

InsulthermTM

PRE-INSULATED PIPE SYSTEMS



TECHNICAL SUBMISSION

STREAM PE100

In a large number of projects, major benefits can be achieved by using the Insultherm pre-insulated pipe system. The insulation, with it's low density and high closed cell rate has relatively low thermal conductivity, along with this, it also has good self extinguishing properties therefore providing you an option with which you can rest assured.

INSULTHERM CAN BE USED FOR TRANSPORTING EITHER ABOVEGROUND OR UNDERGROUND

- Drinking water
- Waste water
- Cooling water
- Hot water
- Condensate
- Chemicals
- Gases
- Air heating/cooling

YOUR CHOICE OF INTERNAL PIPE

- Dynatherm PP-RCT
- Stream PE100
- Primed Steel
- Copper

ENERGY SAVING

- Half the thickness of mineral wool
- More energy efficient.

NO MAINTENANCE COSTS

- Maintenance free
- 100% watertight
- 100% corrosion protected.

QUALITY ASSURED

- Manufactured under carefully monitored factory conditions
- Consistent procedures and controlled conditions throughout manufacture
- No reduction in quality due to site conditions or remoteness.

REDUCED SITE COSTS

- Quick, problem-free installation
- Less disruption of operations
- Doesn't rely on highly skilled installers.

UV RESISTANT

- The outer pipe is black high density polyethylene, which is 100% UV resistant.

INCREASED SURFACE STRENGTH

- High strength casing
- Self supports on casing.

FITTINGS AVAILABLE

Elbows, Tees, Reducing Tees, Flanges, Off-sets. Custom fittings can be supplied, e.g. flanged tees.

UPG SERVICE & TRAINING

Our technicians offer full service in all phases of a project from initial planning to commissioning. After sales service, including training of fitters is an integral part of UPG's services. Our training courses can be arranged onsite - NZ wide.

TALK TO OUR HELPFUL TEAM TODAY ABOUT YOUR INSULATED PIPE REQUIREMENTS.



INSULATION TECHNICAL DATA

- Thermal conductivity: 0.023 W/mK
- Compressive strength: 150 kPa
- Density: 32-35 kg/m³
- Closed cells: 90-95%
- System temperature range: -10°C to 90°C
- Standard pipe lengths: 4mt, 6mt or 8mt
- Dimensional Stability
 - 24 hrs @ 100°C - 1 to 5%
 - 24 hrs @ -40°C - 0%
 - 24 hrs @ 70°C/100% RH - 0 to 5%
- Water Absorption: (23°Ckgs/m²) 0.49
- Water Vapour Permeability: 1.8 (Perm-in ASTM C-355 @ 23°C)

Thickness of insulation is specified at design stage

PROPERTIES AND SUSTAINABILITY OF POLYURETHANE FOAM

Polyurethane rigid foams have a closed cell structure and high cross-linking density give them the characteristics of good heat stability, high compressive strength and excellent insulation properties. PU insulation has a very low thermal conductivity, starting from as low as 0.017W/m.K, making it one of the most effective insulants available today for a wide range of applications. All types of insulation can also play a role in improving the energy efficiency of buildings and reducing CO2 emissions.

The environmental impact Polyurethane offers is as follows:

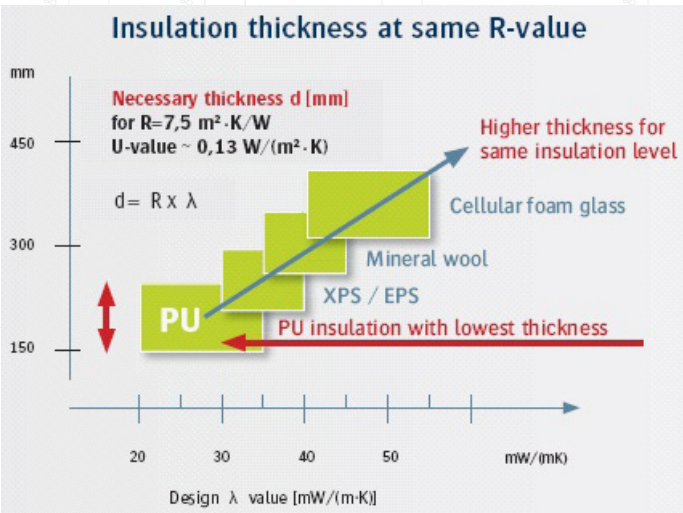
- Excellent thermal efficiency – leading to optimum energy savings and reduced CO2 emissions.
 - Relatively low environmental impact at the building level – the product saves more than 100 times the energy than is used in its manufacture.
 - Durability – leading to long term performance and reducing the need for replacement, therefore saving energy.
- The economic impact from polyurethane is:
- Increased energy efficiency – leading to immediate savings for the end user.

TYPICAL VALUES OF INSULATING MATERIALS ARE:

MATERIAL	DENSITY (KG/M³)	K-FACTOR (W/MK)
Polyurethane foam closed cell	32	0.023
Polyurethane foam open cell	10-12	0.035
Polystyrene foam	16	0.035
Rockwool	100	0.037
Glasswool	65-160	0.041
Timber – white pine	350-500	0.112

Insulation with the above k-factor of 0.023 would give an estimated R-value of 2.17 m² K/W @50mm thickness.

The following graph shows the thickness of insulation materials needed to get an R-value of 7.5 m² K/W with standard PU foam. As seen, PU offers the best insulation at lowest thickness.





TECHNICAL SPECIFICATION FOR STREAM PE100

MATERIAL PROPERTY	UNIT	COMMENTS
Standards	NZS 4130 / NZS 4129	
Density	0.951 – 0.957 g/cm3	
Tensile Strength	25 Mpa	
Modulus of Elasticity	1100 Mpa	
Thermal Conductivity	0.4 W/Mtr k	
Pipe Friction Factor	0.007	
Pressure Class	16 or 10 Bar	See below table

PERMISSIBLE OPERATING PRESSURE RATINGS OF STREAM PE100

TEMPERATURE (°C)	SDR 11 WITH 50 YEAR OPERATING LIFE (BAR)	SDR 17 WITH 50 YEAR OPERATING LIFE (BAR)
0	25.60	16.00
5	22.40	14.00
10	20.80	13.00
15	18.40	11.50
20	16.00	10.00
25	16.00	10.00
30	15.00	9.40
35	14.30	8.90
40	13.50	8.40
45	12.70	8.00
50	10.05	7.20
55	9.60	6.00
60	8.00	5.00

PE100 SDR11 & SDR17 DIMENSIONS

PIPE NB (MM)	PIPE OD (MM)	PIPE ID (MM)	SDR	HDPE OUTER JACKET	INSULATION THICKNESS
15	20	14.2	7.4	75	24.5
20	25	20.2	11	75	22.0
25	32	26.0	11	90	25.5
32	40	32.3	11	90	21.5
40	50	40.4	11	110	25.7
50	63	50.9	11	125	26.1
65	75	60.9	11	160	36.3
80	90	72.9	11	160	28.8
80	90	78.8	17	160	28.8
80	110	89.3	11	200	38.8
100	125	101.4	11	200	31.3
125	160	129.9	11	250	37.2
125	160	129.9	11	315	67.7
150	160	140.6	17	250	37.2
150	180	146.2	11	250	27.2
150	180	158.2	17	280	41.4
150	180	158.2	17	315	57.7
200	250	203.2	11	355	41.7
200	225	197.6	17	315	35.2
200	225	197.6	17	355	54.2
250	315	256.1	11	400	30.2
250	280	246.2	17	400	47.7
300	355	288.7	11	450	36.3
300	355	288.7	11	500	57.2
300	355	312.0	17	450	36.3
300	355	312.0	17	500	57.2

JOINTING METHOD

The inner pipe is to be fused together with UPG's Insulfusion coupler. The ends of the pipes are simply inserted into the coupler which is then electrofused using an electrofusion welder unit.

The outer jacket matches the material and OD of the pipe and you simply just have to heat shrink the joint as is normally carried out to waterproof the joint.

Fittings are to be short pre-insulated spigot fittings and jointed with Insulfusion couplers each side.



The bed of the trench where the pipe is to be laid must be completely flat and should be free from stones >20mm or sharp objects.

The pipe bedding material needs to be a minimum of 10cm of sand to provide a continuous support along the whole length of the pipe. The first 15-20cm of cover over the pipe should be of the same material. The cover must be compressed to prevent pipe movement. Sand compacting should be carried out immediately after the pipe has been covered.

If two or more pipes are to be laid in the same trench, they should not come into contact. A distance of 10 to 15 cm should be left between the two pipes to ensure the required compaction and support of the side support material is achieved.

This space should be filled with sand and compacted on both sides at the same time.

For calculation the following indications in Figures 7 to 9, the official guidelines, standards and regulations should be observed.

Standard cover including sand and backfill should be minimal 450mm (Figure 7).

In trafficable areas, this should be increased to 800mm (Figure 7).

In trafficable areas where the total cover is less than 800mm but more than 450mm it is recommended to cover the layer of sand with light concrete casting in order to evenly distribute the ground pressure (Figure 8).

In trafficable areas where the total cover is less than 450mm, encase the pipe in concrete (Figure 9). Here the behaviour of the pipeline will be rigid and will not undergo deformations; whereas Figures 7 and 8 represent flexible installations.

Figure 1 Light Traffic

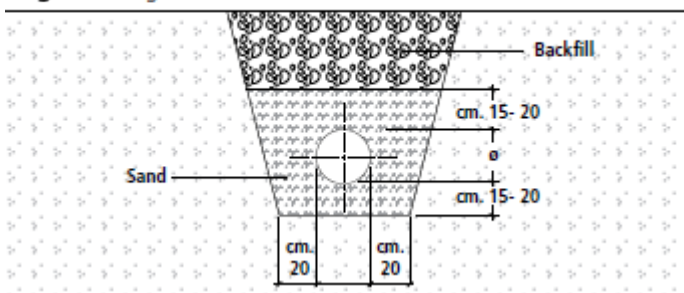


Figure 2 Heavy Traffic

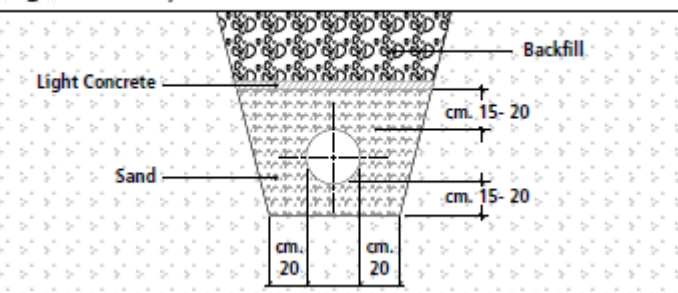
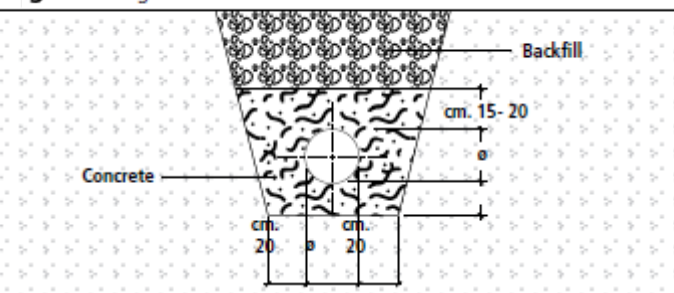


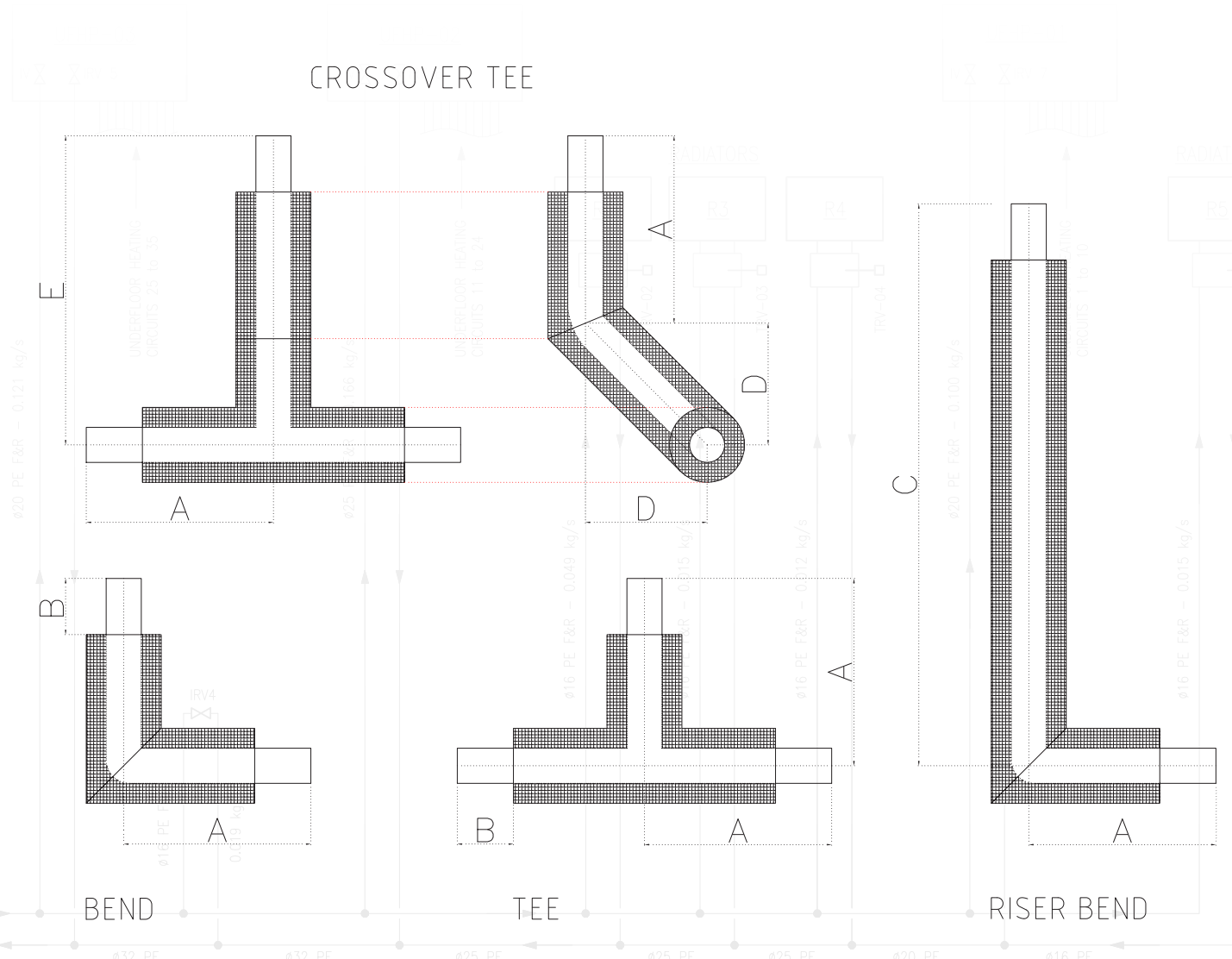
Figure 3 Rigid Installation



EXPANSION CONTROL

Where the air temperature is hotter or colder than the ground temperature, pipe lengths will contract or expand in length on adjustment to ground temperature. Keep the pipes covered from sunlight to help reduce contraction. The rate of expansion / contraction is about 0.1mm / Mtr / °C.

Once the pipework is stabilised, the compacted ground restricts any pipe movement. The pipework is further stabilised by the insulation and HDPE jacket and any expansion/contraction through temperature changes of the fluid is taken up through the wall of the pipe expanding/contracting inwards rather than linear.



DIMENSIONS	A	2x Jacket OD + B
	B	120mm
	C	1200mm
	D	Jacket OD + 100mm
	E	A + D

*Measurements are customisable.



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