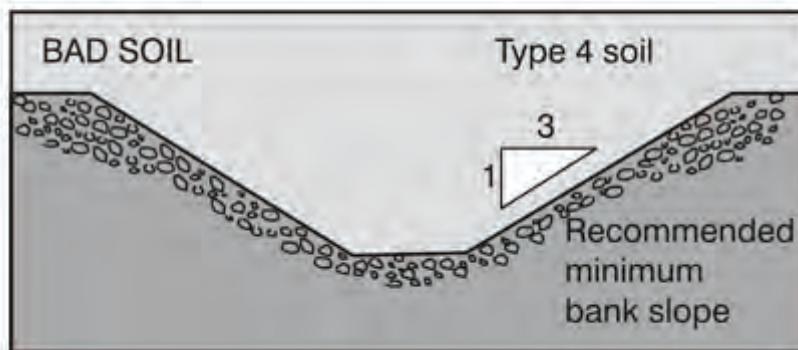


# Water and Sewer Mains

The use of Urecon shallow buried pre-insulated pipe can result in a substantial reduction of excavation costs and may permit earlier project completion. U.I.P.® pre-insulated pipe can be installed in the active frost zone (with low wattage electric tracing if necessary) and resist freezing. The use of Urecon pre-insulated pipe has permitted hundreds of northern communities to obtain year round piped potable water, resulting in major social and health benefits. Savings are greatest when rock is encountered as it is far less expensive to pre-insulate and shallow bury water and sewer pipes than to blast and deep bury in rocky conditions.

In sandy or poor soil conditions, experience has shown that a considerable width to depth ratio is often required for excavation to permit conventional burial of pipelines below the frost zone. A Urecon pre-insulated pipe system, shallow buried (with low wattage electric tracing if necessary) could result in the excavation of one tenth the earth volume otherwise required. Substantial cost savings are thus realized and the danger to workers in deep trench conditions is avoided.



A 3 m (9.8 ft) deep trench in type 4 soil, requires an excavated width at grade of 18 m (59 ft) to provide worker safety.

A 1 to 3 wall slope is required when excavating in type 4 soil conditions. Type 4 soil is defined as: soil that can be excavated with no difficulty using a hydraulic backhoe. The material will flow very easily and must be supported and contained to be excavated to any significant depth.

With its high moisture content, type 4 soil is very sensitive to vibration and other disturbances which cause the material to flow. Typical type 4 material includes muskeg or other organic deposits with high moisture content, quicksand, silty clays with high moisture content, and leta clays. Leta clays are very sensitive to disturbance of any kind. (Source: "Trenching Safety", Construction Safety Association of Ontario).







# **URECON**

**PRE-INSULATED PIPE**

QUALITY



SERVICE



INNOVATION

[urecon.com](http://urecon.com)

ISO 9001 Registered



# Urecon

**Urecon** has been factory insulating pipe with polyurethane foam using the patented U.I.P.<sup>®</sup> process since 1973 in Saint-Lazare, Quebec and 1981 in the Calmar, Alberta facility. The U.I.P.<sup>®</sup> system may be applied to virtually any size and type of core pipe with or without heat trace conduit(s). A full range of outer jackets is available for the product line to suit almost every application.

■ From the Arctic Circle to Antarctica, Urecon is the name synonymous with superior quality and guaranteed void free pre-insulated piping systems. Our systems are manufactured to meet the most rigid quality standards required for projects exposed to the extreme climates of the far north. These identical stringent standards are applied to the piping systems produced for the more benign latitudes of the Caribbean and those in between; thus insuring a level of quality unsurpassed in the industry.

## Applications

- Municipal freeze protection
  - Water and sewer mains
  - Service connections
  - Bridge crossings (1)
- District heating and cooling (2)
- Steam and condensate return
- Outdoor wood furnace and solar hydronic heating
- Mine intake, tailings and reclaim (3)
- Snow melt systems
- Cryogenic systems
- Chemical feed and temperature maintenance
- Industrial process (4)



1 • Elizabeth, CO



2 • Logstor EN253  
Sudbury District Energy  
Sudbury, ON



3 • North American Palladium  
Lac des Iles, ON



4 • DaimlerChrysler  
Windsor, ON

# Urecon

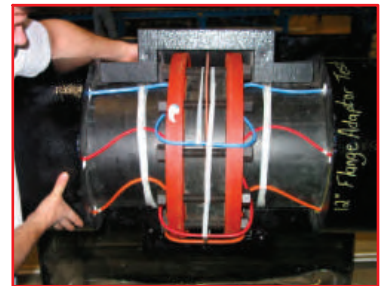
## Products and Services

- System design assistance
- Urecon's U.I.P.<sup>®</sup> insulation systems to 149 °C ( 300 °F) (5)
- Wide range of outer jackets, including
  - Counter wound polyethylene
  - Extruded PE casing
  - Spiwrap<sup>®</sup> spiral wound galvanized steel or aluminum
  - Extruded white PVC casing
  - FRP casing
  - Banded aluminum, galvanized or stainless steel
- Custom specialty jackets available
- Insulation kits custom made to suit all fittings for each of our systems (6)
- Heat Tracing Systems, including Urecon's constant watt Thermocable<sup>®</sup>
  - Series cable
  - Self-regulating cable
  - Mineral insulated cable
  - Electronic and mechanical thermostats (7)
- High temperature composite insulation systems
- Portable foam kits
- Mec-Seal<sup>®</sup> and Slipjoint specialty insulation joint kits
- EN253 District heating systems from Logstor\* (8)
- Flexible systems from Logstor\*
  - PEX-Flex (9)
  - Cu-Flex
  - Steel-Flex

\* Urecon is Logstor's agent for North America; they are one of Europe's largest, most experienced and most respected factory-insulated piping system manufacturers. For more information visit their website @ [Logstor.com](http://Logstor.com)



5 • URECON's U.I.P.<sup>®</sup> insulation system



6 • Flange insulation kit



7 • Electronic and mechanical thermostats



8 • EN253 District heating systems



9 • PEX Flex installation





# Performance Specs

## TEMPERATURE GAIN COMPARISON\* FOR CHILLED WATER

NOMINAL PIPE DIAMETER (I.P.S.)		FLOW RATE		PIPE AMBIENT TEMPERATURE @ 40.6 °C (105 °F)								PIPE AMBIENT TEMPERATURE @ 21.1 °C (70 °F)							
				FINAL TEMPERATURE†				HEAT GAIN		HEAT GAIN		FINAL TEMPERATURE†				HEAT GAIN		HEAT GAIN	
				NO INSULATION		37 mm (1.5 in) U.I.P.®		NO INSULATION		37 mm (1.5 in) U.I.P.®		NO INSULATION		37 mm (1.5 in) U.I.P.®		NO INSULATION		37 mm (1.5 in) U.I.P.®	
				°C	°F	°C	°F	watts/m	btu/hr/ft	watts/m	btu/hr/ft	°C	°F	°C	°F	watts/m	btu/hr/ft	watts/m	btu/hr/ft
25	1	3.9	15	17.8	63.8	5.3	41.4	54.4	56.6	5.2	5.4	10.4	50.6	4.6	40.1	25.4	26.4	2.4	2.5
50	2	6.5	25	13.1	55.0	4.9	40.7	59.3	61.7	6.0	6.3	8.2	46.6	4.4	39.8	27.7	28.8	2.8	2.9
75	3	18	70	7.5	45.3	4.4	39.8	64.6	67.2	7.8	8.1	5.6	41.9	4.2	40.0	30.2	31.4	3.6	3.8
100	4	30.8	120	6.3	43.1	4.3	39.5	71.1	73.9	9.4	9.7	5.1	40.9	4.1	39.3	33.2	34.5	4.4	4.6
150	6	69.4	270	5.2	41.1	4.2	39.3	81.6	84.8	12.5	13.0	4.5	40.0	4.1	39.2	38.1	39.6	5.8	6.1
200	8	115	450	4.8	40.4	4.1	39.2	89.2	92.8	15.3	15.9	4.6	39.6	4.1	39.1	41.7	43.4	7.2	7.5

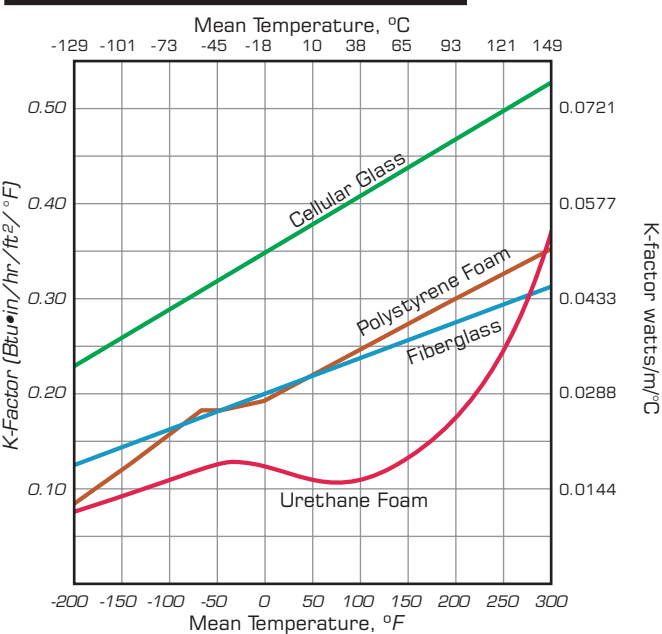
\*Calculations are based on a 4 °C (39 °F) inlet, 1000 m (3281 ft.) long pipe run. †AT END OF PIPE RUN

## TIME TO FREEZE AND HEAT LOSS FOR U.I.P.® INSULATED PIPE

NOMINAL PIPE DIAMETER		PIPE AMBIENT 18 °C (0 °F)				PIPE AMBIENT 34 °C (30 °F)			
		TIME TO FREEZE (hr)*		HEAT LOSS w/ 50 mm U.I.P.®		TIME TO FREEZE (hr)*		HEAT LOSS w/ 50 mm U.I.P.®	
		NO INSULATION	50 mm (2 in) U.I.P.®	watts/m	watts/ft	NO INSULATION	50 mm (2 in) U.I.P.®	watts/m	watts/ft
19	3/4	1	15	1.6	0.5	1	8	2.9	0.9
25	1	1	21	1.8	0.5	1	11	3.3	1.0
30	1 1/4	1	38	2.2	0.7	1	20	4.1	1.2
40	1 1/2	1	45	2.4	0.7	1	22	4.4	1.3
50	2	1	62	2.7	0.8	1	33	5.0	1.5
75	3	2	105	3.5	1.1	1	56	6.5	2.0
100	4	4	145	4.2	1.3	2	77	7.7	2.3
150	6	9	235	5.5	1.7	5	125	10.2	3.1
200	8	15	324	6.7	2.0	8	172	12.4	3.8
250	10	23	422	8.0	2.4	12	224	14.7	4.5
300	12	32	516	9.1	2.7	17	273	16.8	5.1
350	14	39	596	9.8	3.0	21	305	18.0	5.5
400	16	51	674	10.9	3.3	27	357	20.0	6.1

• No safety factor included \*assumes initial water temperature of 1.11 °C (34 °F)  
• to convert watts to Btu/hr, multiply by 3.414

## INSULATION MATERIALS COMPARISON



Spawar Nava Base, Southern Ca form a





## DETAILED SPECIFICATION Standard U.I.P.® System

### 1) General

The pipe shall be insulated using the U.I.P.® factory insulation process, as supplied by Urecon Ltd., complete with integral conduit for electric heat trace cable (*if required*) and 1,27 mm (50 mils) to 2.54mm (100mils) black polyethylene jacket with UV inhibitor. The jacket thickness is dependant on the diameter and intended function. The insulation of associated joints, fittings and accessories shall be as per Urecon's recommendations, depending on the size and type of pipe involved. The product shall be manufactured in accordance to ISO 9001-2000 Standards, or approved equal.

### 2) Pipe preparation

Pipe and casing shall be cleaned of surface dust or dirt, if necessary, to insure adhesion of the foam to the pipe and casing surface. The pipe may be treated by sand blasting or the application of a chemical foam-bonding compound to enhance adhesion, as deemed necessary by Urecon and project requirements.

### 3) Heat tracing conduit(s)

Heat tracing conduit(s) shall consist of an extruded molding and shall be applied to the pipe prior to application of the insulation. The conduit(s) will be securely fastened to the pipe to prevent the ingress of foam therein during the insulation process. All conduit(s) shall be checked after insulating to insure they are not plugged. The ends shall be sealed prior to shipping to prevent any foreign material from entering the conduit while in transit or during installation.

### 4) Insulation

- a) Material: rigid polyurethane foam, factory applied.
- b) Thickness: 50 mm (2 in.) or as required.
- c) Density: (ASTM D 1622) 35 to 46 kg/m<sup>3</sup> (2.2 to 3.0 lbs/ft<sup>3</sup>).
- d) Closed cell content: (ASTM D 2856) 90%, minimum.
- e) Water absorption: (ASTM D 2842) 4.0% by volume .
- f) Thermal conductivity: (ASTM C518) 0,020 to 0,026 W/m °C (0.14 to 0.17 Btu • in/ft<sup>2</sup> • hr • °F).
- g) Temperature limitations: Cryogenic to 93°C (200°F)

### 5) System Properties

- a) System compressive strength: (modified ASTM D 1621 with 50 mil jacket) approximately 414 to 552 kPa (60-80 lbs/in<sup>2</sup>), varies with pipe diameter.
- b) Temperature limitations: -minimum ambient installation temperature @ -34°C (-30°F)  
-service temperature approximately -45°C (-49°F)



**DETAILED SPECIFICATION  
Standard U.I.P®. System**

**6) Outer Jacket on Pipe Insulation *with enhanced cold climate handling properties***

The outer protective jacket shall consist of either –

- i.) *Tape wrap system-*** (available from both manufacturing facilities)
  - a) Jacket material: Scapa #366 polyethylene, UV inhibited, specially formulated for superior cold environment properties.
  - b) Sealant: butyl rubber and resin, applied hot in 1.27mm (25 mils) multiple layers providing a shrink tightened waterproof bond throughout its entire length.
  - c) Minimum elongation: (ASTM D 1000) 300%, 6 month test.
  - d) Tensile strength: (ASTM D-1000) 6,83 kg/cm wide (38 lbs/in wide).

**ii.) *Extruded system-***(from Calmar, AB only)

The outer protective jacket on the casing system shall consist of high density polyethylene copolymer black PE, UV inhibited, factory applied as per the following specifications:

- a.) Minimum cell classification 435560A for PE as per ASTM D 3350
- b.) Minimum 2% carbon black, well dispersed
- c.) Density 0.953 gm/cc ASTM D 4883
- d.) Tensile Strength at yield (50 mm(2 in.) /min) 26 MPa (3,700 psi) , ASTM D 638

**Recommended PE Jacket thicknesses for below grade applications-**

Jacket OD	≤ 400 mm (16 in)	@ 1,27 mm (50 mil)
Jacket OD >450mm (18") to	≥ 450 mm (18 in)	@ 1,90 mm (75 mil)
Jacket OD	≥ 600 mm (24 in)	@ 2.54 mm (100 mil)

\*other jacket thicknesses are available upon request

**7) Insulated Pipe Joints**

**a.) Butt-Fused and Welded joints**

Insulated pipe joints shall be completed using pre-fabricated rigid polyisocyanurate or urethane half shells and sealed with the application of suitable wrap around adhesive lined heat shrink sleeves as supplied by Urecon. The heat shrink sleeves shall overlap the insulation jacket by a minimum of 75 mm (3 in) on either side of the joint.

**b) Bell x Spigot Joints**

Insulated pipe joints shall be sealed with a 150 mm (6 in.) wide heat shrink sleeve or butyl mastic tape if the system is not electrically heat traced, 300 mm (12 in.) wide if traced.



## DETAILED SPECIFICATION Standard U.I.P® System

### 8) Insulation kits for fittings.

Insulation kits for fittings shall consist of rigid polyisocyanurate or urethane foam insulation with a fully bonded polymer protective coating on all exterior and interior surfaces, including ends. Kits to be supplied complete with silicone caulking for seams, stainless steel attachment straps and clips, and heat shrink sleeves or butyl mastic tape to seal between pipe and insulation kit.

#### **a) Rigid Polyisocyanurate or Urethane Foam Insulation**

- .1 Density: (ASTM D1622) 27 to 32 kg/m<sup>3</sup> (1.7 to 2.0 lbs/ft.<sup>3</sup>).
- .2 Compressive strength: (ASTM D1621) 131 to 158 kPa (19 to 23 lbs/in.<sup>2</sup>).
- .3 Closed cell content: 90%, minimum.
- .4 Water absorption: (ASTM C272) 4.0% by volume.
- .5 Thermal Conductivity: (ASTM C 518) 0,027 W/m °C (0.19 Btu • in/ft<sup>2</sup> • hr • °F).
- .6 Thickness: to match pipe insulation thickness.

#### **b) Polymer Coating, Urecon BL-75-20EP**

- .1 Two component high density polyurethane coating, black in color.
- .2 Density: 1170 kg/m<sup>3</sup> (73 lbs/ft.<sup>3</sup>).
- .3 Durometer D scale 60.
- .4 Tensile strength: 11,100 kPa (1610 lbs/in.<sup>2</sup>).
- .5 Tear strength: 26,5 N/mm (151 lbs/in.).
- .6 Thickness: 1,9mm (75 mils) outside surfaces, 0,51mm (20 mils) inside surfaces.

### 9 ) Electric Tracing System

The electric tracing system and associated controls shall be as per the manufacturer's recommendations with particular attention being paid to the watt densities applied through conduits on plastic pipes. All tracing cables and related accessories to be CSA approved and comply with CSA heat tracing standard C22.2 No. 130.2-93. Standard of acceptance is Urecon's Thermocable or approved equal. Please contact your Urecon representative for further details and design assistance.

Note: -Physical characteristics are nominal and may vary depending on pipe type and diameter (Revised Sept. 2010).





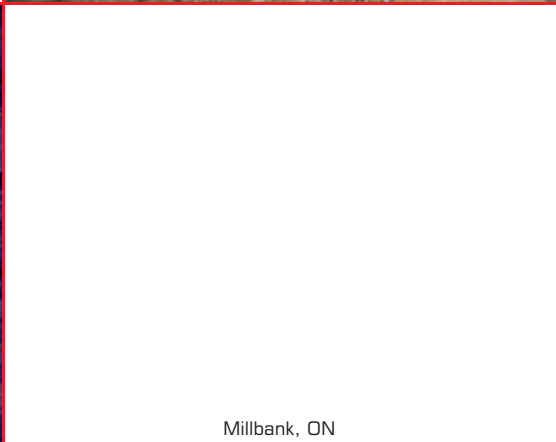
La Tabatière, QC



Les Escoumins, QC



UCSD, La Jolla, CA



Millbank, ON



Queen's University, Kingston, ON



Stowe, VT



Inuvik, NT



Lytton, BC



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