



مصنع جلف كول ثيرم ذ.م.م.
GULF COOL THERM FACTORY LLC

Gulf Cool Therm

PRE-INSULATED PIPES AND FITTINGS

FOR DISTRICT COOLING / UNDERGROUND CHILLED WATER PIPING

*The Quality Insulation
Products for Many Diverse
Application*



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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.

GENERAL DESCRIPTION

Gulf Cool Therm **Pre-insulated Piping systems** for Underground chilled water pipeline, District Cooling and other energy related applications. The product consists of a carrier pipe, insulation and jacket pipe. The insulation are available in different thickness as well as different densities.

The Pre-insulated Pipes and Fittings are manufacture in accordance with BS EN 253 Standard.

CORE PIPES

- Seamless black steel pipes conforming to ASTM A53 / API 5L Grade B, with schedule 40 wall thickness, and beveled ends for welded joints.
- ERW black steel pipes conforming to ASTM A53 / API 5L Grade B, standard weight wall thickness, and beveled ends for welded joints.
- HDPE Pipe PE 100, SDR 11-PN16 or HDPE PE 100, SDR 17-PN10
- GRP PIPES- PL/PL, SN 10,000N/M2 (Dual Helical Filament Winding Process) Plain Ends to be joined by lamination (PL/PL)
- Copper Pipe



SURFACE FINISH

The steel core pipe external surface will be cleaned and coated with red-oxide or the core pipe external surface will be grit-blasted to SA 2½ near white metal finish, then coated by airless spray with self-priming Polyamide/Polyamine epoxy to total DFT of 125 microns nominal 50 mm shall be kept bare (uncoated) from both pipe ends for joint welding as specified.



INSULATION

The thermal insulation will be rigid cellular 100% CFC-free Polyurethane or Polyisocyanurate foam, as per EN 253 factory injected between core pipe and outer casing/protective Jacket, having a density of 35Kg/m³ (2.2lbs/ft³), 48Kg/m³ (3 lbs/ft³) or 60Kg/m³ (3.75 lbs/ft³) and thermal conductivity of 0.023 W/m.K (0.16Btu-in/hr ft² °F) maximum, at mean temperature of 10 °C Typical operating temperature is between -17 to +120°C (0 to 250°F).

OUTER CASING PROTECTIVE JACKET

The outer casing/protective jacket will be made of extruded High Density Polyethylene (HDPE PE 100) pipe, black UV-resistant, having a density of 950 kg/m³ and a long-term mechanical property with tensile stress of 4.0 MPa (580 psi) at 80 °C. OR GRP Pipe with continuous filament winding process (Drosthholm) plain ends to be joined by lamination (Butt & Wrap)

FITTINGS

All fittings will be factory insulated with similar insulation and thickness, 150 mm-200 mm long beveled end extension factory welded to each end. All fabrication joints will be 100% pressure tested prior to insulation.



END SEAL

Each Pre-insulated pipe and fitting will have a factory applied protective coating or end seal applied to the exposed ends of the insulation for protection against moisture ingress.



FIELD INSULATION

When a Underground piping is constructed, the 6/12 meters long pipes/fittings are jointed together after they are laid down and the pressure test is completed. Start by placing the jacketing in position, Check space around and in between the pipes to see that adequate space is available for quick and easy installation without use force.

A 0.7 mm or 0.9 mm G.I sheet roll up around the joint and riveted (Use stainless wire/belt to avoid any bulging during foaming) Then the Polyurethane foam or Polyisocyanurate foam Chemical is poured through the drilled holes into the G.I sheets.

POURING OF THE FOAM CHEMICALS

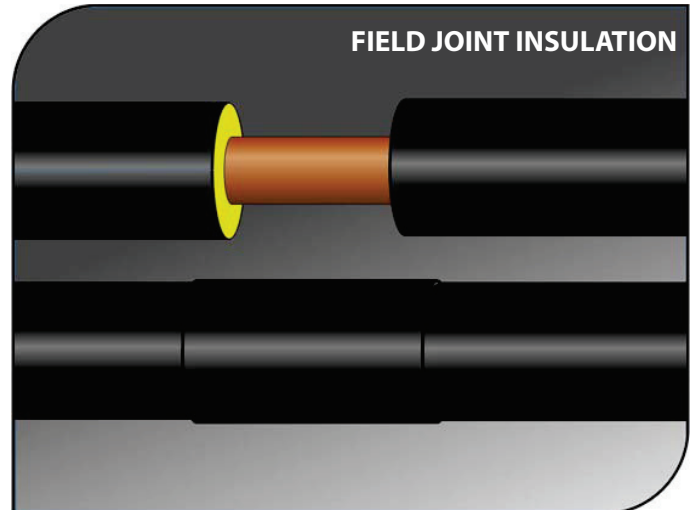
Polyurethane/Polyisocyanurate foam consists of two components: Polyol and Isocyanurate (ISO/MDI) for the field joint insulation.

The chemicals temperature should always be maintained at 20° - 25°C.

- After the GI casing is installed, weight the exact amount of chemicals, Polyol & Isocyanate (ISO/MDI), in separate cups. Please note that Polyol with a pale-to-dark yellow colour and ISO is colored black. Both chemicals should not be exposed to air-moisture or heat for long hours. Make sure the chemicals containers are closed tightly after usage.
- First, pour the Polyol (weighed in a cup) into mixing cup/bucket. When ready to mix, pour the ISO (weighed in a cup) into mixing cup/bucket with Polyol and using electric drill with mixer blade attached, mix the two chemicals for 10-15 seconds. Make sure the chemicals are thoroughly mixed. When the colour of the mixture changes (from dark to pale yellow) pour immediately (as quickly as possible) the mixture through the pouring hole on the top of jacket. Allow few minutes for the foam to rise, then, plug the pouring hole to refrain rising foam from coming out of the hole.

Strictly follow the foam manufacturers instructions for a proper fill.

After successful completion of foam filling the stainless wire/belt shall be removed. Then a Raychem heat shrinkable sleeve with a closure path is applied and heat shrunk over the fitting to finish the joint. The field joint can be air leak tested at 0.2 Bar



LEAKE DETECTION SYSTEM

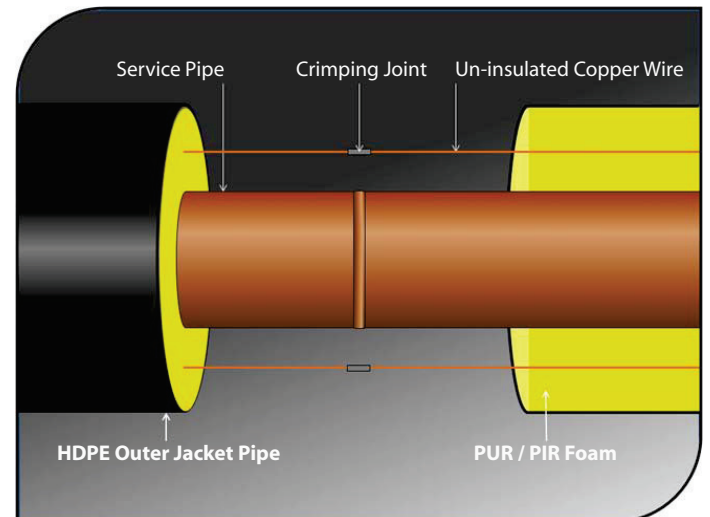
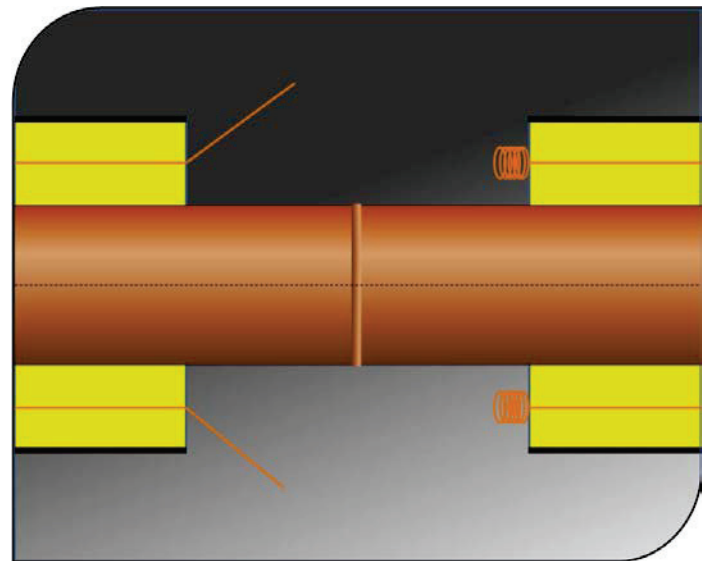
GENERAL INFORMATION

Preinsulated pipe systems usually entail a large investment. A leak from the supply pipe or penetration of water into the pipe insulation should be discovered and localized as quickly as possible. This in turn, demands a monitoring system that functions even after long periods of inactivity. A typical monitoring system consists of Two (1.5mm) uninsulated copper wires which are embedded in the insulation surrounding the pipe and connected to an alarm unit. When moisture is present in the insulation the resistance between the alarm wire and the supply pipe decreases causing an alarm is activated in the central unit.

Localizing the position of a fault is carried out with the help of a measuring instrument which sends an electric pulse through the system. When the pulse detects a fault a reflection is sent back to the measuring instrument. As the velocity of the pulse is known the position of the fault can be calculated.

In order to ensure the greatest accuracy possible in positioning a fault in a pipeline, the alarm wire must be positioned the same distance possible from the pipe, pipe parts and joints. Furthermore, the higher the total resistance was before the fault occurred the more accurate the positioning of the fault.

The leak detection are using to ensure that a pre-insulated piping system gives a long end satisfactory service life, it is essential that the insulation is kept dry preventing corrosion to the steel service pipe.





INSULATION TECHNICAL SPECIFICATION

Properties	Test Method	Value	Value	Value	Value
Nominal Density: Kg/m ³	ASTM D-1622	35	50	60	80
Thermal Conductivity @ 10 °C (W/m.K)	ASTM C 518/91	0.023	0.023	0.024	0.028
Average Compressive Strength @ 10% Relative Deformation: kPa	ASTM D-1621 BS EN 826:1996	170	350	450	750
Tensile Strength: kPa	ASTM D 1623	220	385	480	630
Shear Strength	ASTM D 1622	138	195	230	310
Closed Cell Content (%)	ASTM D 2856	>90	>90	>90	>90
Water vapor Transmission (perm-inch)	ASTM E 96-00	1.5	1.5	0.5	0.4
Water absorption w/v (%)	ASTM C 209 : 1996	2.5	2	1.5	1.3
Dimensional stability (% Linear Change)					
- 24 hours @ -15 °C	ASTM D 2126	Negligible	Negligible	Negligible	Negligible
- 24 hours @ +110 °C	BS EN 1604 : 1997	1.5	1.5	1	<1
- 24 hours @ +70 °C, 100% RH		2	2	1.5	<1
Upper Temperature Limit (°C)		140	140	140	140
Linear Coefficient of Expansion per °C	BS 4370	40-80 x 10 ⁻⁶	40-80 x 10 ⁻⁶	40-80 x 10 ⁻⁶	40-80 x 10 ⁻⁶
Fire Resistance (small scale test)	BS 476 Part 5	Class P	Class P	Class P	Class P
Surface spread of flame	BS 476 part 7	Class 1	Class 1	Class 1	Class 1
Extend of burn (mm)	ASTM D 3014-74	5	5	5	5
Flammability-weight retained	ASTM D 2843-70	90%	90%	90%	90%
Light Obscuration	BS 5111 : Part 1	30%	30%	30%	30%





POLYETHYLENE (PE 100) TECHNICAL SPECIFICATION

Physical Properties		Test Method	Value	Unit
Density	(Base resin)	ISO 1183 D/ISO 1872-2B	950	Kg/m ³
Density	(Compound)	ISO 1183 D/ISO 1872-2B	961	Kg/m ³
Melt Flow Rate MFR ₂	(190°C/2.16 Kg)	ISO 1133	<0.1	g/10 min
Melt Flow Rate MFR ₅	(190°C/5.0 Kg)	ISO 1133	0.25	g/10 min
Tensile Strength at yield	(50mm/min)	ISO 527-2	25	Mpa
Elongation at Break		ISO 527-2	>600	%
Vicat Softening Temperature		ISO 306 A-50	119	°C
Brittleness Temperature		ASTM D 746	< -70	°C
ESCR	(10% Igepal), F ₅₀	ASTM D 1693-A	>1000	H
Charpy Impact, Notched	(0 °C)	ISO 179/1eA	16	kJ/m ²
Crystalline Melting Range		DSC	128-132	°C
Linear Expansion	(20-90 °C)		0.2	Mm/m. °C
Hardness, Shore D		ISO 868	60	-
Carbon Black Content		ASTM D 1603	≥ 2	%
Thermal Conductivity	(20 °C)	DIN 52612	0.4	W/m.K
Thermal Stability	(210 °C)	EN 728	>15	Min



STEEL CORE PIPE DIMENSION			HDPE JACKET PIPE DIMENSION		INSULATION
Nominal Diameter (MM) DN	Outside Diameter D_s (MM)	Minimum Nominal Wall Thickness T (MM)	Minimum Outside Diameter D_c (MM)	Minimum Wall Thickness e_{min} (MM)	Insulation Thickness (MM)
20	26.9	2.0	125	2.50	46.55
25	33.7	2.3	140	3.00	50.15
32	42.2	2.6	140	3.00	45.90
40	48.3	2.6	160	3.00	52.85
50	60.3	2.9	180	3.00	56.85
65	73.0	2.9	180	3.00	50.50
80	88.9	3.2	200	3.20	52.35
100	114.3	3.6	225	3.50	51.85
125	141.3	3.6	250	3.90	50.45
150	168.3	4.0	280	4.40	51.45
200	219.1	4.5	355	5.60	62.35
250	273.0	5.0	400	6.30	57.20
300	323.9	5.6	450	7.00	56.05
350	355.6	9.5	500	7.80	64.40
400	406.4	9.5	560	8.80	68.00
450	457.2	9.5	630	9.80	76.60
500	508.0	9.5	630	9.80	51.20
550	558.8	9.5	710	11.10	64.50
600	609.6	9.5	800	12.50	82.70
650	660.4	9.5	800	12.50	57.30
700	711.2	9.5	900	12.90	81.50
750	762.0	9.5	900	12.90	56.10
800	812.8	9.5	1000	13.30	80.30
850	863.6	9.5	1000	13.30	54.90
900	914.4	9.5	1100	13.80	79.00
950	965.2	9.5	1100	13.80	53.60
1000	1016.00	9.5	1200	14.60	77.40





HDPE CORE PIPE (PE 100) ISO 4427			HDPE JACKET PIPE		INSUATION
OD (MM)	Wall Thickness (MM)		OD (MM)	Wall Thickness (MM)	Insulation Thickness (MM)
	PN 10 (SDR-17)	PN 16 (SDR-11)			
20	-	-	75.00	2.10	25.40
25	-	-	90.00	2.30	30.20
32	-	3.00	90.00	2.30	26.70
40	-	3.70	110.00	2.40	32.60
50	-	4.60	125.00	2.50	35.00
63	-	5.80	160.00	3.00	45.50
75	4.50	6.80	180.00	3.00	49.50
90	5.40	8.20	200.00	3.20	51.80
110	6.60	10.00	225.00	3.50	54.00
125	7.40	11.40	250.00	3.90	58.60
160	9.50	14.60	280.00	4.40	55.60
180	10.70	16.40	300.00	4.90	55.10
200	11.90	18.20	315.00	5.20	52.30
225	13.40	20.50	355.00	5.60	59.40
250	14.80	22.70	400.00	6.30	68.70
280	16.60	25.40	400.00	6.30	53.70
315	18.70	28.60	450.00	7.00	60.50
355	21.10	32.20	500.00	7.80	64.70
400	23.70	36.30	560.00	8.80	71.20
450	26.70	40.90	630.00	9.80	80.20
500	29.70	45.40	630.00	9.80	55.20
560	33.20	50.80	710.00	11.10	63.90
630	37.40	57.20	800.00	12.50	72.50
710	42.10	-	900.00	12.50	82.50
800	47.40	-	1000.00	13.30	86.70

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MAJOR PROJECTS EXECUTED

District Cooling Network at Palm Jumeirah Crescent, Dubai
District Cooling Network at Palm Jumeirah Trunk, Dubai
District Cooling Network at Discovery Gardens, Dubai
District Cooling Network at Jumeirah Lake Towers, Dubai
District Cooling Network at International City Phase II & III, Dubai
District Cooling Network at Jumeirah Village, Dubai
District Cooling Network at Jumeirah Village, Dubai
District Cooling Network at Dubai Maritime City, Dubai
District Cooling Network at Dubai Festival City Package # Z16, P145, Dubai
Underground Chilled Water Piping, Al Ain Club 2003 Facilities, Al Ain
Underground Chilled Water Piping, Zabeel Palace Kitchen, Dubai
Underground Chilled Water Piping, Garden Shopping Mall, Dubai
Underground Chilled Water Piping, Saheik Falah Villa
Underground Chilled Water Piping, Luxury Villa, Ghammadh-Al Ain
Underground Chilled Water Piping, Mafrag Hotel, Abu Dhabi
Underground Chilled Water Piping, Luxury Villa, Ghammadh-Al Ain
Underground Chilled Water Piping, Saeed Al Muheiri Villa, Al Ain
Underground Chilled Water Piping, BMW and Scoda Showroom, Sharjah
Underground Chilled Water Piping, Islamic Musuem, Sharjah
Underground Chilled Water Piping, Shk. Zayed's Palace at Al Wathba
Underground Chilled Water Piping, Al Raha Beach Resort, Abu Dhabi
Underground Chilled Water Piping, Shk. Zayed's Palace at Al Wathba
Underground Chilled Water Piping, Labour Accommodation, DIP, Dubai.
Underground Chilled Water Piping, H.H. Shk. Zayed Al Nahyan Complex Villa, Al Ain
Underground Chilled Water Piping, A4500G Dia Expansion-Car Park, Dubai Int'l Airport
Underground Chilled Water Piping, Al Zawra Central Power Station
Underground Chilled Water Piping, H.H. Shk. Zayed Al Nahyan Complex Villa, Al Ain
Underground Chilled Water Piping, Adnoc New Administration Building at Ruwais, Abu Dhabi.
Underground Chilled Water Piping, Dukhan Beach Resort Doha-Qatar

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