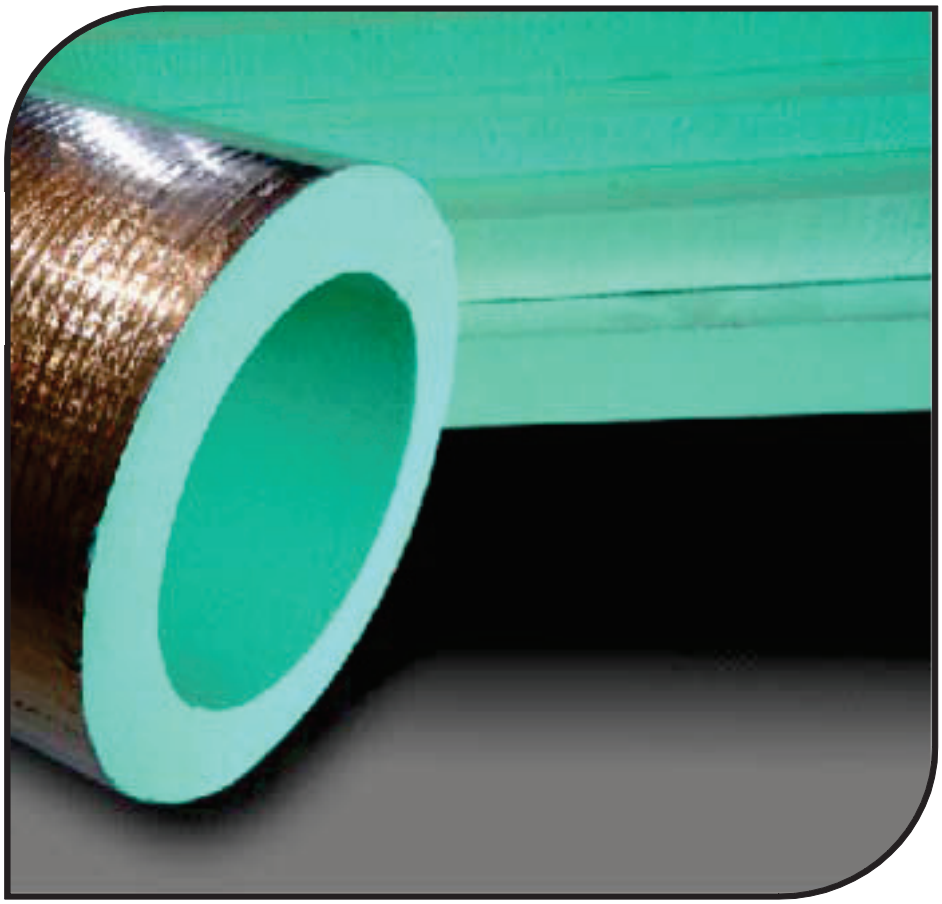
مصنع جلف كول ثيرم ذ.م.م.

GULF COOL THERM FACTORY LLC

Gulf Cool Therm

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 THERAMAL PIPE SUPPORT INSERTS
- HIGH DENSITY THERMAL DUCT SUPPORT INSERTS
- HIGH DENSITY SUPPORT SPACER

DCL PRODUCT CONFORMITY BS EN 13165: 2008 Certificate No. CL10020127

CERTIFICATION INTERNATIONAL ISO 9001: 2008 Cert No: CI/11977

UKAS MANAGEMENT SYSTEMS 063

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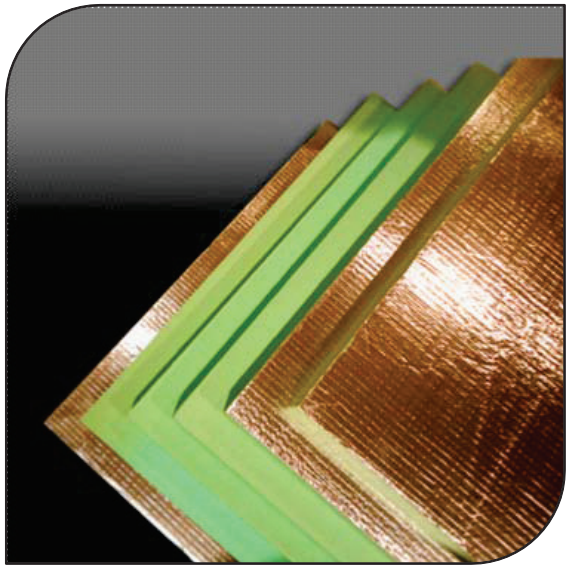


ABOUT US

We are pleased to introduce ourselves as a factory established in 1993, Sharjah – United Arab Emirates. Gulf Cool Therm Factory LLC is an ISO 9001:2008 Certified Company with Quality System certified by UKAS of United Kingdom.

Gulf Cool Therm Factory LLC, is a leading manufacturers and 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.

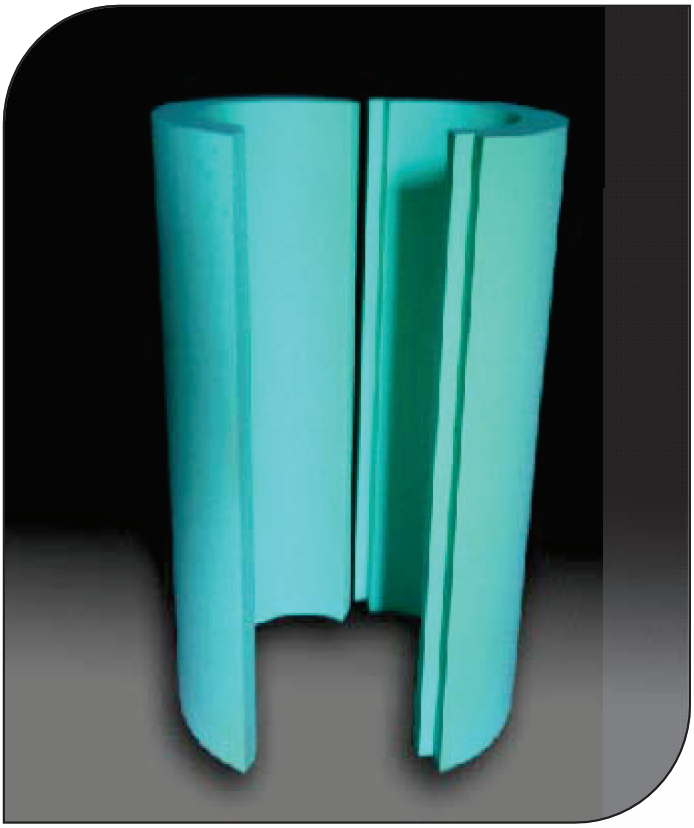
Chilled Water Pipe, Duct and Slab Insulation Materials

Product Description

Gulf Cool Therm **Polyisocyanurate** CFC free rigid closed cell foam manufactured in similar way to standard Polyurethane, *Gulf Cool Therm* **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 ^{o}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.

Gulf Cool Therm **Polyisocyanurate** CFC free rigid closed cell foam with a low Thermal Conductivity of 0.023 W/m ^{o}C at 10 ^{o}C, gives excellent thermal properties and fire properties when tested in accordance with ASTM E 84, and BS 476 Part 7, Class 1 rating.

Gulf Cool Therm **Polyisocyanurate** rigid insulation is 95% closed cell and provides a long end satisfactory service life.



Gulf Cool Therm **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 *Gulf Cool Therm* **Polyisocyanurate** fulfil all the requirements made of insulation materials used in the building industry.

Applications

Gulf Cool Therm **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.

Gulf Cool Therm **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

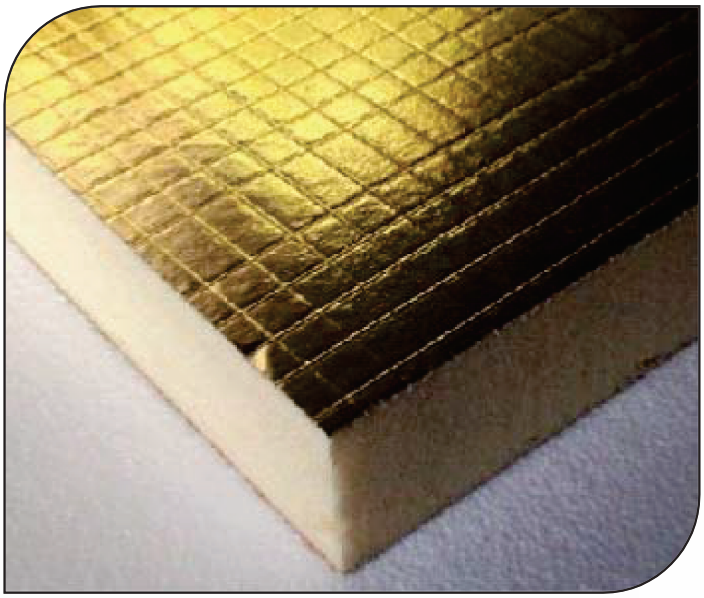
FINISHING

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 SSupport Inserts faced with reinforced Aluminium foil, Aluglass foil or Un-faced.



ADVANTAGES

High Temperature Service – *Gulf Cool Therm* **Polyisocyanurate** insulation does not soften or lose its strength at elevated temperatures within the recommended use limits.

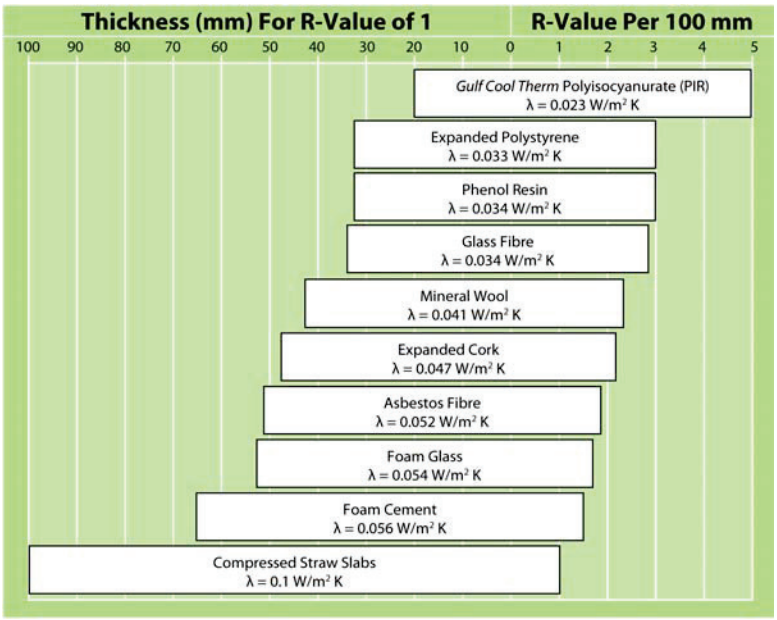
Low Thermal Conductivity – Procuring at the factory provides consistent makes physical properties.

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

Gulf Cool Therm **Polyisocyanurate** is having high thermal properties i.e. Low thermal conductivity, High Compressive strength, durability and dimensional stability.

Gulf Cool Therm **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 ($m^2\ ^0K$ /W) for common insulation materials are shown below.



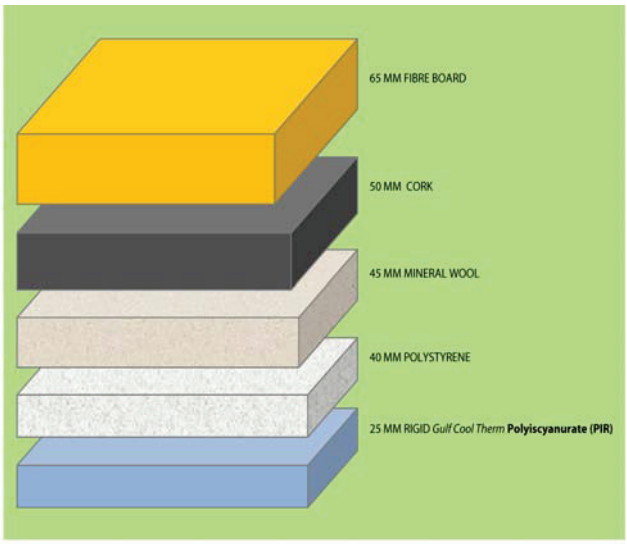
Comparative Thickness (mm) of commonly Specified Insulation Materials Required for Specific Metrics Values of Thermal Resistance (R-value)1

Insulation Material Thermal Conductivity (λ)²	**Thermal Resistance - Metric R-Value¹**							
	5.43 mm	4.75 mm	4.33 mm	3.75 mm	3.17 mm	2.74 mm	1.87 mm	1.59 mm
Polyisocyanurate (PIR) 0.023 W/m² K	108	95	87	75	63	55	37	32
Expanded Polystyrene 0.033 W/m² K	181	158	144	125	106	91	62	53
Phenol Resin 0.033 W/m² K	181	158	144	125	106	91	62	53
Glass Fibre 0.034 W/m² K	187	164	149	129	109	94	65	55
Mineral Wool 0.041 W/m² K	226	198	180	155	132	114	78	66
Expanded Cork 0.047 W/m² K	259	226	206	179	151	130	89	76
Asbestos Fibre 0.052 W/m² K	286	250	228	197	167	144	98	84
Foam Glass 0.054 W/m² K	301	264	241	208	176	152	94	88
Foam Cement 0.056 W/m² K	319	279	255	221	186	161	110	94
Compressed Straw Slabs 0.1 W/m² K	543	475	433	375	317	274	187	159

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

[2] λ = W/m² K Corresponds to British Theraml Unit K-Factory $\frac{(Btu)\ (in)}{(ft^2)\ (^oF)\ (Hr)}$

Comparative Thickness for same degree of Insulation (Dry Conditions)

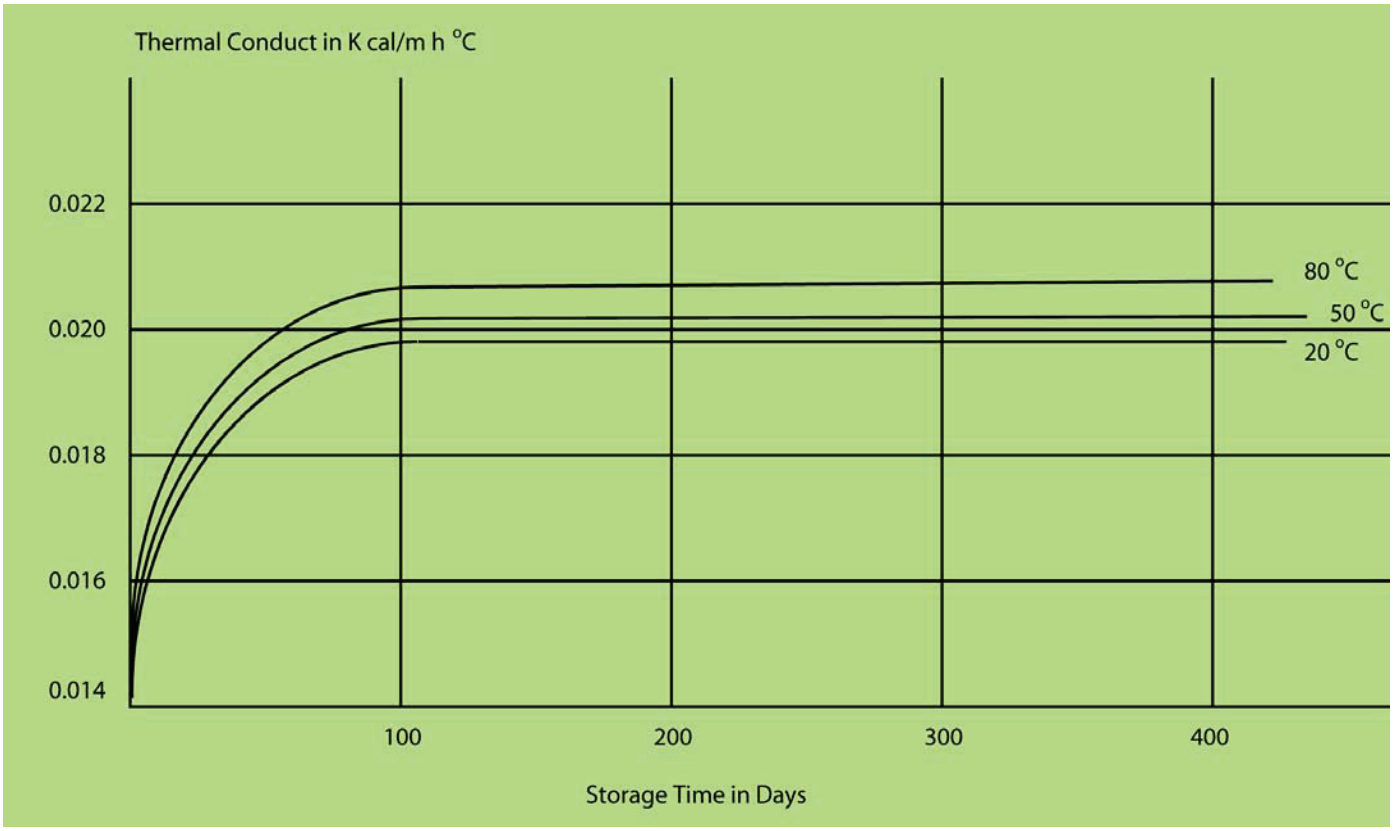


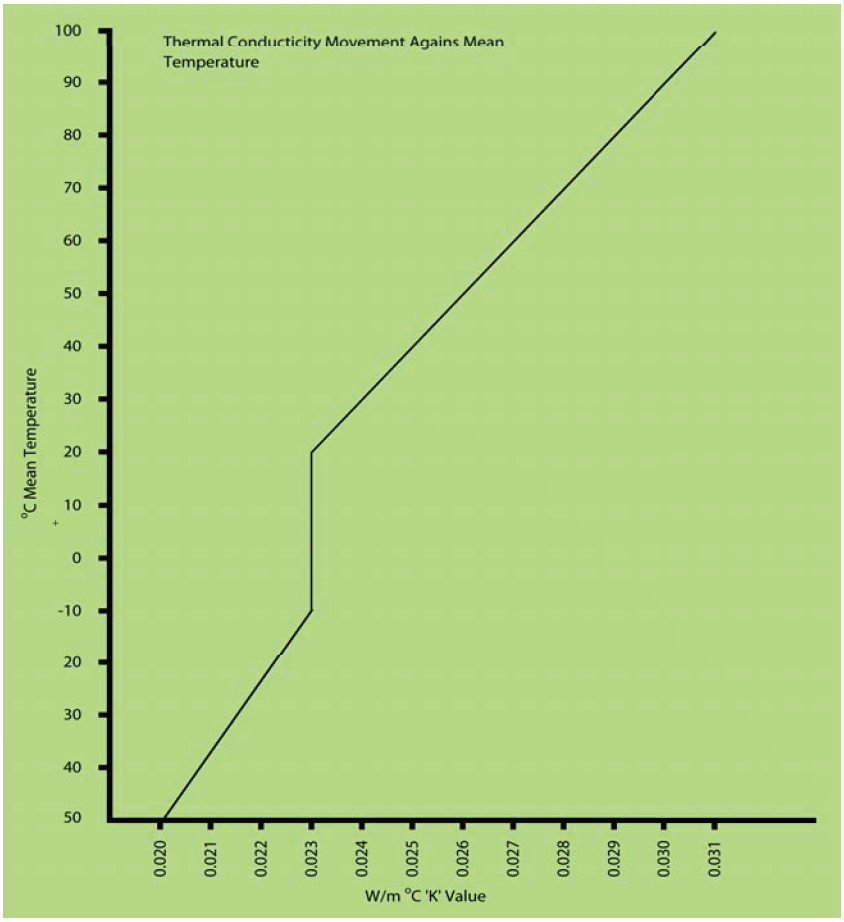
Thickness of *Gulf Cool Therm* **Polyisocyanurate (PIR)** for Calculated Metric Values of Thermal Resistance (R-value)

m m	**Thermal Conductivity²** $\lambda = \frac{W}{m\ ^oK}$	**Thermal Resistances (R-value)¹** $1/\lambda = \frac{m2\ ^oK}{W}$
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
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

Increase in thermal conductivity at various temperatures and prolonged storage time

For low temperature application *Gulf Cool Therm* **Polyiscyanurate (PIR)** must be covered with a vapour barrier to avoid condensation or icing.

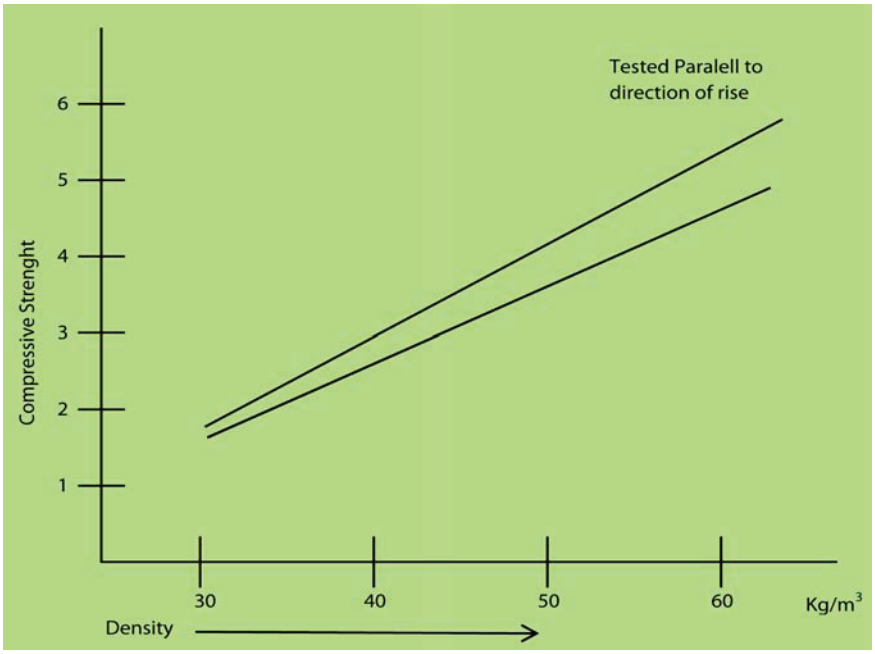




The graphs shown the Theramal Conductivity movement against mean temperature.

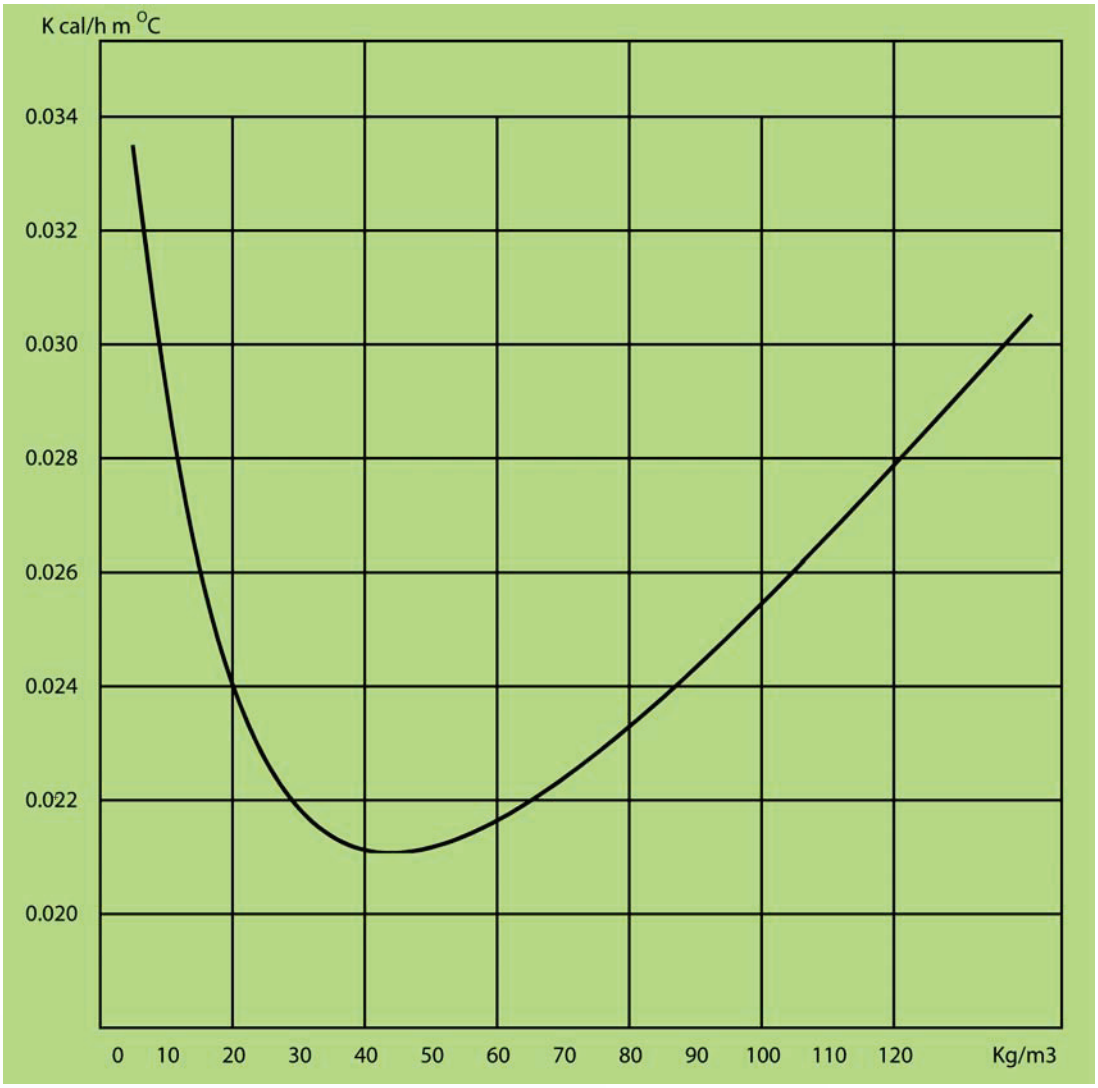
SERVICE TEMPERATURES

Gulf Cool Therm **Polyiscyanurate (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

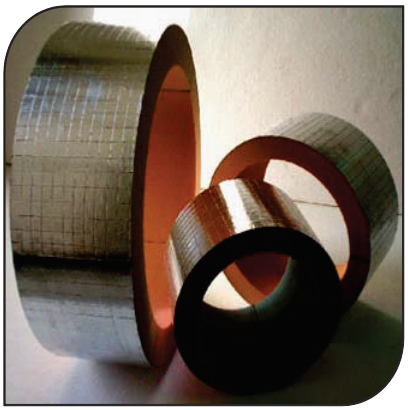
Gulf Cool Therm **Polyiscyanurate (PIR)** can be easily cut with saw blades or knives. It is resistant to all kinds of adhesive, bituminous emulsions and hot bitumen (180 ^{O}C to 220 ^{O}C). We will, however, assist you to find the proper adhesives for your particular application.

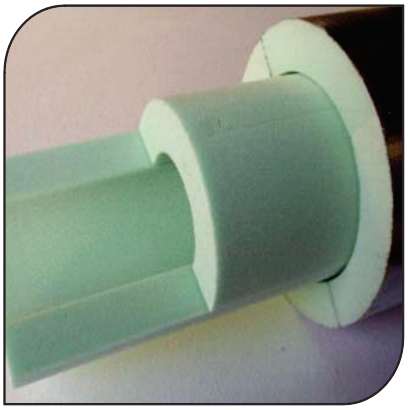


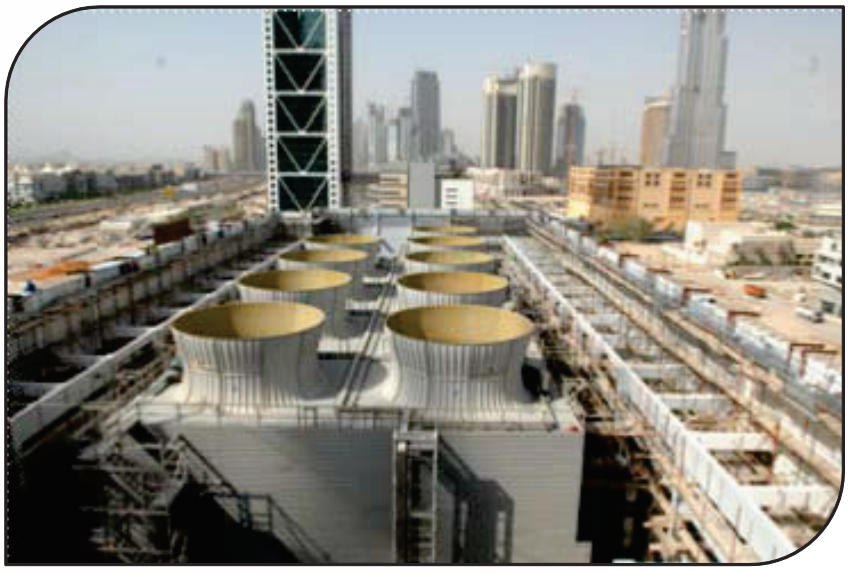
The graph shows the Thermal Conuductivity of *Gulf Cool Therm* **Polyisocyanurate (PIR)** Foam at different densities.

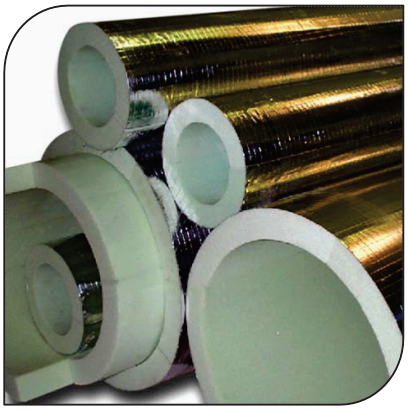
TECHNICAL DATA SHEET

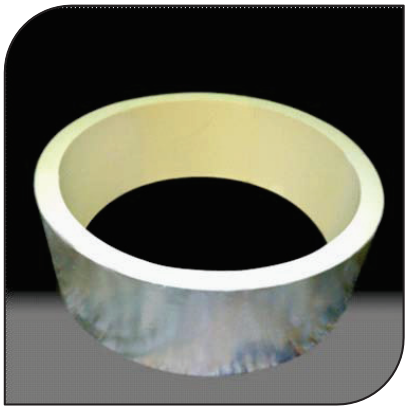
Properties	Test Method	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Nominal Density: Kg/m3 (lb/ft^3)	ASTM D-1622	PIR 35 (2.18)	PIR 50 (3.12)	PIR 65 (4.05)	TS 80 (4.99)	TS 100 (6.24)	TS 120 (7.49)	TS 160 (9.98)	TS 180 (11.23)	TS 200 (12.48)	TS 250 (15.60)	TS 360 (22.47)
Thermal Conductivity @ 10^{O}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 ^{O}C 24 hours @ +110 ^{O}C 24 hours @ +70 ^{O}C 100% RH	ASTM D-2126	 Negligible 1.5 2	 Negligible 1.5 2	 Negligible 1 1.5	 Negligible <1 <1	 Negligible <1 <1	 Negligible <1 <1	 Negligible <1 <1	 Negligible <1 <1	 Negligible <1 <1	 Negligible <1 <1	 Negligible <1 <1
Upper Temperature Limit ^{O}C (^{O}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	45	45	45	45	45	45	45	45	45	45	45
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%

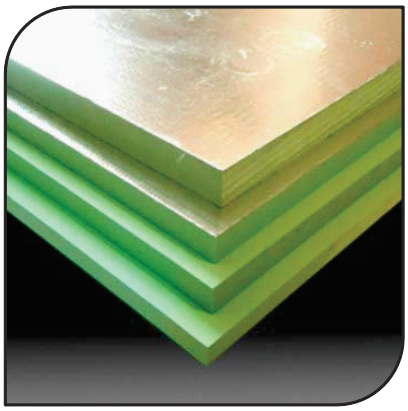


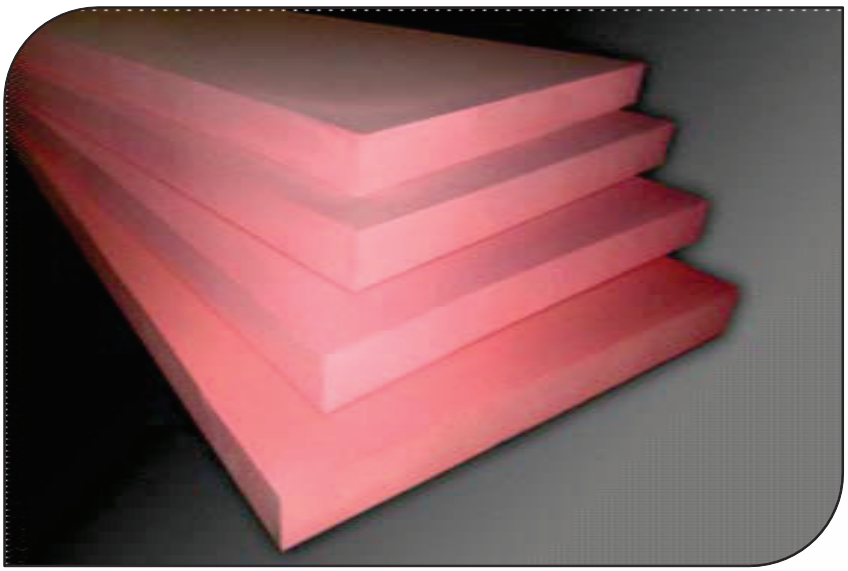






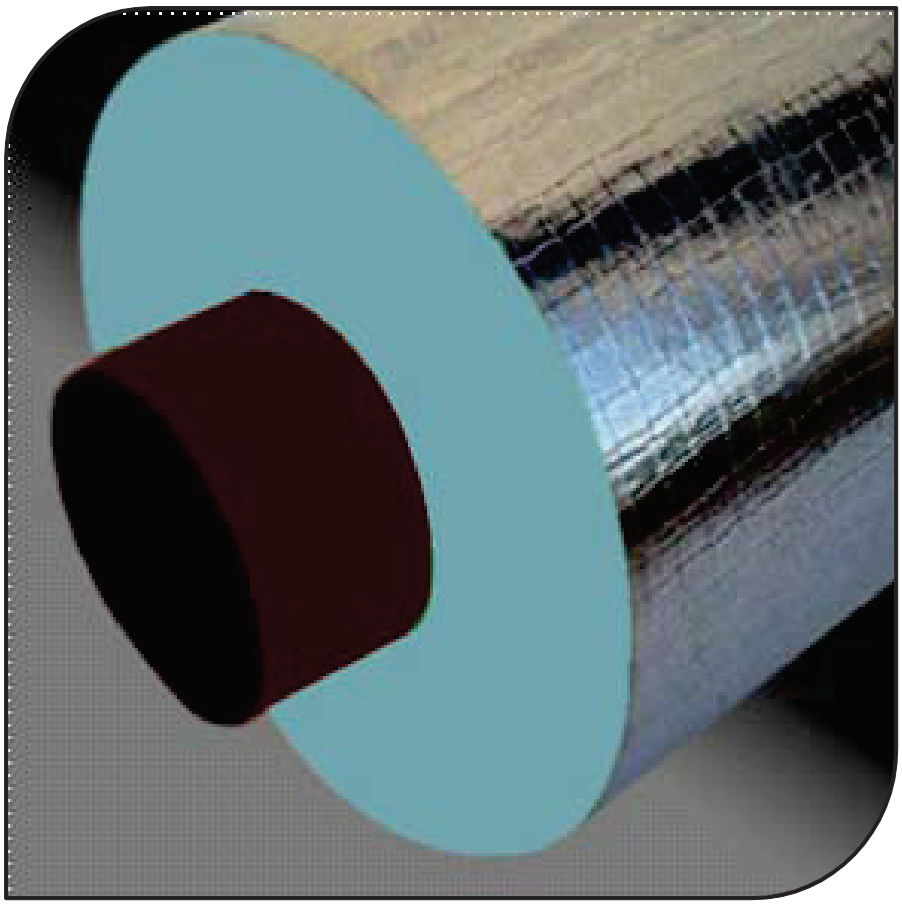


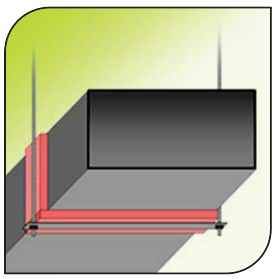


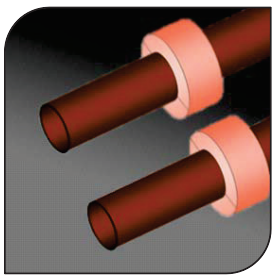


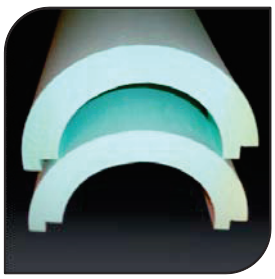
Easy to Fit - Energy Saving

The Quality Insulation Products for Many Diverse Application









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