NAFFCO
FLOW CONTROL

Pre-Insulated Piping System

- Chilled Water
- Hot Water
- Steam/Oil & Gas


Uninterrupted
Flow

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Corporate **Profile**

A Complete Flow Control Solution Provider

- **Piping System**
- **Ventilation Solution**
- **Smoke Management**
- **Passive Fire**

NAFFCO Flow Control provides a complete solution for construction projects, along with the customised system design and supply for the unique projects.

Since its inception, NAFFCO Flow Control has been continuously striving through its research and development to find out the ever changing needs of the market and cater to the same, with the help of its carefully selected vendors. The product portfolio offers a wide, unique & exclusive range of innovative, efficient and eco-friendly products.

PRODUCT APPROVALS

"What's measured improves!"

Corporate **Profile**

A Complete Flow Control Solution Provider

COMMITMENT

We are committed to provide the highest quality products and solutions therefore, we only supply globally recognised and approved products having UL, FM, Kitemark, LPCB, CE, WRAS, Applus certifications and more.

The product portfolio ranges from SHIELD's Steel & HDPE piping systems to the robust solution for the industrial ventilation, smoke management and more.

QUALITY

We always strive to better serve customers' needs by staying up-to-date with latest approved product range. Our strength relies on our quality products, services and delivery of right solutions to address your project requirements.

We supply Innovative, Efficient and Eco-friendly products in compliance with various American and European standards.

REACH

With representation in the Middle East and North Africa (MENA) region, we are capable to deliver our products and services in a short period of time. We simultaneously work on opportunities to explore new markets.

We believe in total customer satisfaction hence providing qualified and well-experienced support team.

Supplying State-of-The-Art Products to Ensure High Efficiency

As a member of NAFFCO Group, our success is driven by our "Passion to Protect"; our vision is to become the world's number one provider of innovative solutions in protecting life, environment and property.

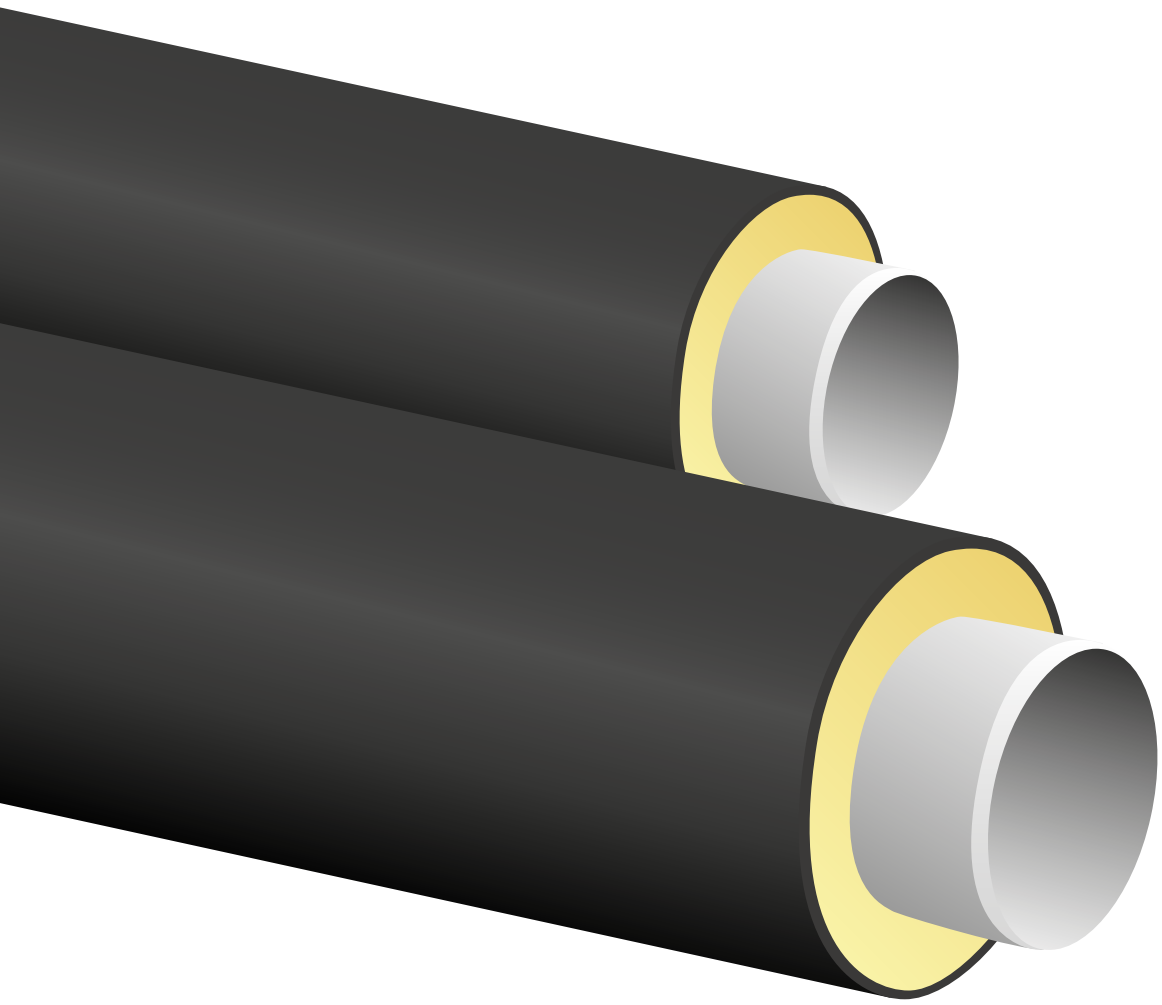
Pre-Insulated **Pipes**

About the Pipe Insulation

INTRODUCTION

SHIELD Pre-Insulated Pipes are widely used for energy related applications. The main purpose of such pipes is to maintain the temperature of the fluid in the pipes. A common application is the Chilled/Hot water from District Cooling/Heating Plant. SHIELD Pre-Insulated Pipes and Fittings are manufactured in accordance with EN 253:2009 Standard.

NAFFCO Flow Control supplies SHIELD Pre-Insulated pipes which are manufactured under factory controlled conditions, so that the system ensures a high level quality standard, excellent durability as well as complete thermal integrity throughout its service life. Efficient working life of district heating pipeline networks can be accomplished by the effective usage of the pre-insulated system.



Pre-Insulated **Pipes**

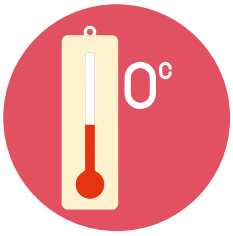
Edge Over Other Products & Materials

THE FEATURES

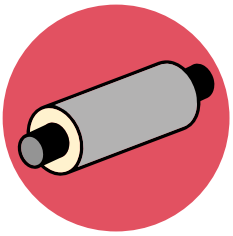
SHIELD Pre-Insulated Pipe Systems provide a safe and efficient method of transporting media while minimizing heat loss or gain. The Pre-Insulated Pipe Systems offers an energy efficient solution for a wide range of industrial, commercial and domestic applications:

System has a long service life with a joint less cover for protecting the insulation and steel against to the corrosion

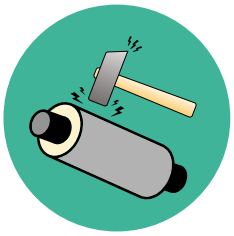
Long-life insulation service against external effects



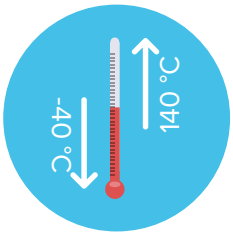
Application is possible up to 140°C



Inner Pipes may produce from steel, copper, PPR, HDPE & GRP

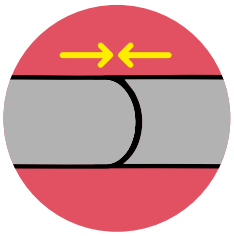


A high integrity and durable finished product

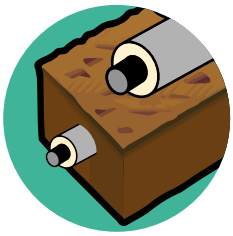


Excellent thermal characteristics

Quick and easy to install maximizing on-site efficiency



Permanently sealed against ingress of external fluids



Ideal for above and below ground usage

NOTE:

- ✓ The Inner pipes coating is possible.
- ✓ All types of pipes & Fittings available.
- ✓ Can be prefabricated to specific site requirements.

Applications **& Structure**

Where to Use

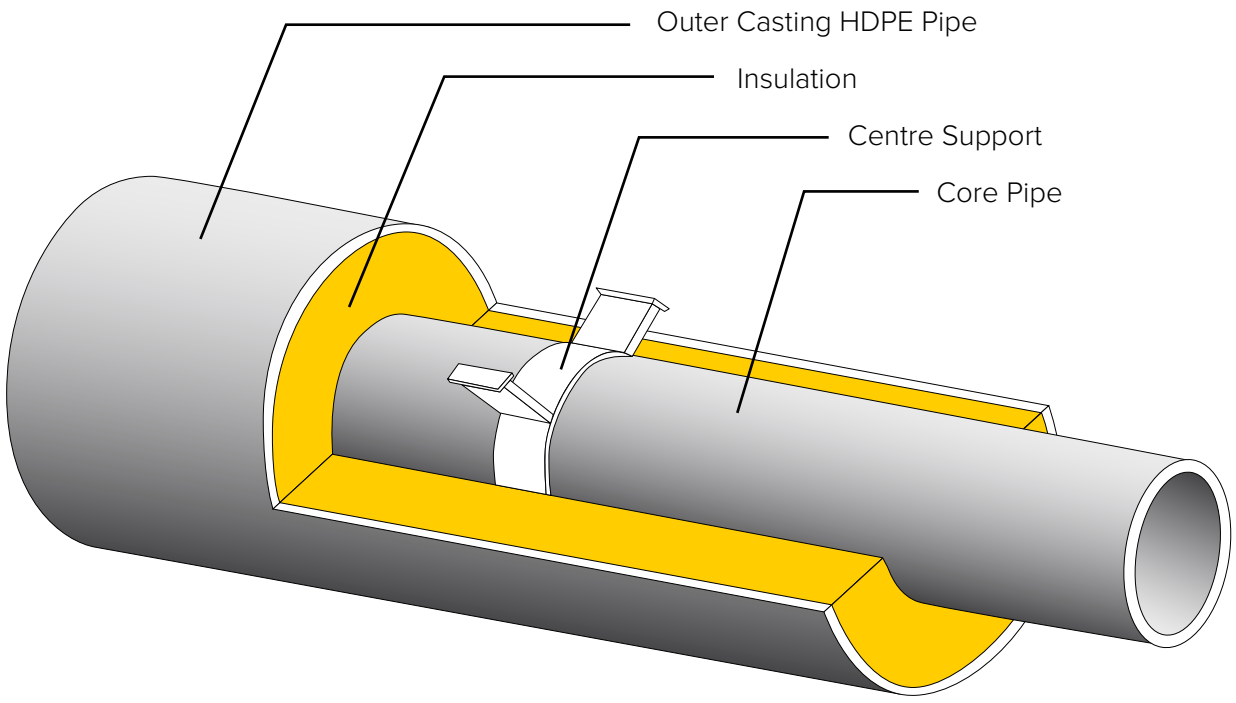
LIST OF APPLICATIONS

SHIELD Pre-Insulated Pipe provides safe, cost effective energy conscious and fuel efficient solutions in a wide range of industrial, commercial and domestic applications:

- ✓ District Cooling Systems
- ✓ District Heating Systems
- ✓ Oil & gas Applications
- ✓ Domestic Hot/Cold Water Systems
- ✓ Transportation of Gas/Steam/Fuel & Lubricants
- ✓ Other Temperature Dependent Industrial Requirement

STRUCTURE OF PRE-INSULATED PIPES

A SHIELD Pre-Insulated Pipe is a three layered pipe consist of an inner service pipe, outer jacket and high quality Polyurethane foam sandwiched between the two.



Carrier/Service **Pipe**

The Inner Pipe

Although the most commonly used service / carrier pipes are Carbon Steel Pipes and High Density Polyethylene Pipes, However, other types of pipes can also be insulated.

NAFFCO Flow Control provides a complete range of high quality SHIELD Carbon Steel Pipes and SHIELD High Density Polyethylene Pipes to fulfil all the piping requirements of projects. Below mentioned table explains our piping range:

Core/Service Pipe Options
SHIELD ERW/SSAW Black Welded Steel Pipe as per ASTM A 53/API 5L, Sch40, 5.80m/11.6m Long
SHIELD Black Seamless Pipe, ASTM A53/API 5L, Grade B, Sch-40, 6m/12m Long
SHIELD ERW/SSAW Black Welded Steel Pipe as per ASTM A 53/API 5L, Grade B, STD Thickness 9.52
SHIELD HDPE Pipe, PE 100 as per ISO 4427 In Different Pressure Ratings

Pre-Insulated **Fittings**

What We Offer

FITTINGS

NAFFCO Flow Control supplies SHIELD Pre-Insulated Pipeline system which includes factory made fittings to match the network requirement. Pre-Insulated fittings can also be produced to the required parameters in accordance to the specifications of the straight pipes.

Core/Service Pipe Options
SHIELD Butt Welded, Black, as per ASTM A234 WPB, ANSI B16.9, Seamless Carbon Steel, Sch. 40
SHIELD Butt Welded, Black, as per ASTM A234 WPB, ANSI B16.9, Long Radius, Seamless Carbon Steel, Sch. STD
SHIELD HDPE PE 100 Fittings, Moulded or Fabricated In Different Pressure Ratings with Electro/Butt Fusion Welding

STANDARD STEEL/HDPE FITTINGS RANGE

- ✓ Elbows 90°
- ✓ Elbows 45°
- ✓ Equal Tee
- ✓ Reducing Tee
- ✓ Concentric & Eccentric Reducers
- ✓ Flange Adopters

NOTE: Others fittings type can also be supplied as per network requirements

Features

- ✓ All fittings will be factory insulated with similar insulation and thickness.
- ✓ 150 mm - 200 mm long bevelled end extension factory welded to each end.
- ✓ All fabrication joints will be 100% pressure tested prior to insulation.
- ✓ Custom made fittings.
- ✓ Ready to install

SURFACE FINISH - STEEL PIPING SYSTEM

Prior to insulate the steel pipes and fittings, external surface will be cleaned and coated with **Red Oxide Anti Rust Primer**.

END SEAL OF PRE-INSULTED PIPES & FITTINGS

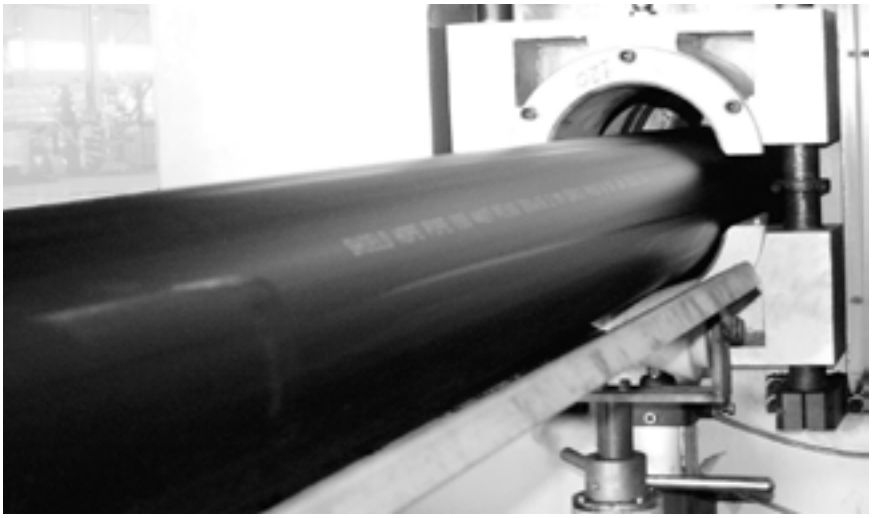
SHIELD Pre-Insulated pipes and fittings will have a factory applied protective coating to the exposed ends of the insulation for protection against moisture ingress. This is most economical solution for the safety against moisture ingress for pre insulated pipes & fittings at site.

Outer **Casing**

Jacket Pipes

NAFFCO Flow Control proudly supplies SHIELD Seamless Extruded or Spiral Welded Pipe as per EN 253:2009 for Injected Insulation.

The remarkable development of the SHIELD HDPE layered outer casing brings about quality and adaptability which makes the casing solid in the cross-sectional direction and adaptable in the longitudinal way.



The outer casing is made up of high density polyethylene EN 253:2009 (DIN 8074), with dimensions Ø90-600mm in length up to 12m, with the following characteristics:

- ✓ Min density of 944 kg/m^3.
- ✓ Coefficient of thermal conductivity of 0.42 W / mK.
- ✓ Softening temperature according to Vicat 121-124 ° C.
- ✓ Elongation at break min. 350%.
- ✓ Yield strength min. 19Mpa.
- ✓ Resistant to the effects of moisture, salt water, various acids and bases Solvent.
- ✓ As per customer request, the external protective casing can be made of Galvanized or GRP.

HDPE JACKET PIPE, PE 100 AS PER EN 253 (DIMENSIONS)

Outer Diameter (mm)	Wall Thickness (mm)
125	2.5
140	3.0
160	3.0
180	3.0
200	3.2
225	3.5
250	3.9
280	4.4
355	5.6
400	6.3
450	7.0
500	7.8
560	8.8
630	9.8
800	12.5

NOTE: Sizes up to 1600 mm at different specifications are available upon request.

Pipe **Insulation**

Thermal Insulation Material

RIGID POLYURETHANE FOAM

Rigid polyurethane foam is one of the most effective practical thermal insulation materials known, whether used in buildings, domestic refrigerators or on Pre-Insulated pipes. The combination of small unconnected closed cells, each containing a low conductivity gas, reduces the flow of heat. Compared with most other insulations, rigid polyurethane's performance throughout the life of a Pre-Insulated piping system provides long term economy, in both cost savings and energy conservation.

METHOD OF INSULATION

High Pressure Injected Foam - It is directly injected to fill the annular space between the core & Jacket.

Polyurethane insulation foam fills the space between the service pipe and the outer protective jacket have the following characteristics:

- ✓ Coefficient of thermal conductivity less than 0.033 W/mk.
- ✓ Density of the foam - 40 kg/m^3 - 80 kg/m^3.
- ✓ Compressive strength in the radial direction at 10% deformation min 0.30 Mpa.
- ✓ Resistance to shear 0.26 MPa.
- ✓ Flammability class is according to DIN 4102 B3.
- ✓ Foam is non-toxic.

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Core **Pipes**

Our Products

STEEL CORE PIPE

STEEL CORE PIPE DIMENSION			HDPE JACKET PIPE DIMENSION		PIPE INSULATION	BARE LENGTH	UNIT LENGTH
Nominal Diameter	DN Designator	Outside Diameter	Outside Diameter	Wall Thickness	Insulation Thickness	The Length of Weld Making Place	
DN (inch)	(mm)	d (mm)	D (mm)	T (mm)	(mm)	S (mm)	L (m)
½"	15	21.3	-	-	-	-	-
¾"	20	26.7	125	2.5	46.65	150	5.8 / 6 / 12
1"	25	33.4	140	3.0	50.30	150	5.8 / 6 / 12
1¼"	32	42.2	140	3.0	45.90	150	5.8 / 6 / 12
1½"	40	48.3	160	3.0	52.85	150	5.8 / 6 / 12
2"	50	60.3	180	3.0	56.85	150	5.8 / 6 / 12
2½"	65	73.0	180	3.0	50.50	150	5.8 / 6 / 12
3"	80	88.9	200	3.2	52.35	150	5.8 / 6 / 12
4"	100	114.3	225	3.5	51.85	150	5.8 / 6 / 12
5"	125	141.3	250	3.9	50.45	150	5.8 / 6 / 12
6"	150	168.3	280	4.4	51.45	150	5.8 / 6 / 12
8"	200	219.1	355	5.6	62.35	150	5.8 / 6 / 12
10"	250	273.0	400	6.3	57.20	150	5.8 / 6 / 12
12"	300	323.8	450	7.0	56.10	150	5.8 / 6 / 12
14"	350	355.6	500	7.8	64.40	150	5.8 / 6 / 12
16"	400	406.4	560	8.8	68.00	150	5.8 / 6 / 12
18"	450	457.2	630	9.8	76.60	150	5.8 / 6 / 12
20"	500	508.0	630	9.8	51.20	150	5.8 / 6 / 12
24"	600	609.6	800	12.5	82.70	150	5.8 / 6 / 12
36"	900	919.06	1100	12.5	77.97	150	6 / 12
40"	1000	1019.04	1200	12.5	77.98	150	6 / 12

NOTE: Sizes up to 60" at different specifications are available upon request.

Core **Pipes**

Our Products

HDPE CORE PIPE

HDPE CORE PIPE DIMENSION (ISO 4427)			HDPE JACKET PIPE DIMENSION		PIPE INSULATION	BARE LENGTH	UNIT LENGTH
Nominal Diameter	Minimum Wall Thickness		Outside Diameter	Wall Thickness	Insulation Thickness	The Length of Weld Making Place	
DN (inch)	(mm)		D (mm)	T (mm)	(mm)	S (mm)	L (m)
	SDR 17 PN 10	SDR 11 PN 16					
20	-	2.0	75	2.1	25.4	150	6/12
25	-	2.3	90	2.3	30.2	150	6/12
32	2.0	3.0	90	2.3	26.7	150	6/12
40	2.4	3.7	110	2.4	32.6	150	6/12
50	3.0	4.6	125	2.5	35.0	150	6/12
63	3.8	5.8	160	3.0	45.5	150	6/12
75	4.5	6.8	180	3.0	49.5	150	6/12
90	5.4	8.2	200	3.2	51.8	150	6/12
110	6.6	10.0	225	3.5	54.0	150	6/12
125	7.4	11.4	250	3.9	58.6	150	6/12
140	8.3	12.7	250	3.9	51.1	150	6/12
160	9.5	14.6	280	4.4	55.6	150	6/12
180	10.7	16.4	300	4.9	55.1	150	6/12
200	11.9	18.2	315	5.2	52.3	150	6/12
225	13.4	20.5	355	5.6	59.4	150	6/12
250	14.8	22.7	400	6.3	68.7	150	6/12
280	16.6	25.4	400	6.3	53.7	150	6/12
315	18.7	28.6	450	7.0	60.5	150	6/12
355	21.1	32.2	500	7.8	64.7	150	6/12
400	23.7	36.3	560	8.8	71.2	150	6/12
450	26.7	40.9	630	9.8	80.2	150	6/12
500	29.7	45.4	630	9.8	55.2	150	6/12
560	33.2	50.8	710	12.5	62.5	150	6/12
630	37.4	57.2	800	12.5	72.5	150	6/12

NOTE: Sizes up to 1200 mm at different specifications are available upon request.

Leak **Detection System**

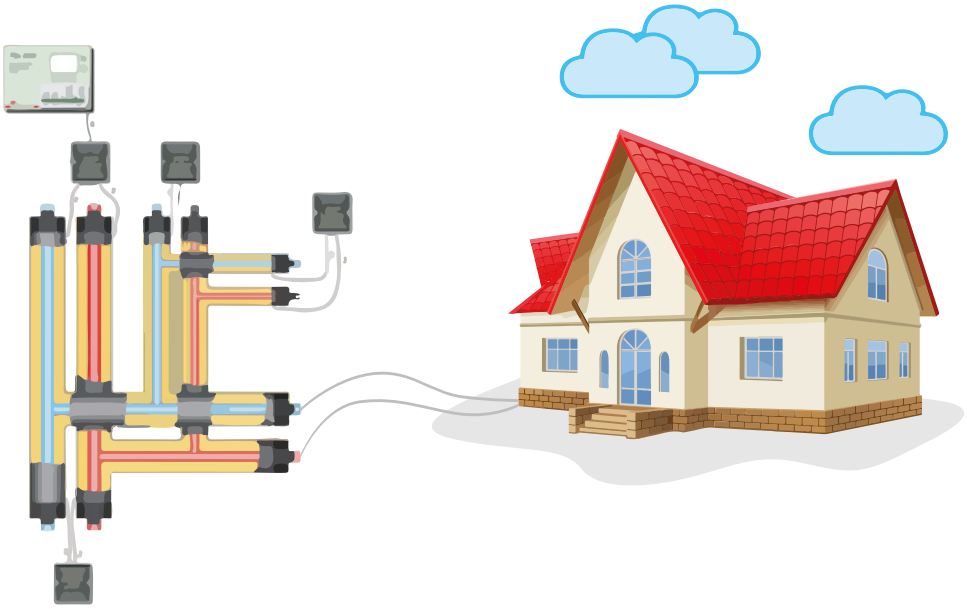
To Monitor the Piping System

APPLICATION OF LEAK DETECTION SYSTEM

NAFFCO Flow Control provides most advanced system to monitor, detect & locate water in Pre-Insulated piping system.

The monitoring system consists of:

- ✓ Direct assembly near to the media pipes.
- ✓ An alarm unit.
- ✓ Monitoring software.



In line with an all bigger expansion of district cooling systems, with insulated pipes, a unique alarm system with cable will eliminate the problems that other systems with conventional un-insulated alarm wires are afflicted with. It is intended to be used in district cooling pipes with steel or plastic as media pipe.

The exactly parallel cable wires give the same impedance along the cable length which facilitates leak search and detection of wet insulation and water faults.

At the production of district cooling pipes and fittings the cable is assembled directly close to the media pipe - a fast and simple handling. Also in field joints the cable shall be located directly against the media pipe.

The special design of the cable permits that impedance changes from wet insulation, of certain size can be detected, although the cable is insulated along the whole cable length.

ADVANTAGES OF LEAK DETECTION SYSTEM

- ✓ Minimizes condense problems in pipes and fittings
- ✓ Fast installation in the production stage
- ✓ Can be used to both steel - and plastic pipes
- ✓ Easy to assemble and connect in the field
- ✓ Constant distances between wires in the cable
- ✓ Facilitates fault detection in fields

Jointing & Protection

Fusion & Machine Blasting

FIELD JOINTS

NAFFCO Flow Control provides thermo-shrinkable joints for protection of pipe joints. Thermo-shrinkable joints are made from high density polyethylene HDPE, and were carried out fully in accordance with European standard EN 489.

Diameters of the shells are made from Ø90 mm to Ø630 mm. Shells lengths are performed by contemporary standards and customer demand of 500 mm, 600 mm and 700 mm.

BLASTING OF STEEL PIPES

Mechanical blasting of steel pipe to the surface level of cleanliness Sa 2.5 per DIN 18 364, DIN 55928 Part 4, ASTM T. 2200-67.

Blasting covers diameters from Ø26 to Ø800. Length of pipe that can be blasted is up to 12 m.






Storage & **Handling**

Rules & Regulations

Pre-Insulated piping system has been engineered for rugged application. However, certain precautions shall be taken during normal handling operations.

UNLOADING

Materials shall be unloaded carefully with cranes and using Nylon straps or similar materials, to ensure enough protection for the outer casing (as per attached figures). Steel wires and chain are not recommended to be used in direct contact with the outer casing. Also, steel hooks are not to be used for lifting pipes at their ends, in case they might damage the bevelled or grooved ends.

Pipes should never be dropped on to hard or uneven surfaces

Pipes should never be dragged or rolled along the ground

Pipes should never be thrown from vehicles

Metal chain or hooks should never be used

Pipes should never be stored near sharp objects

TRANSPORTATION

- ✓ Vehicle transporting pipes should have a flat bed, which includes supports that should be free from sharp edges or projections.
- ✓ Pipes should be evenly supported over their full length and not overhang the vehicle by more than I meter.
- ✓ Where different sizes of pipes are to be transported together then larger diameter pipes should be loaded first with the vehicle having side supports at no longer than 1.5 meters intervals.
- ✓ All support should be free from sharp edges.

Storage & **Handling**

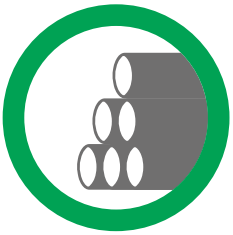
What We Offer

STORAGE

Prior to installation, SHIELD Pre-Insulated pipes & fittings shall be kept safely in a dry place, raised off the ground by at least 0.1m on a compact stone - free sand bed or on wooden sleepers.

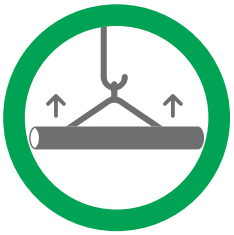
Wooden sleepers shall be placed at intervals no greater than 2.0m. Their width will depend on the maximum height of the stack. At no time, stack height shall exceed 2.0m or 6 stacked pipes of medium or small diameter, whichever is less.

Field joint insulation kit materials, such as shrink sleeves and foam chemicals shall be stored in an air conditioned space. SHIELD Pre-Insulated pipes & fittings with UPVC or HDPE outer casing shall not be exposed to direct sunlight for a long period. It is recommended that they shall be covered with a light coloured Polyethylene cover or canvas in a well vented place, to reduce the effect of the sun's ultra violet rays.



Pipes should be stored properly on flat ground or pallet

Always store pipes/fittings away from intense heat



Use non-metal slings when handling pipes (e.g. nylon or polypropylene)

Never place pipes/fittings near oil or other greasy materials

Pipes should never be stored more than 2 meters or 6 stacks high

Never store dissimilar size pipes together

PROTECTION FROM ULTRA-VIOLET

This is recommended that pipes should be protected from direct sunlight. External jacket is UV protected.

A First-in, First-out stock rotation system of pipes & fittings usage should be adopted Pipes should be kept under cover at all time during storage.

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HVAC for **Aboveground**

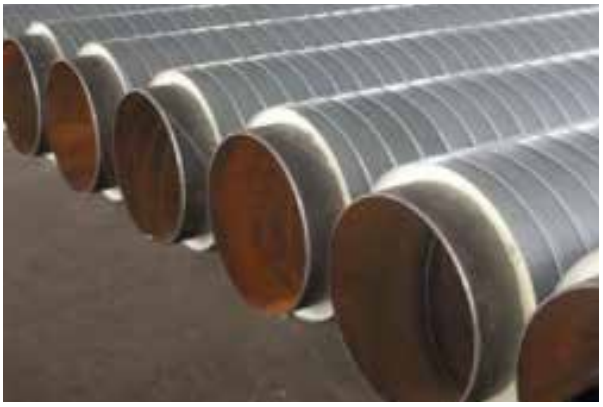
Pre-Insulated Pipes for Aboveground Corridors

APPLICATION RANGE

Product Application	: Heating supply, Cooling supply, Anti-corrosive in the field of crude oil transportation & Thermal insulation pipeline engineering
Medium Temperature	: ≤ 120°C (accidental peak < 140°C)
Medium Pressure	: ≤ 2.5 MPa
Laying Mode	: It is mainly used for overhead laying of intergrated pipe gallery

PRODUCT ADVANTAGES

- ✓ The prefabricated overhead type metal protective layer polyurethane insulation pipe is the preferred product of the comprehensive pipe corridor and the overhead laying, which is convenient and fast to install.
- ✓ The metal protective layer can be made of galvanized iron coating, stainless steel, aluminum strip and other different materials. It has strong corrosion resistance and mechanical strength.
- ✓ The polurethane insulation layer is made of polyurethane raw material with combustion property B1 (refractory). Its high fire resistance solves the hidden danger of safety in the laying of integrated pipe gallery and it' s heat preservation performance is advantageous. Long-term operation can save a lot of energy and significantly reduce energy cost.
- ✓ The production line overhead polyurethane insulation pipe in domestic, the process technology and the forming equipment are independently developed by our company.
- ✓ Has extremely strong water-proof, corrosion-resistant capability and can not cause the overall impact of the overhead pipe as a whole due to rain or other severe enviroments.



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