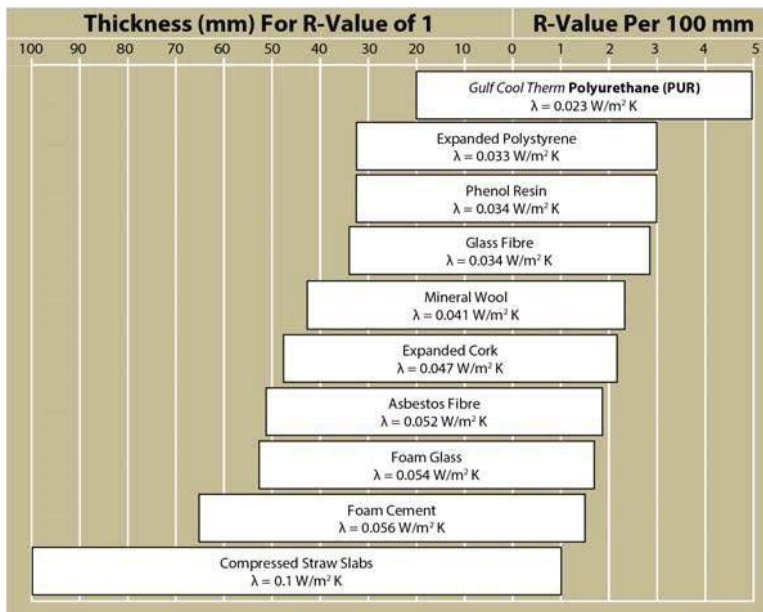
Polyurethane Aluglass Finished Insulation is easy to fit and installation cost can save because of applying canvas cloth and vapour barrier will not be required.

PIPE Support Inserts or DUCT Support Inserts faced with reinforced Aluminium foil, Aluglass foil or Un-faced.

DUCT BOARD faced with one side reinforced Aluminium foil and other side Kraft Paper or Aluglass foil finished.



A λ factor, R-value per 100mm, and thicknesses for an R-value of 1 ($\text{m}^2 \text{ } ^\circ\text{K} / \text{W}$) for common insulation materials are shown below. Comparative Thickness for same degree of Insulation (Dry Conditions)



Thickness of **Polyurethane (PUR)** for Calculated Metric Values of Thermal Resistance (R-value)

Comparative Thickness (mm) of commonly Specified Insulation Materials Required for Specific Metrics Values of Thermal Resistance (R-value)¹

Insulation Material Thermal Conductivity (λ) ²	Thermal Resistance - Metric R-Value ¹							
	5.43	4.75	4.33	3.75	3.17	2.74	1.87	1.59
	mm	mm	mm	mm	mm	mm	mm	mm
Polyurethane (PUR) 0.023 $\text{W/m}^2 \text{ K}$	108	95	87	75	63	55	37	32
Expanded Polystyrene 0.033 $\text{W/m}^2 \text{ K}$	181	158	144	125	106	91	62	53
Phenol Resin 0.033 $\text{W/m}^2 \text{ K}$	181	158	144	125	106	91	62	53
Glass Fibre 0.034 $\text{W/m}^2 \text{ K}$	187	164	149	129	109	94	65	55
Mineral Wool 0.041 $\text{W/m}^2 \text{ K}$	226	198	180	155	132	114	78	66
Expanded Cork 0.047 $\text{W/m}^2 \text{ K}$	259	226	206	179	151	130	89	76
Asbestos Fibre 0.052 $\text{W/m}^2 \text{ K}$	286	250	228	197	167	144	98	84
Foam Glass 0.054 $\text{W/m}^2 \text{ K}$	301	264	241	208	176	152	94	88
Foam Cement 0.056 $\text{W/m}^2 \text{ K}$	319	279	255	221	186	161	110	94
Compressed Straw Slabs 0.1 $\text{W/m}^2 \text{ K}$	543	475	433	375	317	274	187	159

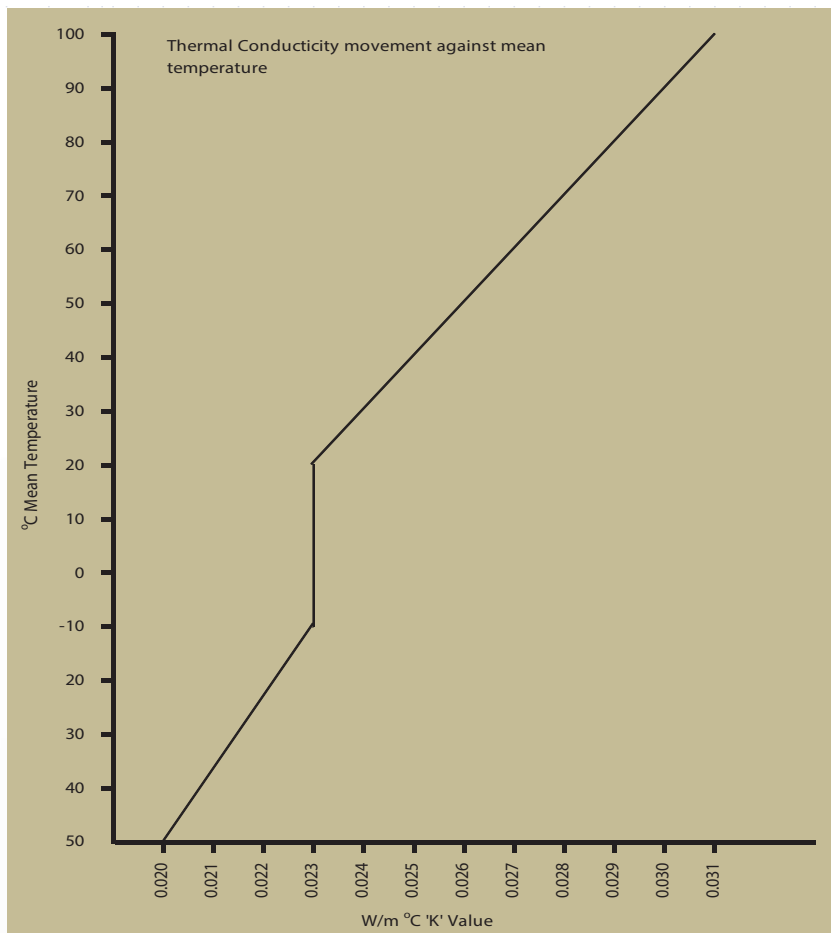
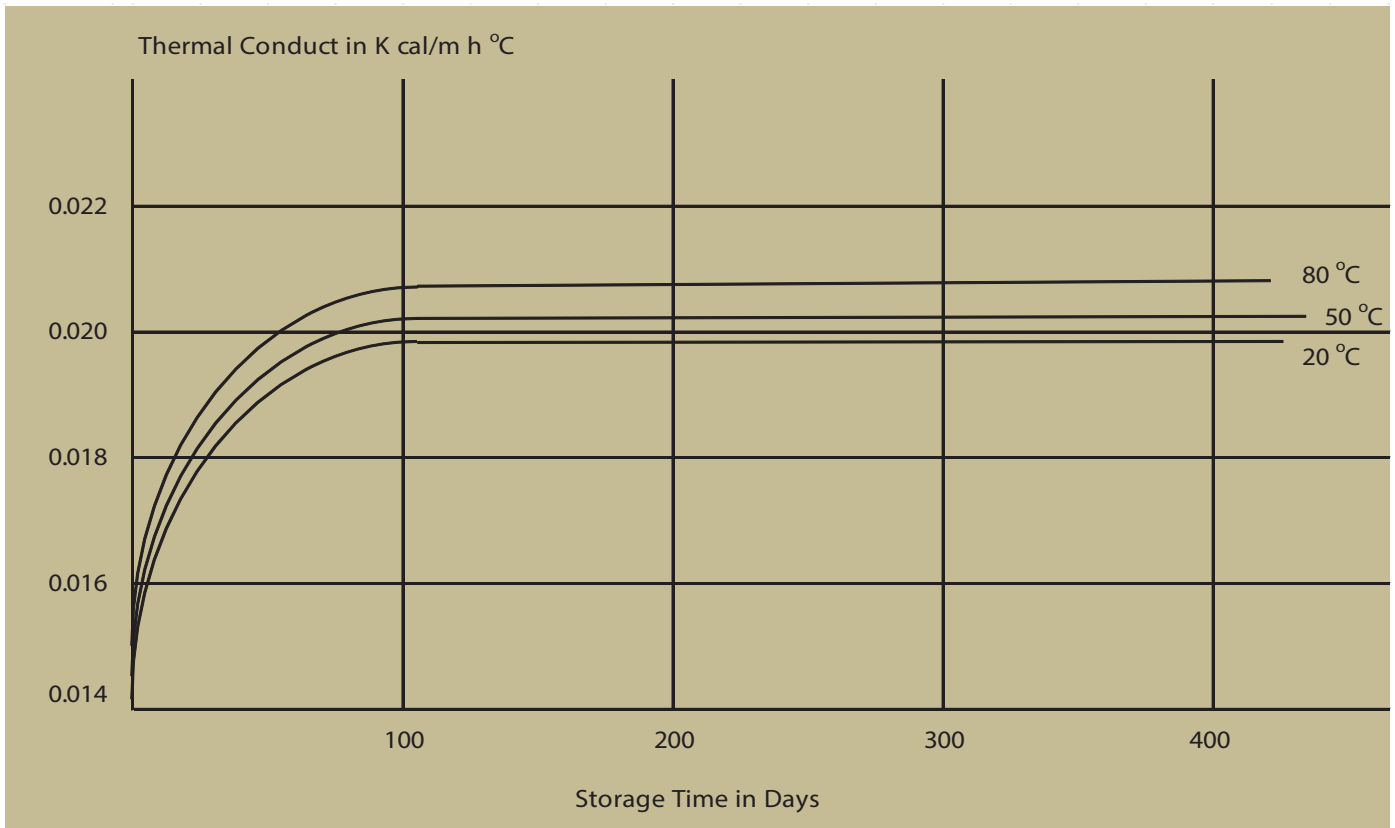
M M	Thermal Conductivity ²	Thermal Resistances (R-value) ¹
	$\lambda = \frac{\text{W}}{\text{m}^2 \text{ } ^\circ\text{K}}$	$1 / \lambda = \frac{\text{m}^2 \text{ } ^\circ\text{K}}{\text{W}}$
25	0.020	1.25
38	0.0129	1.59
41	0.0119	1.73
48	0.0109	1.87
51	0.0102	2.01
54	0.0095	2.16
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108	0.0049	4.18
111	0.0047	4.33
114	0.0046	4.47
118	0.0044	4.61
121	0.0043	4.75
124	0.0041	4.90
127	0.0040	5.05
130	0.0039	5.19
134	0.0038	5.33
143	0.0037	5.48

¹ Metric R = $\frac{\text{m}^2 \text{ K}}{\text{W}}$ Corresponds to British Thermal Unit R-Factor 1 $\frac{(\text{Btu}) (\text{in})}{(\text{ft}^2) (^\circ\text{F}) (\text{Hr})}$

² $\lambda = \text{W/m}^2 \text{ K}$ Corresponds to British Thermal Unit K-Factor $\frac{(\text{Btu}) (\text{in})}{(\text{ft}^2) (^\circ\text{F}) (\text{Hr})}$

Increase in thermal conductivity at various temperatures and prolonged storage time

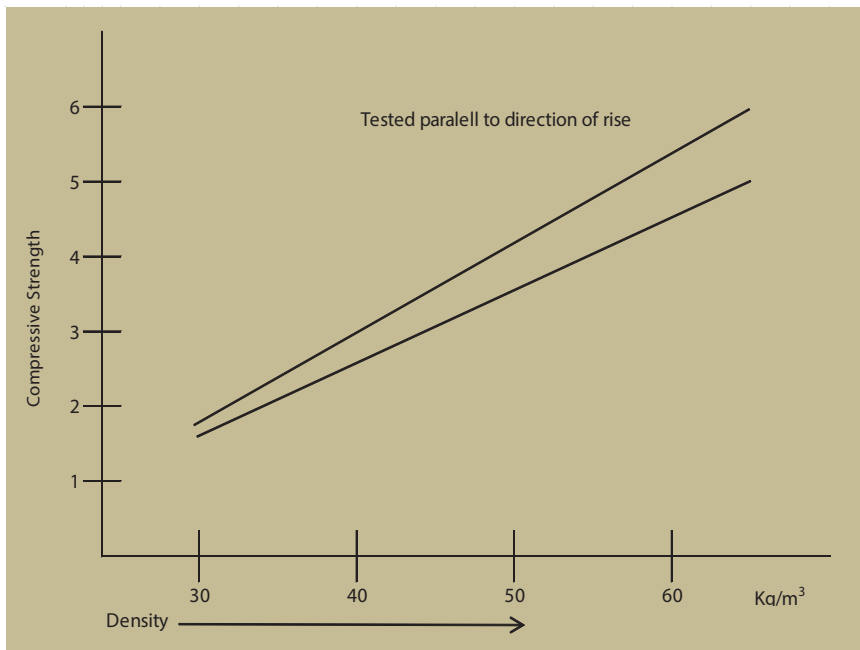
For low temperature application **Polyurethane (PUR)** must be covered with a vapour barrier to avoid condensation or icing.



The graphs shown the Thermal Conductivity movement against mean temperature.

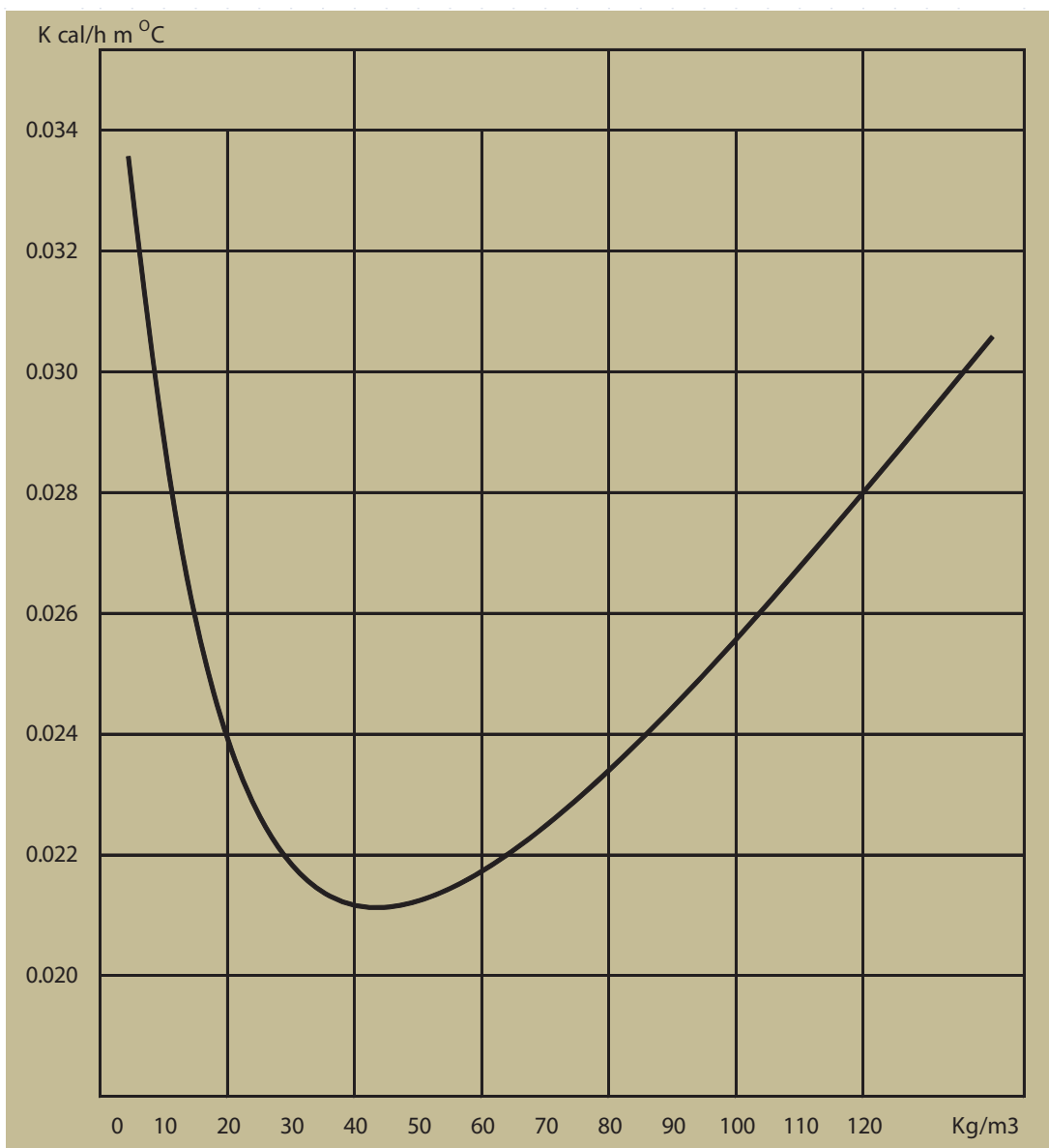
SERVICE TEMPERATURES

Polyurethane (PUR) can be used from -160 °C up to +140 °C. Temperatures below 0 °C and above 120 °C require special methods of installation. In such cases do not hesitate to contact us.



WORKABILITY

Polyurethane (PUR) can be easily cut with saw blades or knives. It is resistant to all kinds of adhesive, bituminous emulsions and hot bitumen (180 °C to 220 °C). We will, however, assist you to find the proper adhesives for your particular application.

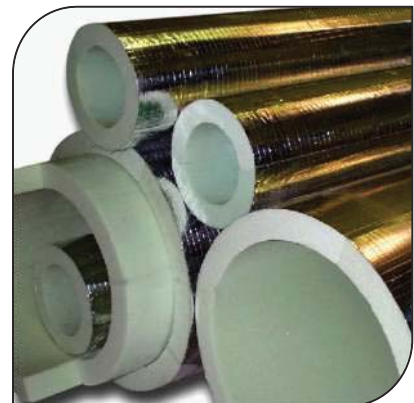
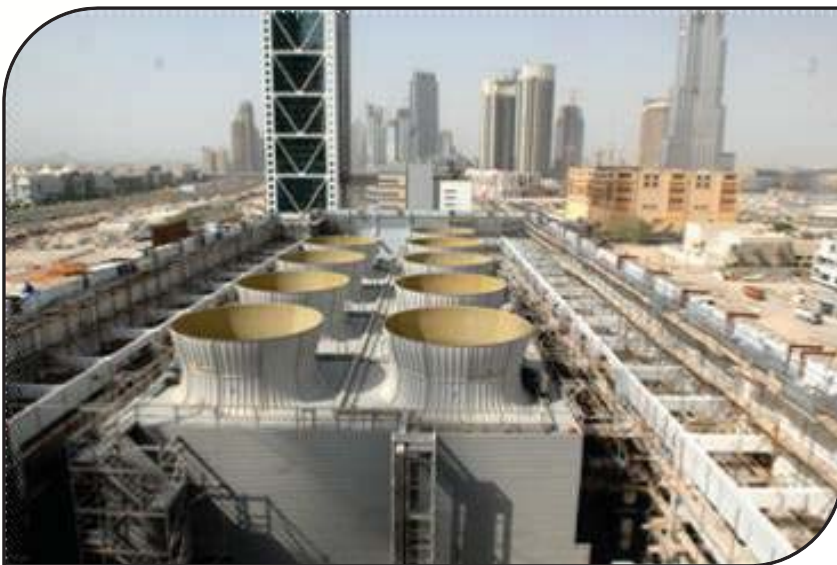
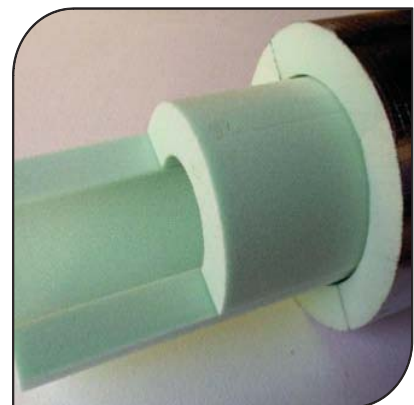
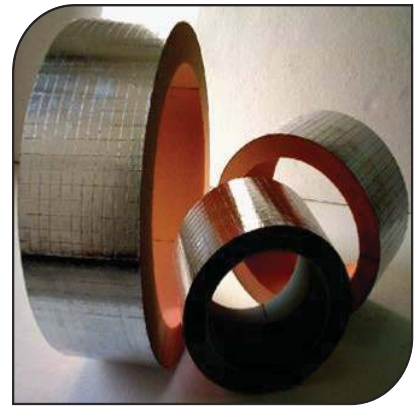


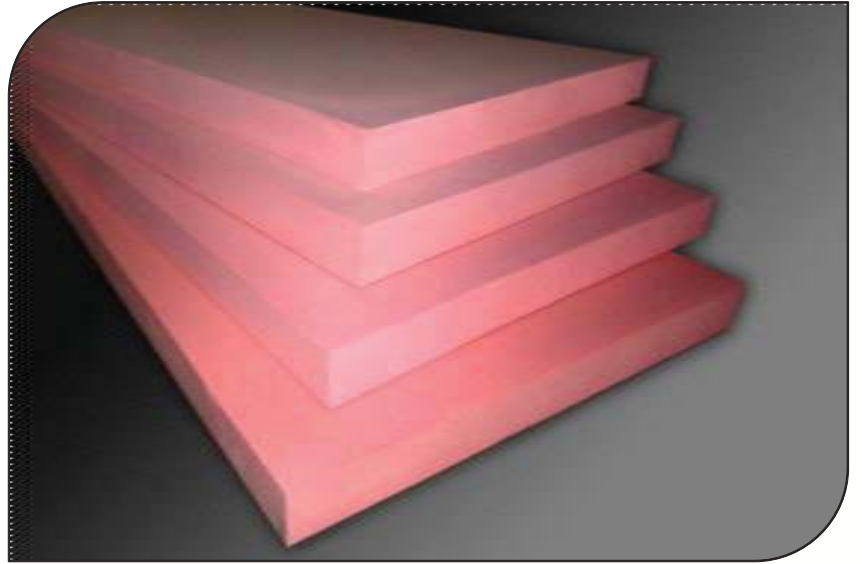
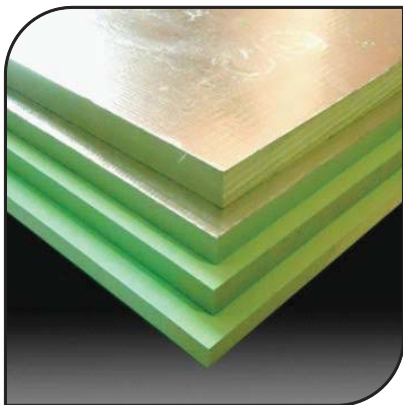
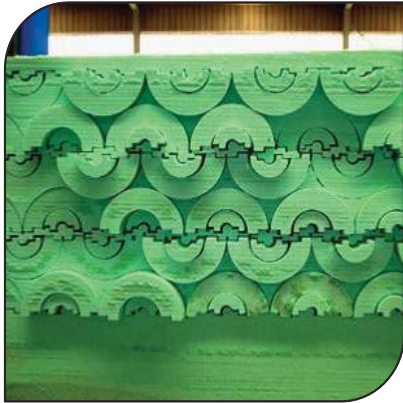
at different densities.

TECHNICAL DATA SHEET

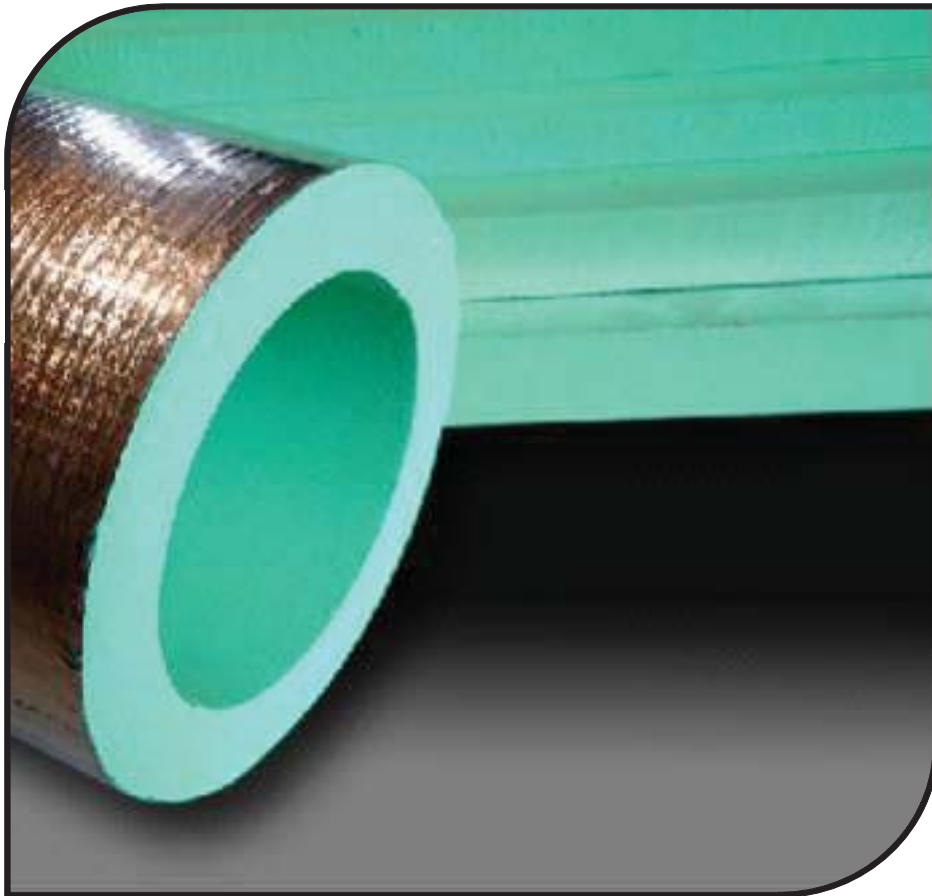
Properties	Test Method	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Nominal Density: Kg/m ³ (lb/ft ³)	ASTM D - 1622	PUR 35 (2.18)	PUR 50 (3.12)	PUR 65 (4.05)	PUR 80 (4.99)	PUR 100 (6.24)	TS 120 (7.49)	TS 160 (9.98)	TS 180 (11.23)	TS 200 (12.48)	TS 250 (15.60)	TS 360 (22.47)
Thermal Conductivity @10°C (50°F) aged W/m*K (Btu-in/h*ft ² °F)	ASTM C518/91	0.023 (0.159)	0.023 (0.159)	0.024 (0.166)	0.027 (0.187)	0.030 (0.207)	0.032 (0.221)	0.034 (0.0235)	0.034 (0.235)	0.034 (0.235)	0.035 (0.241)	0.038 (0.262)
Average Compressive Strength @ 10% Relative Deformation: kPa (lb/in ²)	ASTM D-1621 BS EN 826:1996	245 (35.53)	365 (52.93)	750 (108.77)	1120 (162.44)	1400 (203.05)	1680 (243.66)	>1790 (259.60)	>2000 (>290.06)	2400 (348.09)	>4000 (>580.13)	>7000 (>1015.23)
Compressive Modulus: kPa (lb/in ²)	ASTM F-1839-01	13020 (1888.39)	18600 (2697.70)	24200 (3509.91)	29880 (4333.72)	37360 (4333.72)	44830 (6502.04)	59600 (8644.24)	66300 (9616.00)	72250 (10478.98)	90150 (13075.15)	128350 (18615.59)
Tensile Strength: kPa (lb/in ²)	ASTM D-1623	220 (31.9)	385 (55.83)	730 (105.87)	1080 (156.64)	1340 (195.65)	1610 (233.51)	2140 (310.36)	2400 (348.07)	2650 (384.33)	>3310 (>480.05)	>4300 (>623.63)
Shear Strength: kPa (lb/in ²)	ASTM F-1839-01	225 (32.63)	390 (56.56)	610 (88.47)	850 (123.28)	1070 (155.19)	1280 (185.64)	1525 (221.17)	1730 (250.9)	1950 (282.81)	>2445 (>354.6)	>3210 (>465.55)
Shear Modulus: kPa (lb/in ²)	ASTM F-1839-01	3620 (525.03)	5210 (755.64)	6770 (981.9)	10910 (1582.36)	13640 (1978.31)	16360 (2372.81)	17020 (2468.54)	>18730 (>2716.55)	20800 (3016.78)	>25945 (>3763.00)	>37350 (>5417.16)
Closed Cell Content (Apparent vol. %)	ASTM D-2856	95	95	95	96	98	98	98	98	98	98	98
Avg. Water Vapor Transmission (grains/h*ft ²)	ASTM E96-00	1.19	1.12	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.25
Water Absorption % W/V	ASTM D-2842	2.25	2	1.5	1.3	0.8	0.8	0.2	0.2	0.2	0.18	0.15
Dimensional Stability (% Linear Change)												
24 hours @ -20 °C	ASTM D-2126	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
24 hours @ +110 °C		1.5	1.5	1	<1	<1	<1	<1	<1	<1	<1	<1
24 hours @ +70 °C 100% RH		2	2	1.5	<1	<1	<1	<1	<1	<1	<1	<1
Upper Temperature Limit °C (°F)		140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)
Linear Coefficient of Expansion m/m*K	ASTM D-696	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶
Flammability Class	BS 4102	B2	B2	B2	B2	B2/B3	B2/B3	B2/B3	B2/B3	B2/B3	B2/B3	B2/B3
Average time & Extent of Burning (mm)	ASTM D-635:91	<5	<5	<5	5	5	5	5	5	5	5	5

This leaflet cancels and supersedes all previous editions. We reserve the right to amend specification without prior notice. Whilst the information contained in the leaflet is true and accurate to the best of our knowledge and belief, all liability for errors and omissions, damage or loss resulting herefrom is hereby excluded. Recommendations for uses should be verified as to suitability and compliance with actual requirements, specification and any applicable laws and regulations.





Polyisocyanurate(PIR) Insulation



*The Quality Insulation
Products for Many Diverse
Application*

- CHILLED WATER PIPE AND DUCT INSULATION
- CONTINUOUS PIR FOAM BLOCK PRODUCTION
- CRYOGENIC INSULATION
- COLD INSULATION FOR OIL, GAS AND REFINERY INDUSTRIES
- SLAB / BOARD INSULATION
- EQUIPMENT / TANK / VESSEL INSULATION
- HIGH DENSITY THERMAL PIPE SUPPORT INSERTS
- HIGH DENSITY THERMAL DUCT SUPPORT INSERTS
- HIGH DENSITY SUPPORT SPACER



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ABOUT US

We are pleased to introduce ourselves as a leader supplier in United Arab Emirates, where by we supply an ISO 9001:2008 certified products under UKAS of united kingdom.

Tijara Middle East is a leading suppliers of high quality:

Thermal Insulation Materials

- **Pre-insulated Pipes and Fittings for District Cooling Application**
- **Polyisocyanurate Pipe, Duct, Slab and Vessel/Equipment Insulation**
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- **High Density Thermal Support Inserts for piping and Ducting**
- **Heat Exchanger Insulated Box and Tray**
- **Field Joint Insulation and Application**

Chilled Water Pipe, Duct and Slab Insulation Materials

Product Description

Tijara Middle East **Polyisocyanurate** CFC free rigid closed cell foam manufactured in similar way to standard Polyurethane, Tijara Middle East **Polyisocyanurate** has all the characteristics and advantages of rigid Polyurethane foam but offers greatly increased resistance to burning and spread of flame and is able to withstand temperatures up to 140 °C. When subjected to fire the outer surface of the foam forms a strong carbonaceous layer, which retards further flame spread and penetration. For ease of identification.

Tijara Middle East **Polyisocyanurate** CFC free rigid closed cell foam with a low Thermal Conductivity of 0.023 W/m °C at 10 °C, gives excellent thermal properties and fire properties when tested in accordance with ASTM E 84, and BS 476 Part 7, Class 1 rating.

Tijara Middle East **Polyisocyanurate** rigid insulation is 95% closed cell & provides a long end satisfactory service life.



Tijara Middle East **Polyisocyanurate** CFC free rigid closed cell insulation materials display excellent insulation characteristics. They have extremely low thermal conductivity values and can achieve optimal energy savings. The excellent mechanical strength values and exceptional durability of rigid Tijara Middle East **Polyisocyanurate** fulfil all the requirements made of insulation materials used in the building industry.

Applications

Tijara Middle East **Polyisocyanurate** CFC free rigid closed cell insulation has many diverse applications in Air-Conditioning Systems, Oil, Petrochemical, Process Plant and General Insulation Industries. It can be used for Pipe, Duct, Tank, Vessel and Equipment Insulation.

Densities

35Kg/m3 to 65Kg/m3 for Pipe Sections, Duct Insulation and Slabs.

80Kg/m3 to 200Kg/m3 for Thermal Support Inserts

Other Densities are available upon request



AVAILABILITY

Pipe Insulation, Duct Insulation, Slab Insulation

Pipe Support Inserts

Duct Support Inserts

PIPE FITTINGS Including Elbows, Tees, Valve, Covers... etc...

PIR Foam Blocks/Slabs for Design Mould and Boat/Ship partition/support work.

Tijara Middle East **Polyisocyanurate** insulation is available as sectional pipe covering, complete with a vapour barrier jacket, as well as sections for fittings, board, segments for equipment and large vessels.

Factory fabrication Standards: ASTC C 450 and ASTM C 585



FINISHING

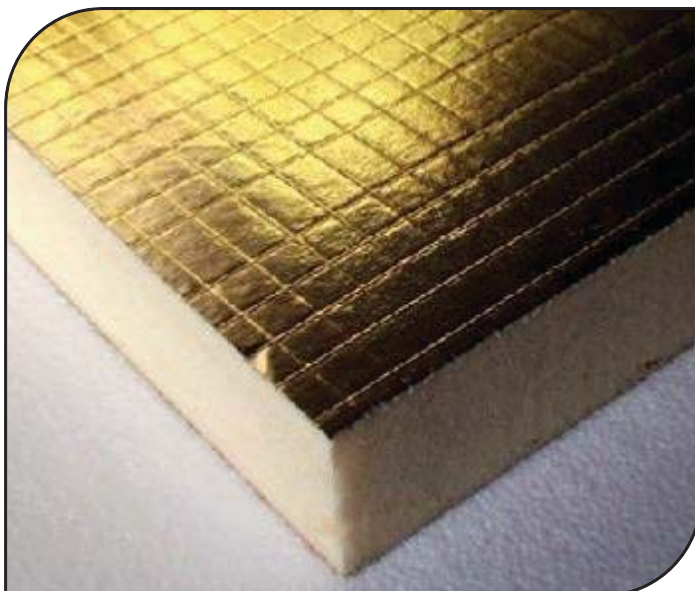
PIPE SECTION with reinforced Aluminium Class '1' foil faced.

PIPE SECTION with reinforced aluminium Class 'O' foil faced.

PIPE SECTION with Aluglass foil faced (Aluminized glass Cloth). *Gulf Cool*

Therm **Polyisocyanurate** Aluglass Finished Insulation is easy to fit and installation cost can save because of applying canvas cloth and vapour barrier will not be required.

PIPE Support Inserts or DUCT Support Inserts faced with reinforced Aluminium foil, Aluglass foil or Un-faced.



ADVANTAGES

High Temperature Service – Tijara Middle East **Polyisocyanurate** insulation does not soften or lose its strength at elevated temperatures within the recommended use limits.

Low Thermal Conductivity – Procuring at the factory provides consistent makes physical properties.

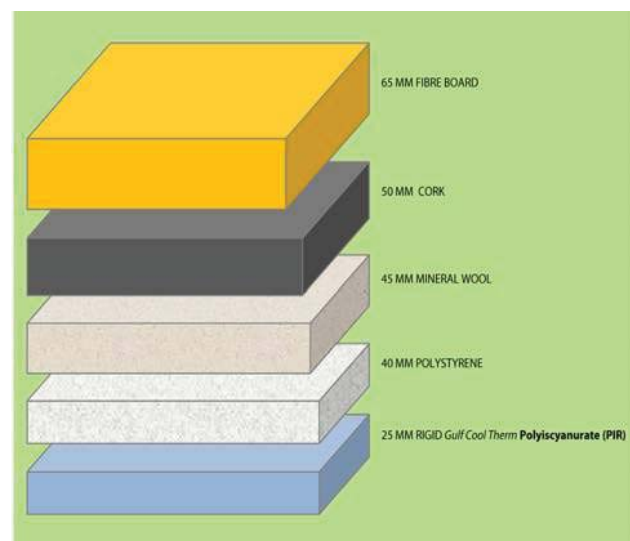
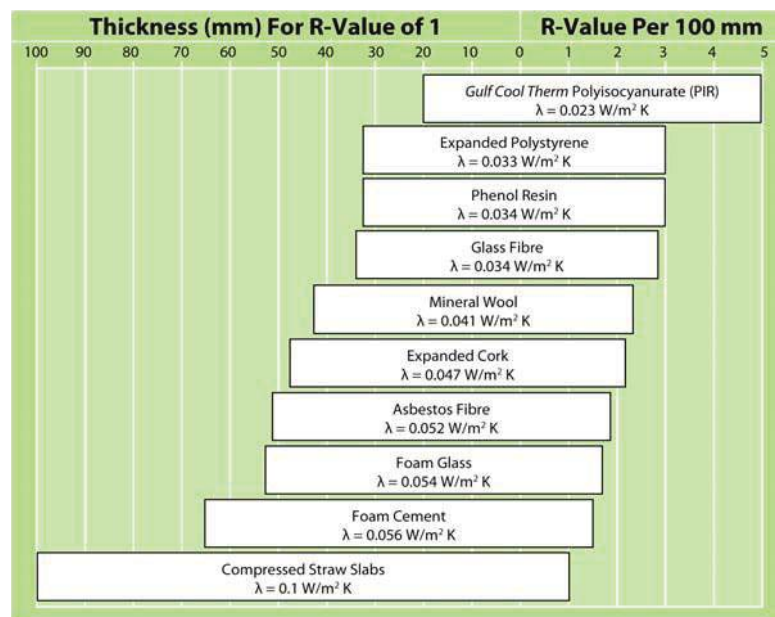
Easy Installation – Its light weight and ease of adherence to a variety of surfaces makes it easy to apply.

Tijara Middle East **Polyisocyanurate** is having high thermal properties i.e. Low thermal conductivity, High Compressive strength, durability and dimensional stability.

Tijara Middle East **Polyisocyanurate** is 95% closed cell and keep insulation dry and secured until the life time of the construction.



A λ factor, R-value per 100mm, and thicknesses for an R-value of 1 ($\text{m}^2 \text{ } ^\circ\text{K} / \text{W}$) for common insulation materials are shown below. Comparative Thickness for same degree of Insulation (Dry Conditions)



Thickness of **Polyisocyanurate (PIR)** for Calculated Metric Values of Thermal Resistance (R-value)

Comparative Thickness (mm) of commonly Specified Insulation Materials Required for Specific Metrics Values of Thermal Resistance (R-value)1

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m m	Thermal Conductivity ²	Thermal Resistances (R-value) ¹
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51	0.0102	2.01
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60	0.0089	2.30
64	0.0079	2.60
67	0.0074	2.74
73	0.0072	2.88
76	0.0067	3.02
83	0.0064	3.17
86	0.0062	3.32
89	0.0059	3.46
92	0.0057	3.61
95	0.0054	3.75
99	0.0053	3.89
102	0.0050	4.03
108	0.0049	4.18
111	0.0047	4.33
114	0.0046	4.47
118	0.0044	4.61
121	0.0043	4.75
124	0.0041	4.90
127	0.0040	5.05
130	0.0039	5.19
134	0.0038	5.33
143	0.0037	5.48

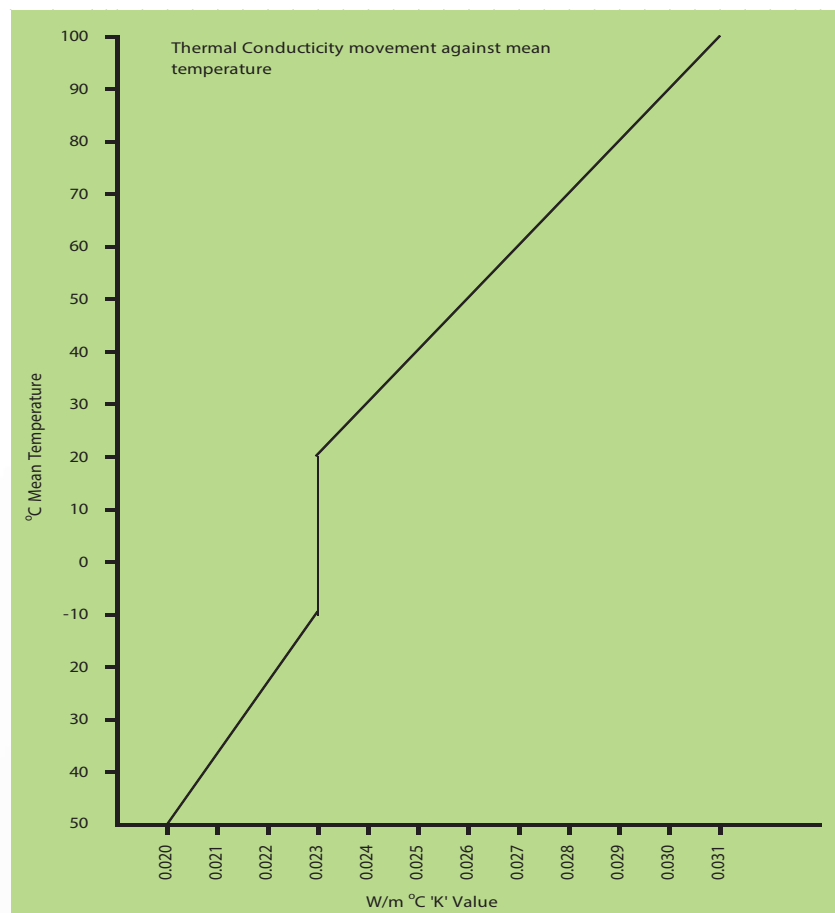
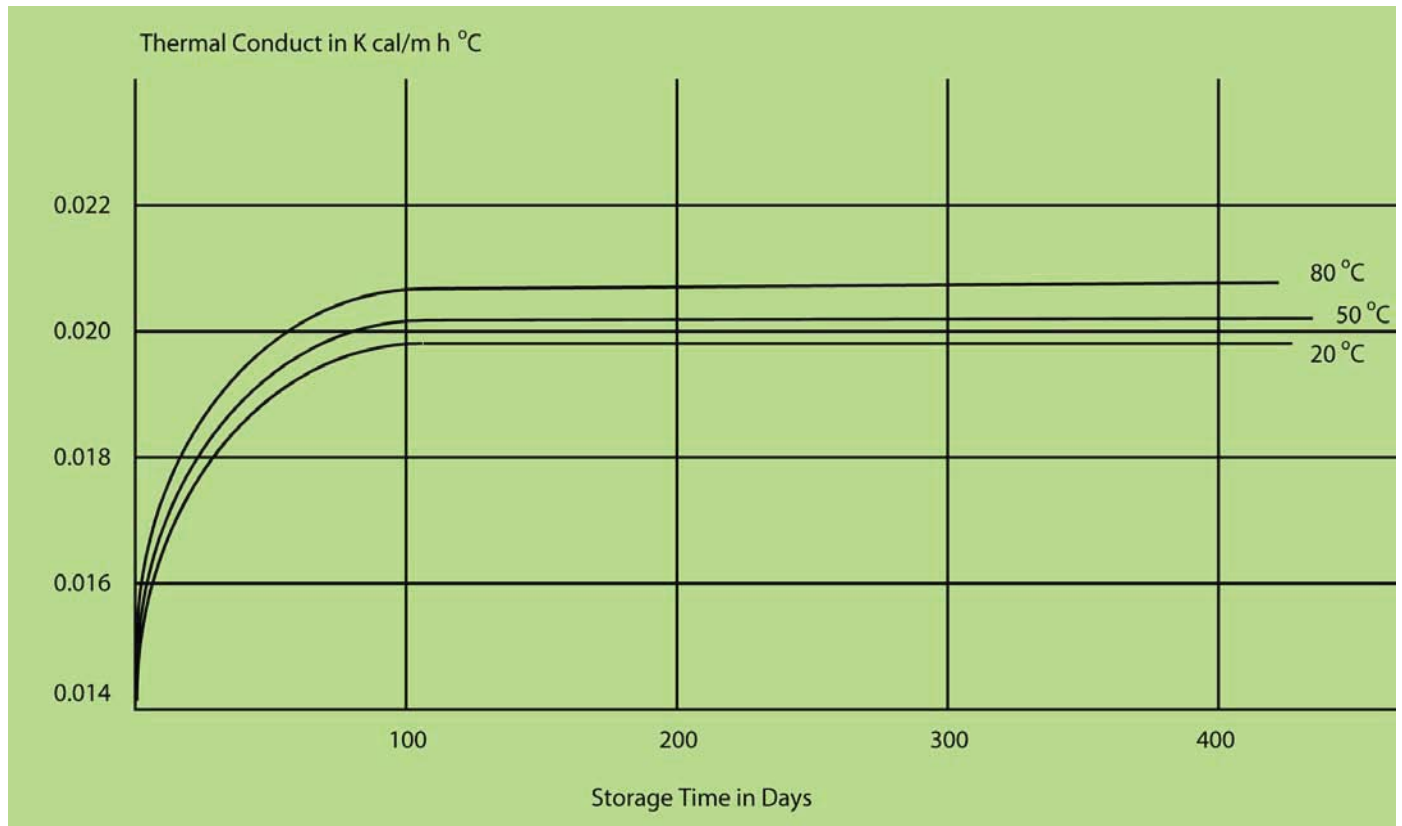
¹ Metric R = $1 \frac{\text{m}^2 \text{ K}}{\text{W}}$ Corresponds to British Thermal Unit R-Factor 1 (Btu) (in) (ft^2) ($^\circ\text{F}$) (Hr)

² $\lambda = \text{W/m}^2 \text{ K}$ Corresponds to British Thermal Unit K-Factor (Btu) (in) (ft^2) ($^\circ\text{F}$) (Hr)



Increase in thermal conductivity at various temperatures and prolonged storage time

For low temperature application Tijara Middle East **Polyisocyanurate (PIR)** must be covered with a vapour barrier to avoid condensation or icing.

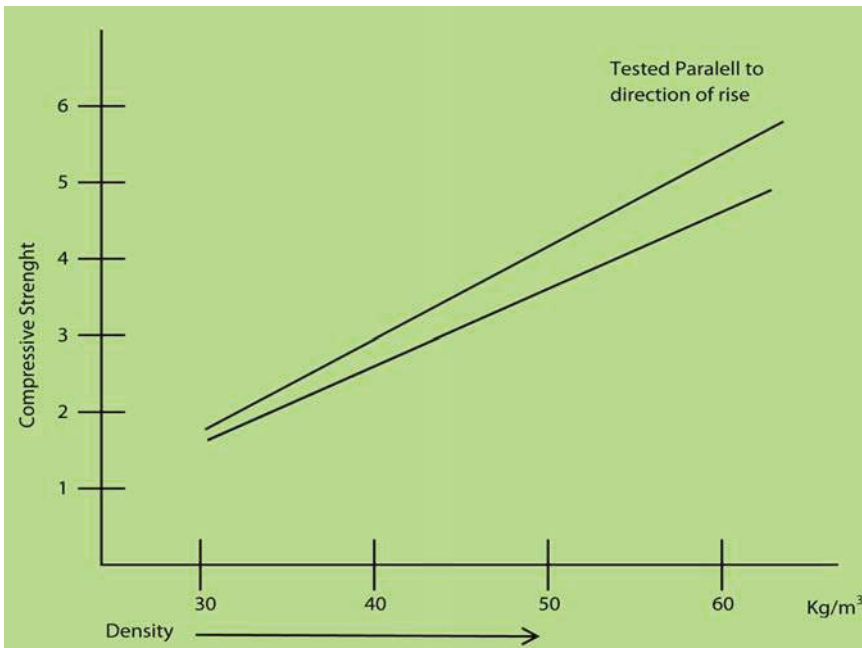


The graphs shown the Thermal Conductivity movement against mean temperature.

SERVICE TEMPERATURES

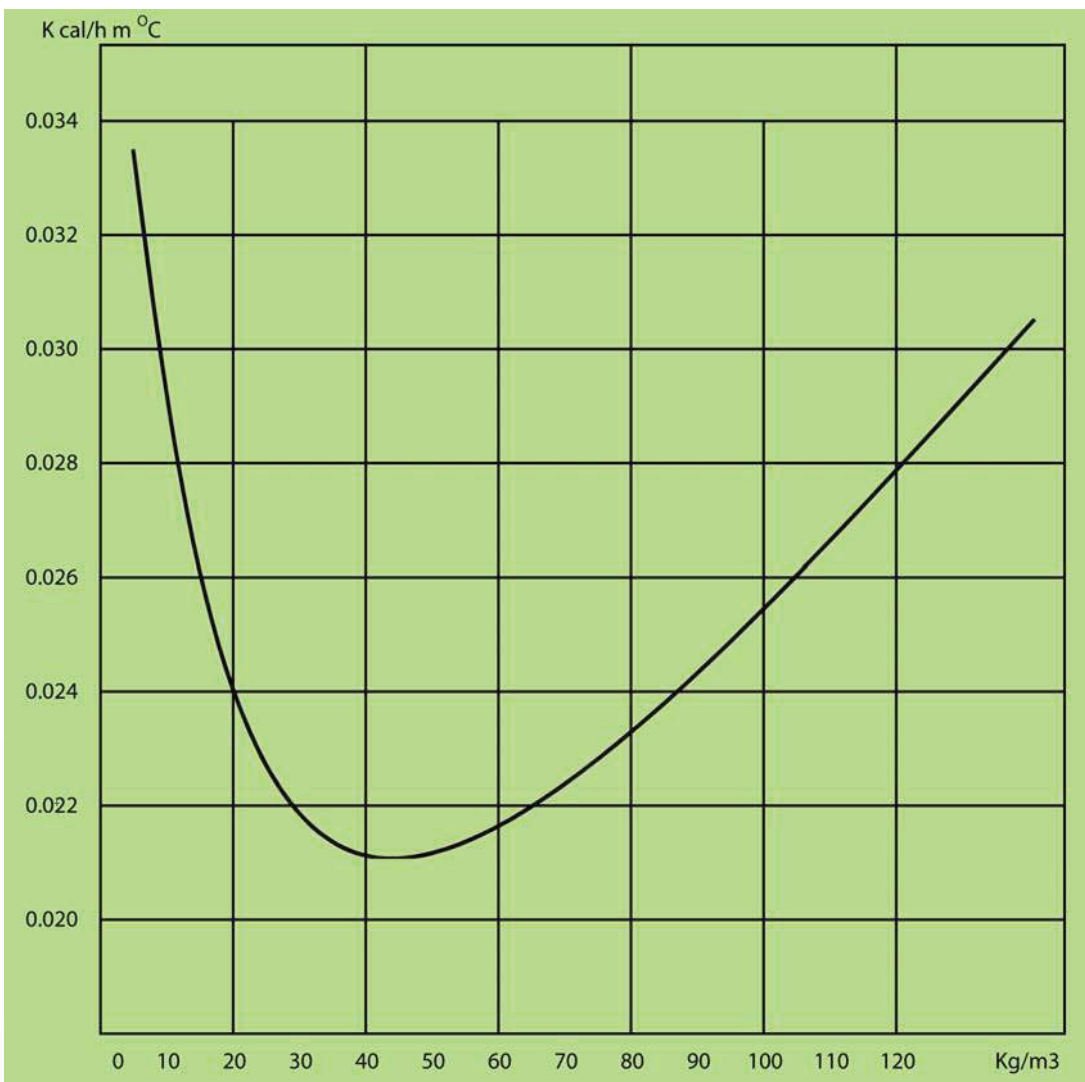
Tijara Middle East **Polyisocyanurate (PIR)** can be used from -160 °C up to +140 °C. Temperatures below 0 °C and above 120 °C require special methods of installation. In such cases do not hesitate to contact us.





WORKABILITY

Tijara Middle East **Polyisocyanurate (PIR)** can be easily cut with saw blades or knives. It is resistant to all kinds of adhesive, bituminous emulsions and hot bitumen (180 °C to 220 °C). We will, however, assist you to find the proper adhesives for your particular application.

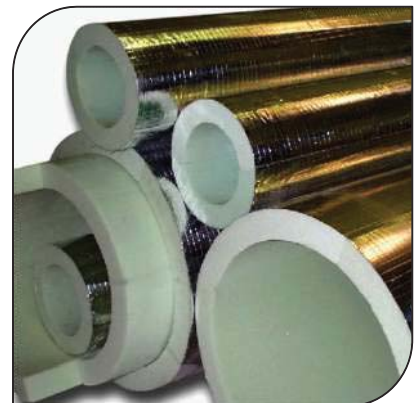
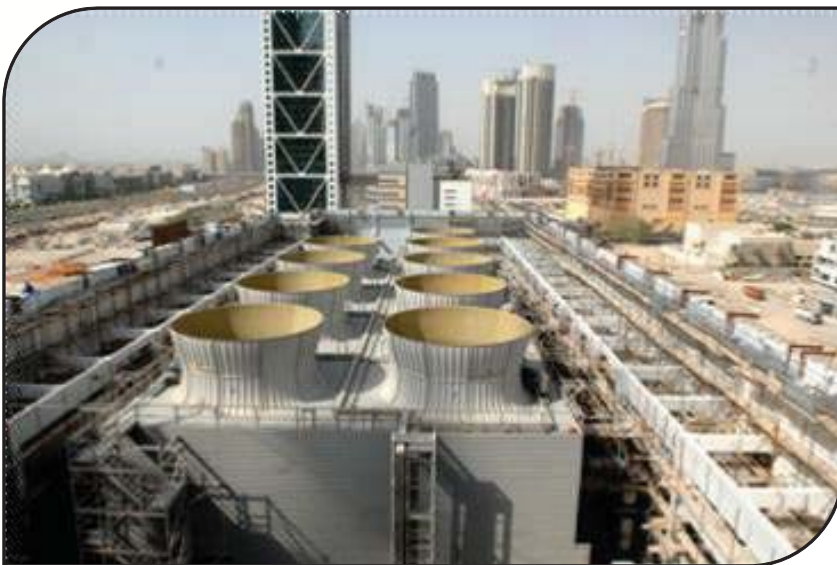
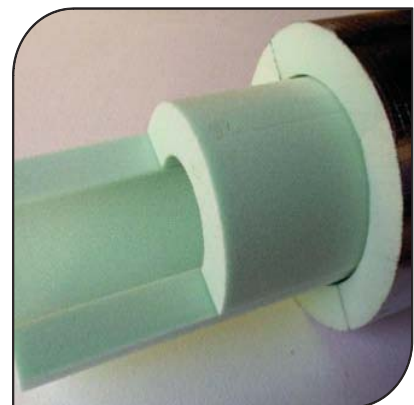
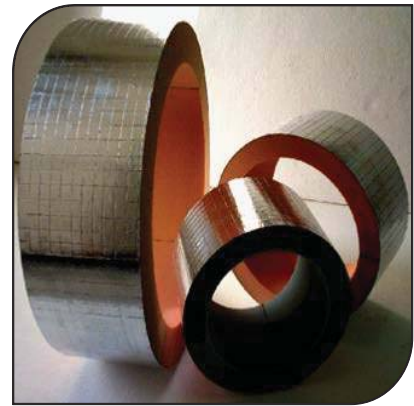


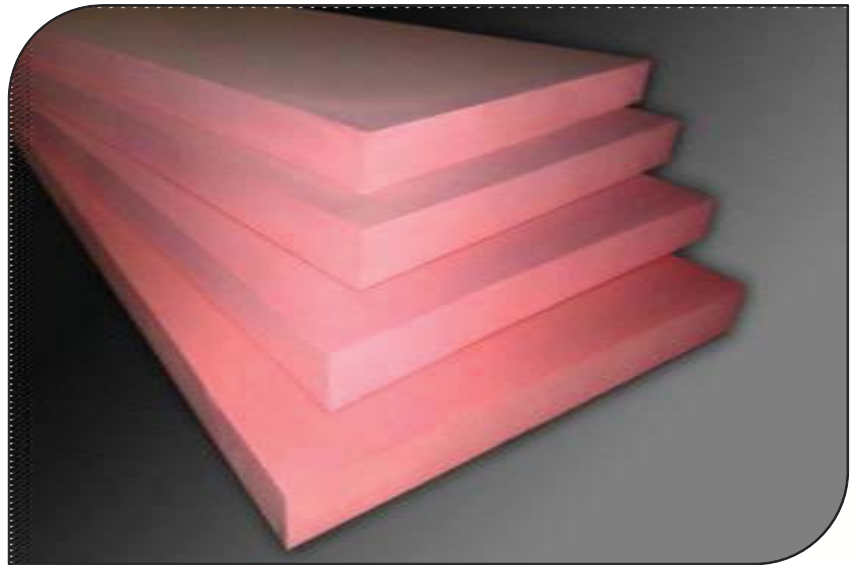
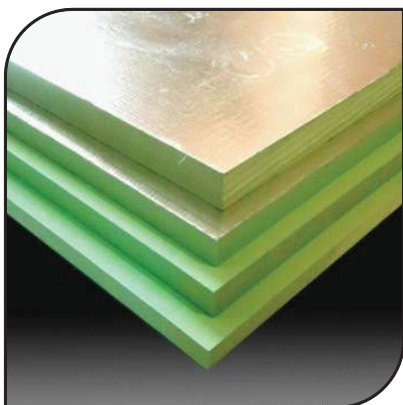
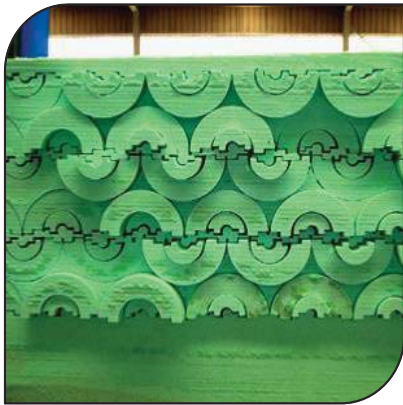
Polyisocyanurate (PIR) The graph shows the Thermal Conductivity of Foam at different densities.

POLYISOCYANURATE (PIR) INSULATION TECHNICAL DATA SHEET

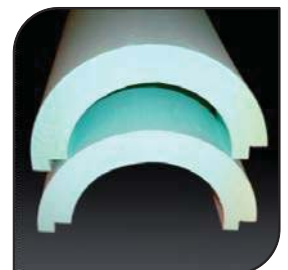
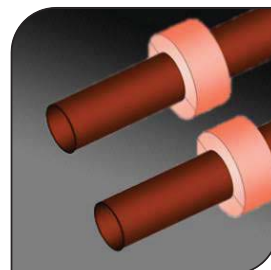
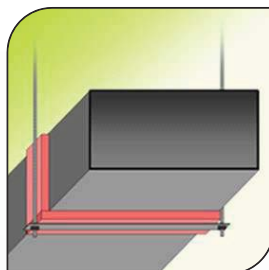
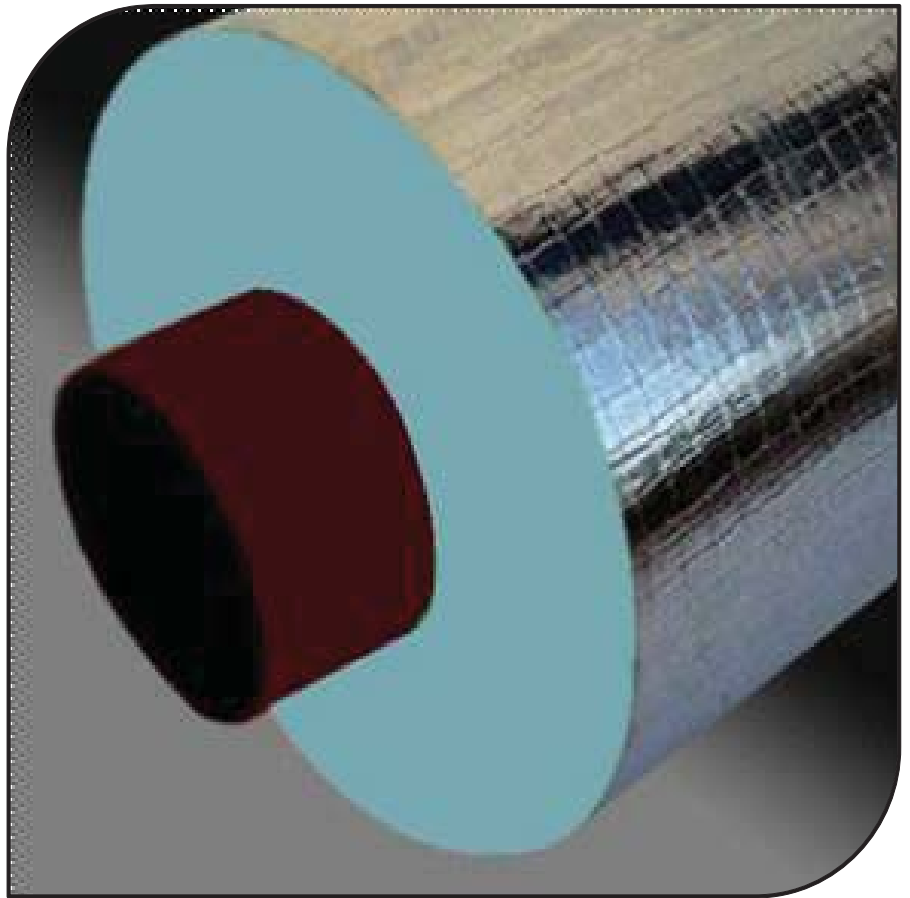
Properties	Test Method	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Nominal Density: Kg/m ³ (lb/ft ³)	ASTM D-1622	PIR 35 (2.18)	PIR 50 (3.12)	PIR 65 (4.05)	TS 80 (4.99)	TS 100 (6.24)	TS 120 (7.49)	TS 160 (9.98)	TS 180 (11.23)	TS 200 (12.48)	TS 250 (15.60)	TS 360 (22.47)
Thermal Conductivity @ 10°C (50°F) aged W /m*K (Btu-in/h*ft ² °F)	ASTM C518/91	0.023 (0.159)	0.023 (0.159)	0.024 (0.166)	0.027 (0.187)	0.030 (0.207)	0.032 (0.221)	0.036 (0.2486)	0.036 (0.2486)	0.038 (0.262)	0.038 (0.262)	0.040 (0.276)
Average Compressive Strength @ 10% Relative Deformation: kPa (lb/in ²) ±10%	ASTM D-1621 BS EN 826:1996	245 (35.53)	365 (52.93)	750 (108.77)	1120 (162.44)	1350 (195.79)	1425 (206.67)	>1790 (259.60)	>2000 (>290.06)	>2400 (>348.09)	>4000 (>580.13)	>7000 (>1015.23)
Compressive Modulus: kPa (lb/in ²)	ASTM F-1839-01	13020 (1888.39)	18600 (2697.70)	24200 (3509.91)	29880 (4333.72)	37360 (4333.72)	44830 (6502.04)	59600 (8644.24)	66300 (9616.00)	72250 (10478.98)	90150 (13075.15)	128350 (18615.59)
Tensile Strength: kPa (lb/in ²)	ASTM D-1623	220 (31.9)	385 (55.83)	730 (105.87)	1080 (156.64)	1340 (195.65)	1610 (233.51)	2140 (310.36)	2400 (348.07)	2650 (384.33)	>3310 (>480.05)	>4300 (>623.63)
Shear Strength: kPa (lb/in ²)	ASTM F-1839-01	225 (32.63)	390 (56.56)	610 (88.47)	850 (123.28)	1070 (155.19)	1280 (185.64)	1525 (221.17)	1730 (250.9)	1950 (282.81)	>2445 (>354.6)	>3210 (>465.55)
Shear Modulus: kPa (lb/in ²)	ASTM F-1839-01	3620 (525.03)	5210 (755.64)	6770 (981.9)	10910 (1582.36)	13640 (1978.31)	16360 (2372.81)	17020 (2468.54)	>18730 (>2716.55)	20800 (3016.78)	>25945 (>3763.00)	>37350 (>5417.16)
Closed Cell Content (Apparent vol, %)	ASTM D-2856	95	95	95	96	98	98	98	98	98	98	98
Avg. Water Vapor Transmission (grains/h*ft ²)	ASTM E96-00	1.6	1.5	1.25	1.2	1	0.8	0.6	0.6	0.5	0.4	0.3
Avg. 6	ASTM D-2842	2.25	2	1.5	1.3	0.8	0.8	0.3	0.3	0.3	0.25	0.2
Dimensional Stability (% Linear Change)												
24 hours @ -20 °C	ASTM D-2126	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
24 hours @ +110 °C		1.5	1.5	1	<1	<1	<1	<1	<1	<1	<1	<1
24 hours @ +70 °C 100% RH		2	2	1.5	<1	<1	<1	<1	<1	<1	<1	<1
Upper Temperature Limit °C (°F)		140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)	140 (284)
Linear Coefficient of Expansion m/m·K	ASTM D-696	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶	40-70x10 ⁻⁶
Fire resistance (small scale test)	BS476 Part 5	Class P	Class P	Class P	Class P	Class P	Class P	Class P	Class P	Class P	Class P	Class P
Surface Spread of Flame	BS476 Part 7	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1	Class 1
Flame Spread Index	ASTM E 84	≤25	≤25	≤25	25	25	25	25	25	25	25	25
Smoke Developed Index	ASTM E 84	≤450	≤450	≤450	≤450	≤450	≤450	≤450	≤450	≤450	≤450	≤450
Average Time of Burning (mm)	ASTM D-635:91	<5	<5	<5	5	5	5	5	5	5	5	5
Average Extend of Burning (mm)	ASTM D-635:91	<5	<5	<5	5	5	5	5	5	5	5	5
Flammability-weight retained	ASTM D-3014-74	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Light Obscuration	ASTM D-2843-70	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Obscuration	BS 5111 Part 1	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%

This leaflet cancels and supersedes all previous editions. We reserve the right to amend specification without prior notice. Whilst the information contained in the leaflet is true and accurate to the best of our knowledge and belief, all liability for errors and omissions, damage or loss resulting herefrom is hereby excluded. Recommendations for uses should be verified as to suitability and compliance with actual requirements, specification and any applicable laws and regulations.





*The Quality Insulation
Products for Many Diverse
Application*



Class 'O' CFC & HCFC Free

Phenolic Foam (PF) Insulation

*The Quality Insulation
Products for Many Diverse
Application*

The Superior Insulation Foam



- Chilled Water Pipe and Duct Insulation
- Slab Insulation
- Roof and Wall Insulation



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EMIRATES

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ABOUT US

We are pleased to introduce ourselves as a leader supplier in United Arab emirates, where by we supply an ISO 9001:2008 certified products under UKAS of united kingdom.

Tijara Middle East is a leading suppliers of high quality:

Thermal Insulation Materials

- **Pre-insulated Pipes and Fittings for District Cooling Application**
- **Polyisocyanurate Pipe, Duct, Slab and Vessel/Equipment Insulation**
- **Polyurethane Pipe, Slab and Vessel/Equipment Insulation**
- **Class 'O' CFC & HCFC Free Phenolic Foam Pipe, Duct, Wall and Roof Insulation**
- **Continuous PIR/PUR Foam Block Production**
- **Cold Insulation Materials for LNG, Oil and Gas Industries**
- **Foam Glass Insulation**
- **Phenolic Foam / Polyisocyanurate Pre-insulated Air Duct Panels**
- **Roof and Wall Insulation**
- **Polyurethane Spray Applied Foam**
- **High Density Thermal Support Inserts for piping and Ducting**
- **Heat Exchanger Insulated Box and Tray**
- **Field Joint Insulation and Application**

With many CNC Foam cutting machineries and production process units in the field with quality material available, highly qualified technical and commercial staff. We are confident that our product will comply with all international standard and definitely will meet your requirements.

In order to facilitate our client with best service and respect to quality, prompt delivery, respective elements of production and marketing were provided and enhanced under a tight quality control.

THE SUPERIOR INSULATION FOAM

Phenolic Foam is a rigid CFC and HCFC Free cellular foam insulation material with a substantially closed cell structure, whose polymer structure is made primarily from the poly-condensation of phenol, its homologues and/or derivatives with aldehydes and ketones.

Phenolic Foam has various distinct properties that make it better than any other conventional insulation materials.

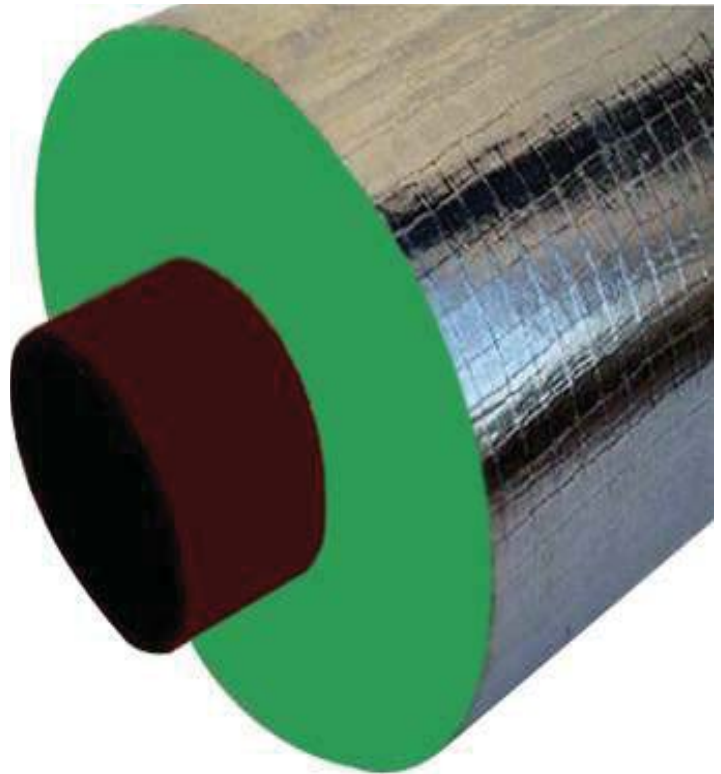
Lower K Value (K Value = $0.018W/mk$) – that means exceptionally low thermal conductivity.

Main application **Phenolic Foam** are using for the application of Chilled Water Pipe and Duct Insulations.

Wide service range for diverse insulation applications.

Coast-effective because lower thermal conductivity facilitates usage of lesser thickness of **Phenolic Foam** for the same level of insulation.

A Wide service temperature range between $-196^{\circ}C$ to $+130^{\circ}C$ makes **Phenolic Foam** ideal for low temperature and cryogenic applications. It can be effectively used on LSHS, fuel oil and low pressure steam and hot water lines.



Low water absorption is a key feature of **Phenolic Foam**

A high closed cell content of up to 95% results in very low water vapour transmission and reduces condensation.

Phenolic Foam assures **longer life** as it is unaffected by most aromatic and aliphatic solvents.

Odourless and does not absorb colour.

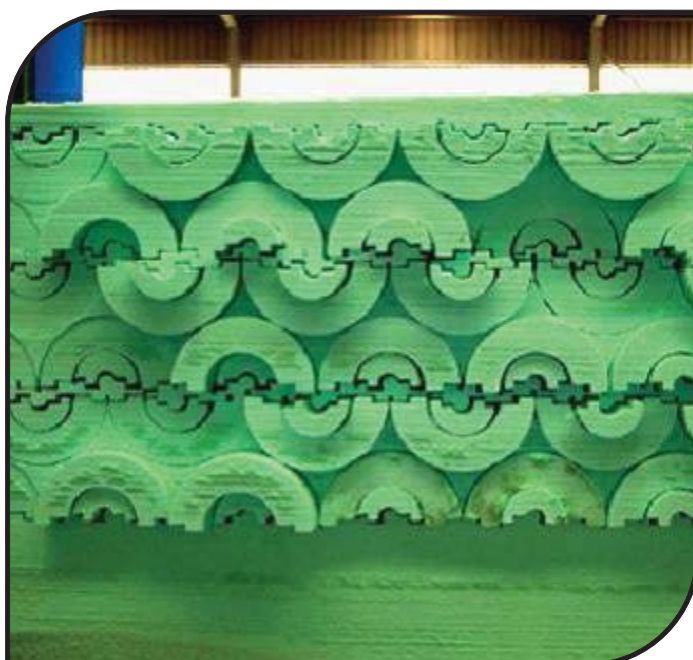
Rodent/insect Proof and being mildly antiseptic resists fungal and bacterial growth.

Corrosion and chemical resistance is another strength.

Phenolic Foam resists organic solvents and chemicals. Being non-abrasive and hydrophobic, it does not corrode metal.

Phenolic Foam has **anti-static properties**. It is an electrical insulator and in case of friction does not generate static electricity or sparks.

FIRE PERFORMANCE The fire performance of **Phenolic Foam** is exceptional. It combines zero or very low flame spread with negligible smoke emission and a very low level of toxic gas emission.



ENVIRONMENT Phenolic Foam has very low embodied energy per unit thermal performance compared to other insulation materials.

Significant CO₂ savings can be achieved compared to other insulation materials.

Phenolic Foam is available in both CFC and HCFC free forms.

MOISTURE RESISTANCE Phenolic Foam has been used successfully in insulation systems where moisture resistance is a key issue.

The reasons for this excellent performance are:

Phenolic Foam has a low water vapour permeance and is therefore highly resistant to the passage of water vapour.

Phenolic Foam has low water absorption which takes place predominantly in the cut/broken surface cells of the foam.

Phenolic Foam is non-wicking. This means that if water enters the insulation system due to the vapour barrier becoming punctured, any moisture ingress is limited and confined to the punctured area. This ensures moisture does not build up and compromise the whole system.

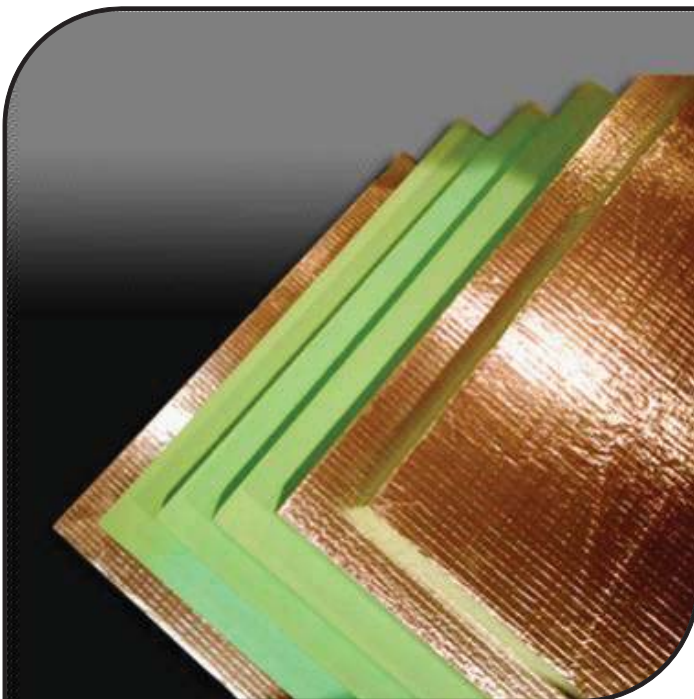


THERMAL PERFORMANCE Phenolic Foam offer a range of thermal conductivity performance. The closed cell type offers the lowest thermal conductivity available from any other conventional insulation material resulting from:

- Closed cell structure.
- Extremely small cell diameter.
- Low thermal conductivity gas permanently encapsulated in cells.

Phenolic Foam offers the following benefits:

- λ values from 0.018 W/m.K depending on national certification requirements
- Excellent low thermal conductivity allows reduction in long term energy costs
- Phenolic Foam can be up 50% more thermally efficient than other common insulation materials
- Higher thermal efficiency allows reduced insulation thicknesses to be used thereby saving valuable space



Phenolic Foam is workable, easy to install and can be cut

and shaped to any size with hand tools.

AVAILABILITY Pipe Sections, faced with reinforced (Class 'O') Aluminium foil, reinforced (Class '1') Aluminium Foil, Aluglass Foil (Aluminized Glass Cloth) OR un-faced.

PIPE FITTINGS including Elbows, Tees, Valve, Covers.. etc...

PIPE SUPPORTS faced with reinforced (Class 'O') Aluminium foil, reinforced (Class '1') Aluminium Foil, Aluglass Foil (Aluminized Glass Cloth) OR un-faced.

DUCT BOARD faced with one side reinforced (Class 'O') Aluminium foil, reinforced (Class '1') Aluminium Foil, Aluglass Foil (Aluminized Glass Cloth) OR un-faced.

Factory Fabrication Standards: ASTM C 450-08 and ASTM C 585-10

DENSITIES

35Kg/m³ to 50Kg/m³ for Pipe Sections, Duct and Slabs.

65Kg/m³ to 120Kg/m³ for the use of Thermal Supports.



DIVERSE APPLICATIONS

Under-deck and over-deck (roof) insulation.

Pipe and Duct Insulation.

Suspended ceilings and partitioning for commercial complexes, residential buildings and hospitals.

Insulation of Vessels, pipelines in petrochemical, fertilizer, chemical and pharmaceutical plants and in refineries.

Insulation of cold storage and refrigerated rooms.

Life-saving equipment such as life jackets, buoyancy block and other marine equipment.

Insulation of refrigerated rail, surface and marine equipment and containers.

Insulation of high-altitude shelters.

Ship insulation.



TECHNICAL DATA SHEET

Properties	Test Method	Value	Value	Value	Value	Value	Value
Nominal Density: Kg/m ³	(UNI 6349 – 68) ASTM D-1622	PF 35-40	PF 48-50	PF 65	TS 80	TS 100	TS 120
Closed cells content (%)	ASTM D-2856	96	96	96	96	96	96
Average Compressive Strength @ 10% Relative Deformation: kPa	ASTM D-1621 BS EN 826:1996	170	200	375	750	960	1150
Fire resistance	ASTM C 1126 BS 476 Part 6 & 7	Class 'O'	Class 'O'	Class 'O'	Class 'O'	Class 'O'	Class 'O'
Toxicity index	As per NES 713 testing procedure	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Oxygen index	As per BS 2782 part 1 method 141	Not Less than 45	Not Less than 45	Not Less than 45	Not Less than 45	Not Less than 45	Not Less than 45
Smoke obscuration	As per BS 5111 part 1	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%
CFC and HCFC		Free	Free	Free	Free	Free	Free
Steam water transmission speed (Test conditions: 23 °C, 85 % RH)							
- Steam transmission (g/mq. 24h)	ISO 1663	43.65	43.65	43.65	43.65	43.65	43.65
- Steam permeability (nm/m.Pa.S.)		3.35	3.35	3.35	3.35	3.35	3.35
- u		58.7	58.7	58.7	58.7	58.7	58.7
Thermal conductivity (W /m*K)	In accordance with ASTM						
-20°C Mean Temperature	C518/91, UNI	0.018	0.018	0.021	0.022	0.024	0.026
-10°C Mean Temperature	7891, BS 874,	0.018	0.018	0.021	0.022	0.024	0.026
0°C Mean Temperature	BS2972, MICA,	0.018	0.018	0.021	0.022	0.024	0.026
10°C Mean Temperature	ASTM C 680 (95)	0.018	0.018	0.021	0.022	0.024	0.026
50°C Mean Temperature	and fully aged with BS 3927	0.023	0.023	0.024	0.026	0.030	0.032
80°C Mean Temperature	Appendix A	0.025	0.025	0.028	0.030	0.032	0.034
Dimensions stability (Dimensional variations in % after conditioning)							
48 hours @ 70°C	ASTM 2126	-1.24	-1.24	-1.24	-1.24	-1.24	-1.24
48 hours @ 70°C; 95% U.R.		+0.276	+0.276	+0.276	+0.276	+0.276	+0.276
48 hours @ -25°C		-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
Water absorption (%) 96 hours @ 20°C							
Weight	ISO 2896	0.113	0.113	0.113	0.113	0.113	0.113
Volume		0.045	0.045	0.045	0.045	0.045	0.045

Factory Fabrication Standards: ASTM C 450 -08 and ASTM C 585 -10

Inorganic material: It is inherently proof against rotting mould, fungal growth and attack by vermin and is non-hygroscopic

The material doesn't contain asbestos

Fire: Test run with *Gulf Cool therm* Phenolic material in full view for sheathing of walls directly exposed to fire; Degree of reaction to fire: 1 (one)

Smoke: in conformity with the regulation NF F 16 – 101 table 4- For smokes, it is classified as **degree F1**, with smoke index " I.F." : 6,3.- (emissions of smoke, noxious or toxic fumes are almost inexistent)

Corrosion of steel: after 28 days of contact, no corrosion phenomenon is highlighted on



Performance

High compressive strength
Low thermal conductivity
No water absorption
Zero permeability
High performance barrier
Noncombustible
Nontoxic
Resistant to pests and vermin

Performance

Low temperature & cryogenic
Cryogenic piping
Chilled and hot water lines
Heat traced pipes & equipment
Hydrocarbon processing
Above and below ground steam lines
Offshore platforms
Cryogenic vessels, equipment & tanks
High temperature pipelines
Asphalt and hot oil storage tanks

Performance

Procedural and random testing of cellular glass (FOAM GLASS) during the manufacturing process ensures the most consistent and high performance insulation reaches our customers. Our in-house testing equipment is Calibrated and certified to ensure ASTM performance and quality of Cellular glass (FOAM GLASS).

CELLULAR GLASS (FOAM GLASS) INSULATION

ASTM STANDARD AND APPLIED WORLDWIDE

Cellular glass (FOAM GLASS) is made of one hundred percent pure glass in a basic block foam. Blocks can be fabricated into wide range of shapes and sizes to the customer requirements.

PHYSICAL PROPERTIES OF CELLAR GLASS (FOAM GLASS) INSULATION				
PHYSICAL PROPERTIES	ASTM		EN ISO	
	SI	ENGLISH	METHOD	METHOD
Density	120 kg/m ³	7.8 lb/ft ³	C303	EN1602
Thermal Conductivity	W/mK	Btu-in/hr.ft ² .°F	C177	EN 12667
	0.043 @ 10°C	0.314 @ 50 °F	C158	EN 12939
	0.045 @ 24°C	0.327 @ 75°F		
Compressive Strength Block	0.8Mpa	116Psi	C165	EN 826
	Strength for flat surfaces With hot asplat		C240 C552	EN 826 Method A
Absorption of Moisture (Water % by Volume)	0.20%	0.20%	C240	EN 1609 EN 12087
Linear Coefficient of Thermal Expansion	9.0 x 10 ⁻⁶ /°F 25°C to 300°C	5.0 x 10 ⁻⁶ /°F 75°F to 575°F	E228	EN 13471
Hygroscopicity	No increase in weight at 90% relative humidity			
Water-Vapor Permeability	0.00 perm-cm	0.00 perm-in	E96 Wet Cup procedure B	EN 12086 EN ISO 10456
Acid Resistance	Impervious to common acids except hydrofluoric acids			
Capillarity	None			
Combustibility & reaction to fire	Noncombustible-will not burn Flame Spread 0 Smoke Development 0		E136 E84	EN ISO 1182 (Class A1)
Composition	Soda-lime silicate glass - inorganic with no fibers or binders			
Dimensional Stability	Excellent - does not shrink, swell or warp			EN1604
Flexural Strength,Block	0.48 Mpa	70 psi	C203 C240	EN 12089 (BS450)
Modulus of Elasticity, Approx	900 Mpa	1.3 x 10 ⁵ psi	C623	EN 826 Method A1
Specific Heat	0.84 Kj/kg.K	0.18 Btu/lb.°F		
Thermal Diffusivity	4.2 x 10 ⁻⁷ m ² /sec	0.016 ft ² /hr		
Corrosion Protection	Acceptable		C871	
Maximum Service Temperature	482°C	900°F		



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