

Uponor

Uponor Meltaway

Snow and ice melting system for outdoor areas





“ Easily predictable snow removal costs with Uponor Meltaway. ”

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Uponor Meltaway design principles

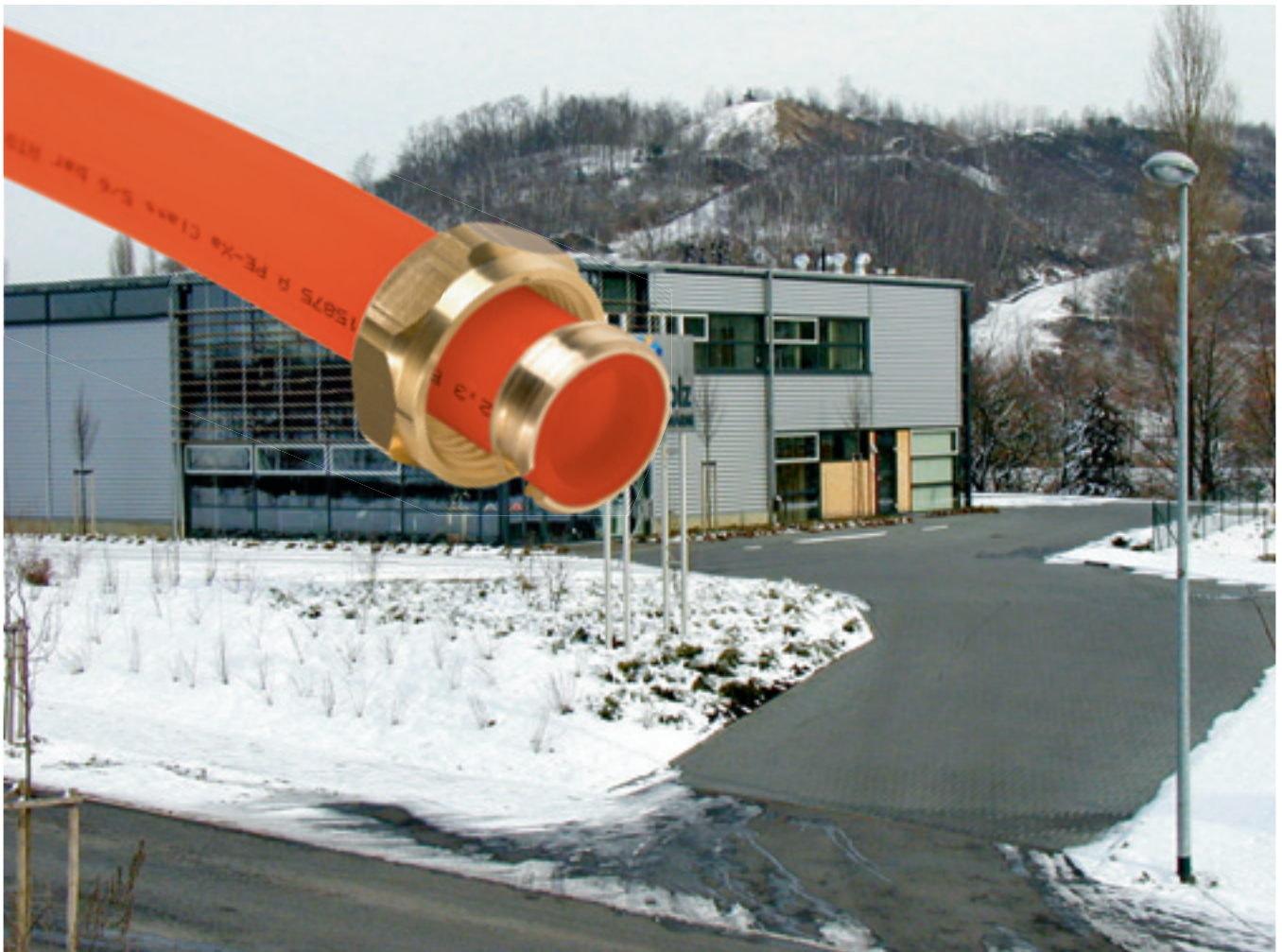
The Uponor snow and ice melting system needs a minimum of +35°C water temperature to function which means that a wide variety of heat sources can be used, including district heating return water, waste heat from various processes, heat pumps, etc. The heat from any suitable source can be transferred through a heat exchanger to the Uponor snow and ice melting system. The basic and easy design consists of Uponor PE-Xa piping with pipe c/c of 250 mm and Uponor Industrial Manifold. Where the Uponor snow and ice melting system differs from an industrial underfloor heating system is that when it functions it is almost always at maximum operating flows and temperatures with really high capacity needs.

Advantages

- Very few system components with only one pipe size
- Simple planning and installation
- Easily predictable snow removal costs

Basic principle

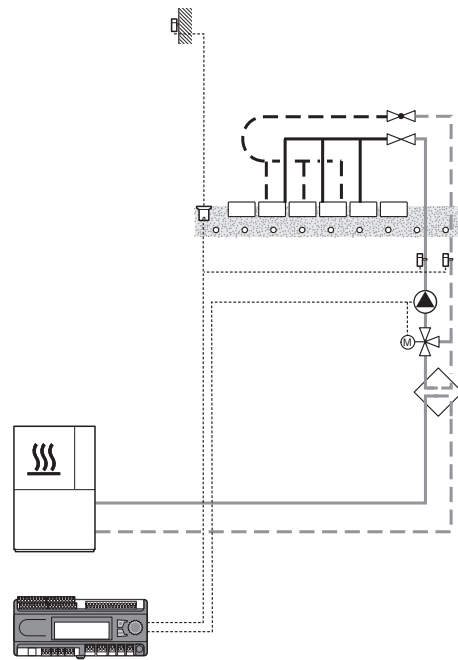
A fundamental principle of the Uponor snow and ice melting system is that all loops from a given manifold should be of equal lengths. The heat will then be distributed evenly, without the use of throttling valves. Distribution pipes should be designed using Uponor's Pre-insulated pipe system for industrial buildings. The pipes have an advantage of having a ready insulation and flexibility to install them either into the ground or to the walls. Uponor snow and ice melting system can be rated for heat outputs ranging up to 350 W per m². The output required is dependent on the geographical location and the requirements of the system. Thanks to our research work and long experience, we can always recommend an optimum output. The depth of installation and the loop centre-to-centre distance are also matched to the relevant system.

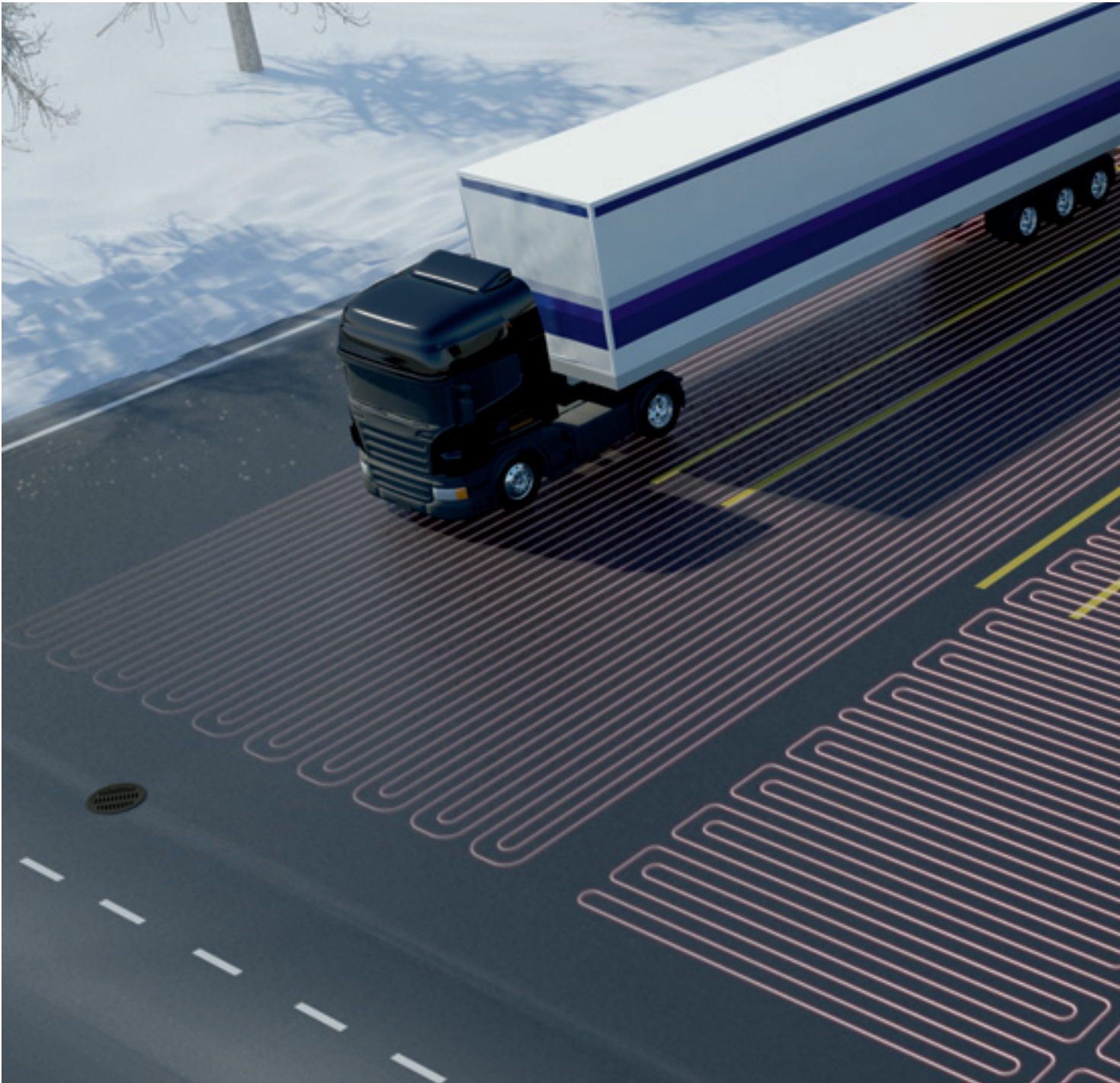


Simplified snow and ice melting scheme

The diagram shows a typical connection for the snow & ice melting system. It is recommended to use a snow and ice detector to achieve better functionality and energy efficiency when using the snow and ice melting system.

“ Heat from any suitable source can be transferred through a heat exchanger to the Uponor Meltaway system. ”

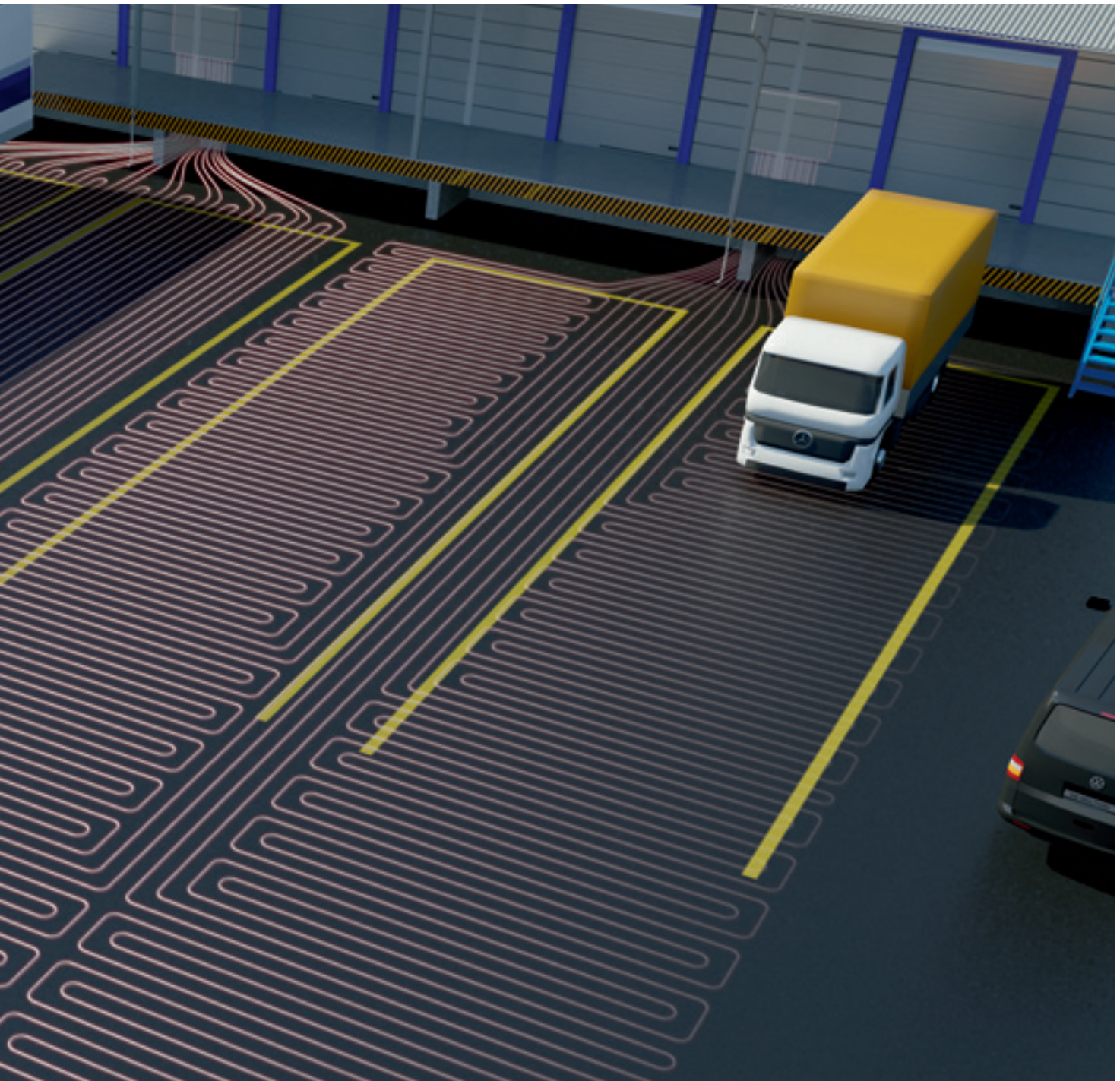




The design

This illustration shows an example of a truck loading area with an Uponor snow and ice melting system design. There are four uniformly sized (160 m²) melting areas designed using two separate manifolds.

The table on the right shows design data and estimated energy consumption data from one of the four uniformly sized melting areas.



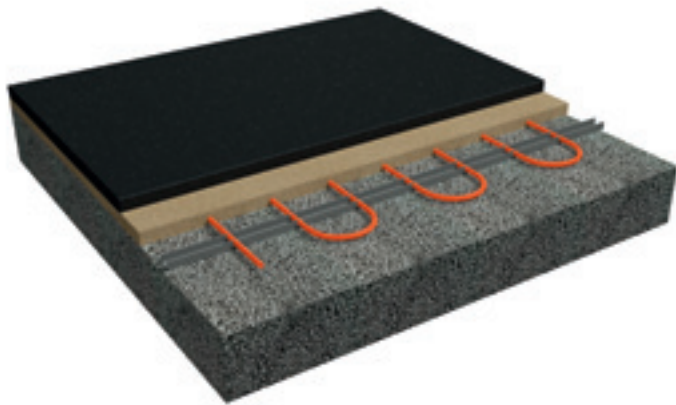
Example of snow and ice melting calculations

Size of the area to be melted	160 m ²
Designed effect of the system	200 W/m ²
Supply water / return water	35/20 °C
Liquid used water / propylene glycol mix	~65/~35 %
Heat conductivity of the liquid	3,8 kJ/kg °C
Amount of snowfall	20 mm/h
Temperature of the environment	-5 °C
Speed of wind	8 m/s
Relative humidity of the air	40 %
Length of snowfall	5 h
Total amount of yearly snowfall in hours	600 h
Total yearly energy used in estimated area for snow & ice melting	26,100 kWh

Adjustable system solution for different structures

The pipe can be covered with asphalt, gravel, sand or can be cast into concrete slab. For surface heating, the pipe should be laid about 100 mm below the finished surface level and at a centre-to-centre distance of 250 mm in order to

ensure an uniform temperature at the surface. Mark the U-bends on site before laying the pipes. Fill the pipes with water and pressurize them before starting surfacing work (internal pressure of 0.2 MPa).

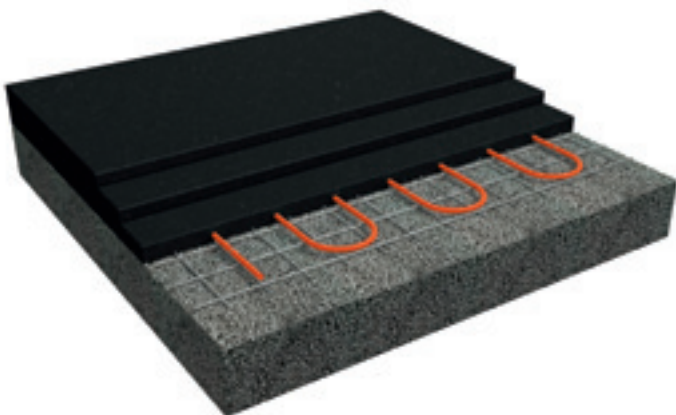
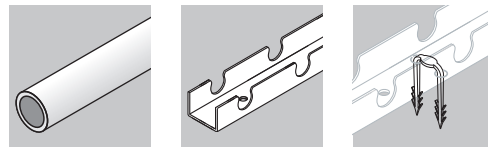


Asphalted surfaces

The picture on the left shows the basic installation of an asphalted structure with low wear. Mainly used for parking areas and low trafficked truck loading areas.

Components

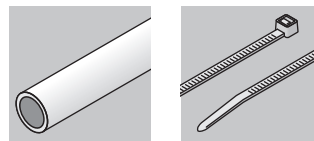
- Uponor PE-Xa pipe
- Uponor PE-Xa Clamp track
- Uponor Clamp track nail



The picture on the left shows the installation of an asphalted structure with high wear. The main usage areas are parking area ramps, high trafficked areas like roads and high truck traffic areas like the roads around logistic centers and so on.

Components

- Uponor PE-Xa pipe
- Uponor Pipe tie



Important note for installation

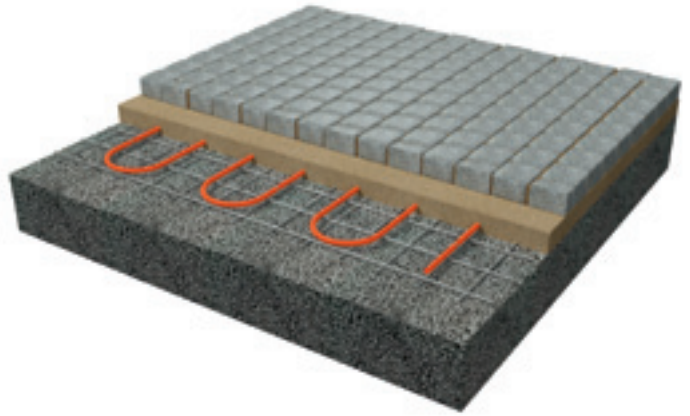
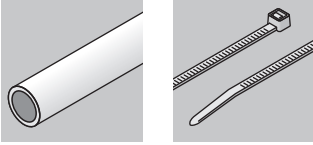
The pipe can be covered with asphalt surfacing at a maximum temperature of 120°C, provided cold water flows through the pipes while the asphalt is being laid, and that the pipe is kept under pressure of 0.2 MPa.

Paving stones

The picture on the right shows the installation of a snow and ice melting system under paving stones. Installation is done using Uponor industrial clamp tracks. The main usage for paving stone areas include pedestrian areas and roads.

Components

- Uponor PE-Xa pipe
- Uponor Pipe tie

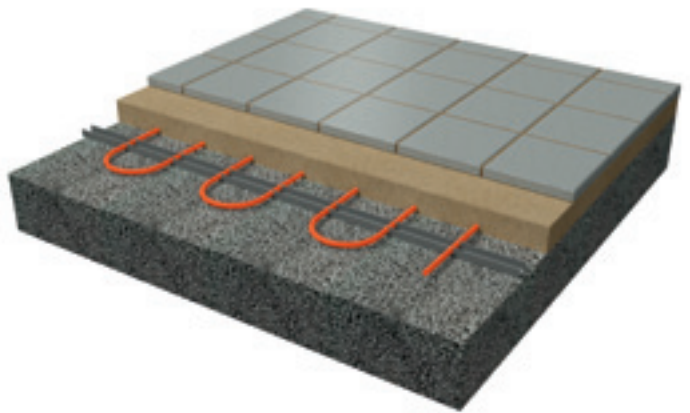
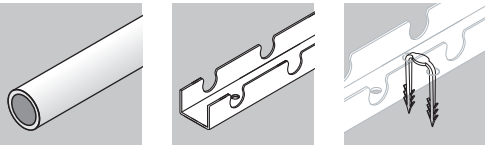


Slab-surfaced pavements and surfaces

The picture on the right shows the installation of a snow and ice melting system under slab surfaced pavements and surfaces. The main usage is for pedestrian areas.

Components

- Uponor PE-Xa pipe
- Uponor PE-Xa Clamp track
- Uponor Clamp track nail

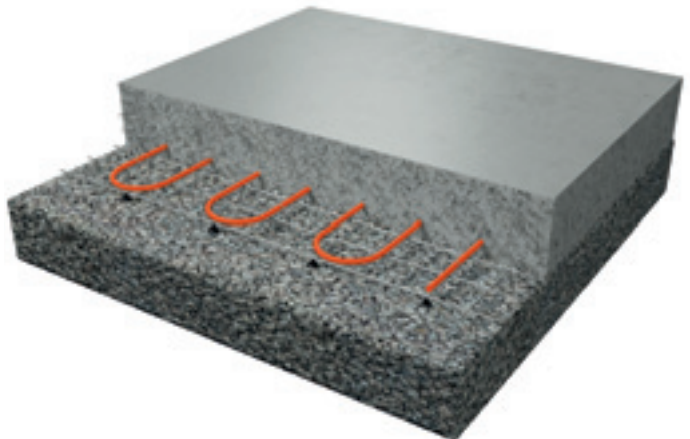
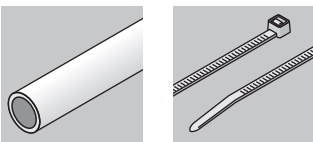


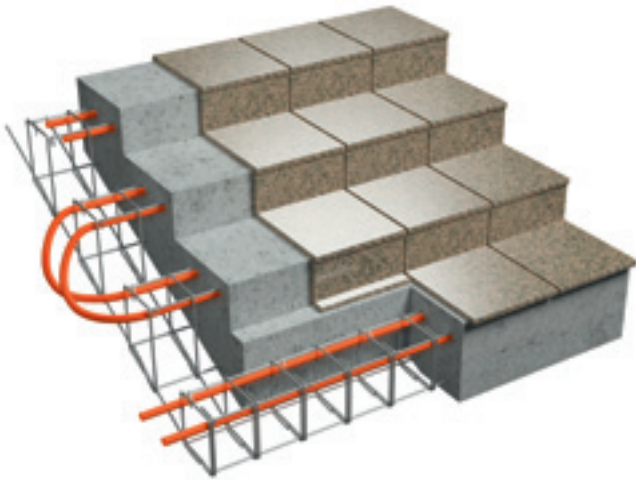
Concrete surfaces

The picture on the right shows the installation of a snow and ice melting system into concrete cast. The actual concrete solution and its height is calculated according to structural requirements. Concrete structures might be used because of high loads - for example, aeroplane hangars. Another reason for using concrete slab can be for walking areas that are tiled instead of laid using paving stones.

Components

- Uponor PE-Xa pipe
- Uponor Pipe tie



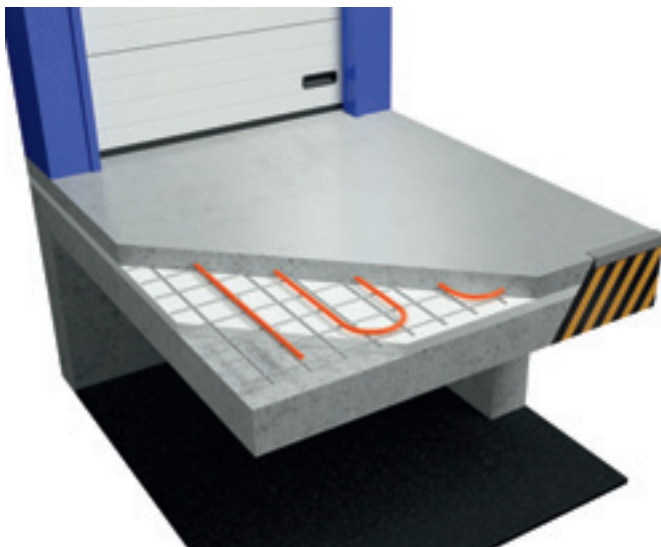
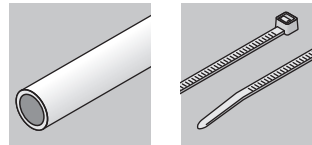


Stairs

The picture on the left shows an example of an Uponor snow and ice melting system and how Uponor PE-Xa pipes can be installed to a steel reinforcement in concrete staircase.

Components

- Uponor PE-Xa pipe
- Uponor Pipe tie

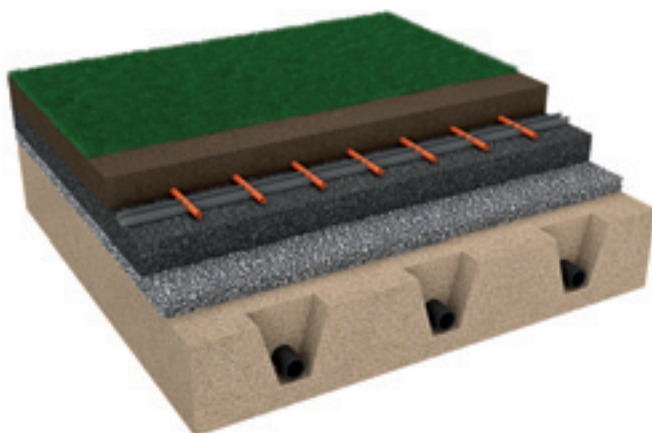
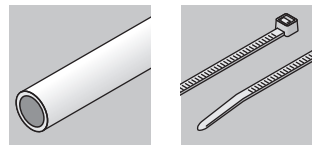


Deck structures

The need for insulation is normally low because of the high temperature difference between the heated surface outdoors and the ground. But when designing deck structures like loading areas or bridges the structure will also cool from underneath. In these cases it is recommended to use insulation in the structure to prevent heat loss downwards.

Components

- Uponor PE-Xa pipe
- Uponor Pipe tie

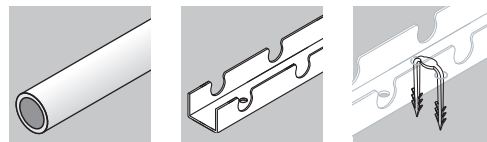


Turf Heating

Uponor turf heating systems are a radiant heating installations that keep the soil of a grass or artificial grass field snow and frost free. Frost free soil provides an ideal playing surface for sports such as football even in adverse weather conditions.

Components

- Uponor PE-Xa pipe
- Uponor PE-Xa Clamp track
- Uponor Clamp track nail



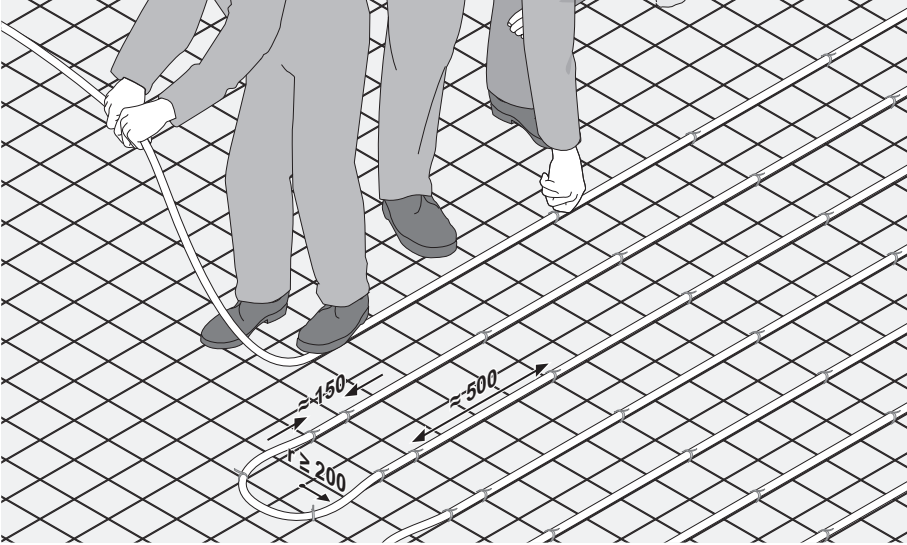
Installing Uponor heating pipes

The Uponor snow and ice melting system is normally installed just underneath the surface layers of the structure. The structural requirements and load-bearing characteristics of such areas must be determined to ensure that predicted loads will not cause the piping to break. It should be noted

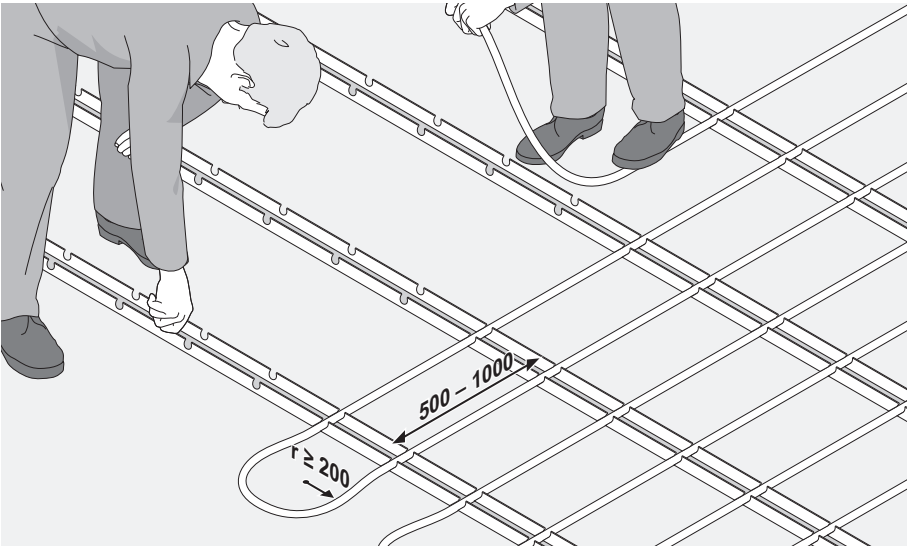
that the installation of, and heating from, the snow and ice melting system will not reduce structural requirements.

The brief guides describe only some aspects of the process of installing Uponor snow and ice melting system.

Installation with cable tie



Installation with clamp track



Optimal energy efficiency control of Uponor Meltaway

Uponor Smatrix Move PRO snowmelt control is an energy efficient system, able to keep the ground warm enough but not more than necessary whilst in idle state thanks to an advanced algorithm based on outdoor and ground temperatures.

The Uponor Smatrix Move PRO snowmelt algorithm utilizes 3 operation states and 1 protection mode:

- **Stop:** no snow risk, system stopped.
- **Idle:** no snow or ice present but there's a risk. Keep ground warm to avoid ice creation and increase speed when turning into meltaway state.
- **Meltaway:** snow or ice detected.
- **Security:** Protects the heat exchanger against extremely low return temperatures that may damage the unit. This mode is automatically deactivated once the risk has disappeared.

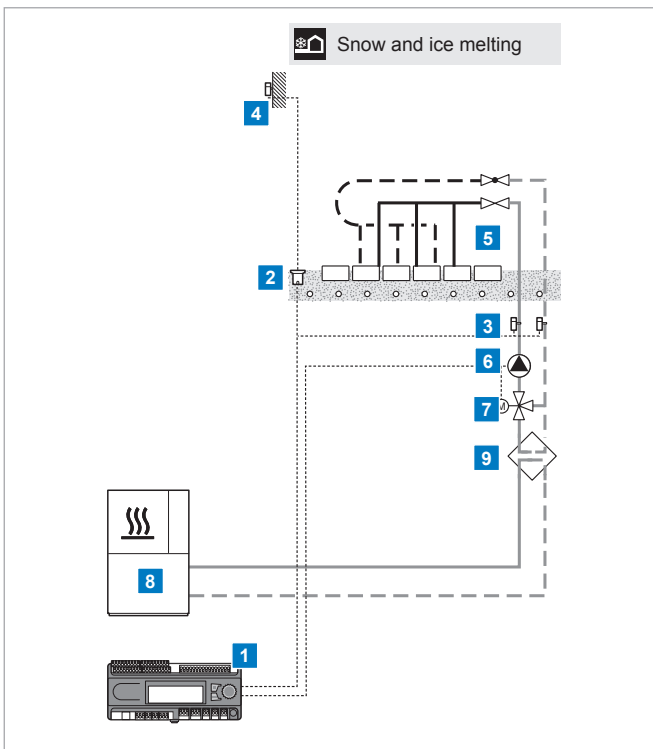


Smatrix Move PRO, featuring snow and ice melting and domestic hot water functions

The changeover between the different states is done automatically in order to enhance the system performance while keeping a high energy efficiency.

Installation examples

Snow and ice melting

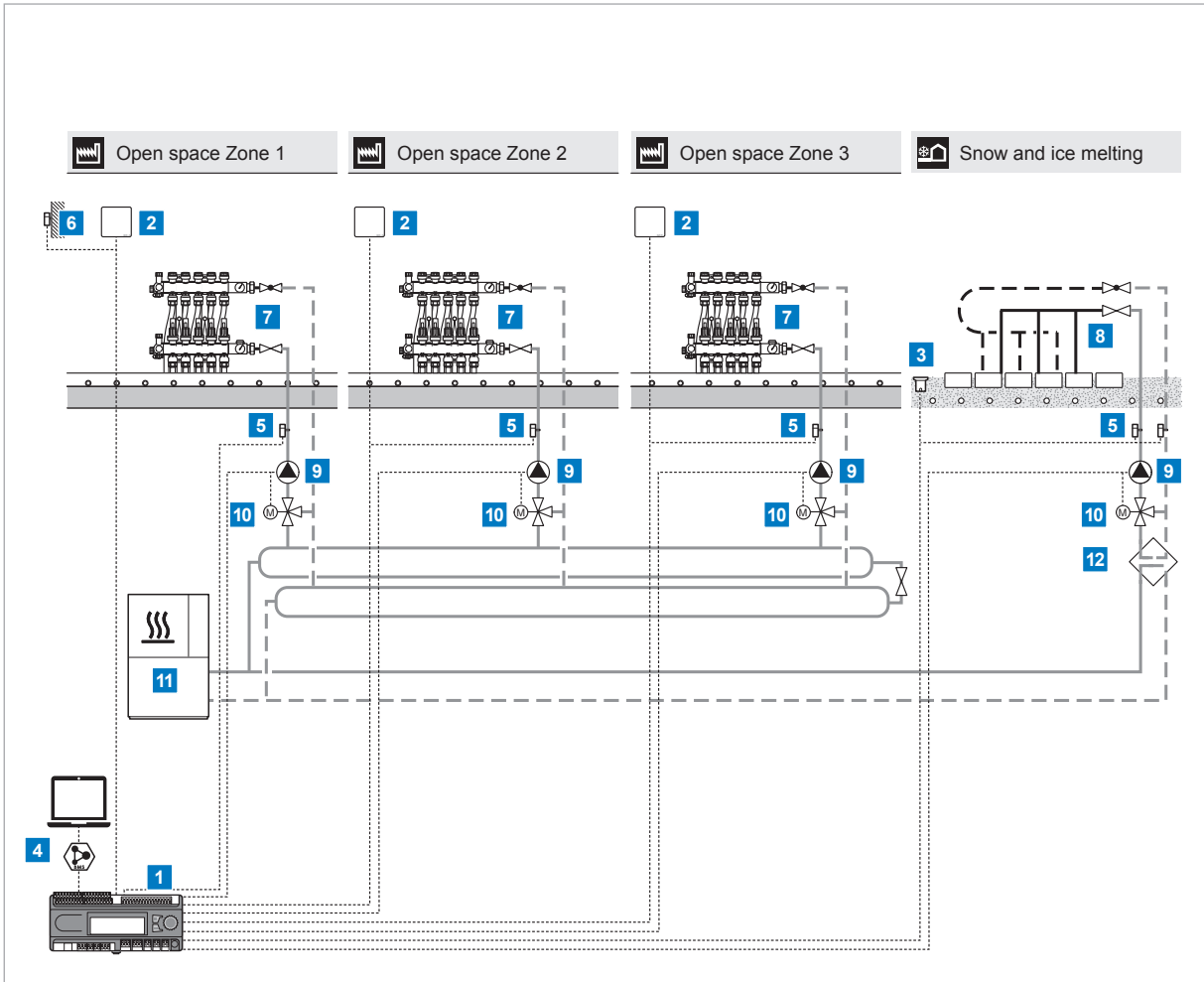


- 1 Uponor Smatrix Move PRO Controller X-159
- 2 Uponor Smatrix Move PRO Sensor Snow S-158
- 3 Uponor Smatrix Move sensor supply/return S-152
- 4 Uponor Smatrix sensor outdoor S-1XX
- 5 Tichelmann Manifold/Manifold with actuators TA 24/ TR 24
- 6 Circulation Pump
- 7 3 way mixing valve 0-10V
- 8 Heat Source
- 9 Heat exchanger

The diagram shows a simplified illustration of the key control components for heating supply water temperature control.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

Industrial/Retail and Snow/ice melting Modbus



The diagram shows a simplified illustration of the key control components for heating application with both room and supply water temperature control.

The connection to the BMS system is provided from the Smatrix MOVE PRO Modbus port.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

- 1 Uponor Smatrix Move PRO Controller X-159
- 2 Uponor Smatrix Move PRO Room sensor S-155
- 3 Uponor Smatrix Move PRO Sensor Snow S-158
- 4 BMS connection
- 5 Uponor Smatrix Move sensor supply/return S-152
- 6 Uponor Smatrix sensor outdoor S-1XX
- 7 Manifold with actuators TA 24/ TR 24
- 8 Tichelmann Manifold/Manifold with actuators TA 24/ TR 24
- 9 Circulation Pump
- 10 3 way mixing valve 0-10V
- 11 Heat Source
- 12 Heat exchanger

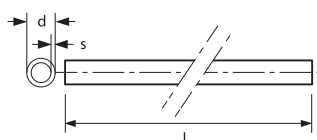
Uponor Meltaway components

Uponor Meltaway PE-Xa pipe



Technical data

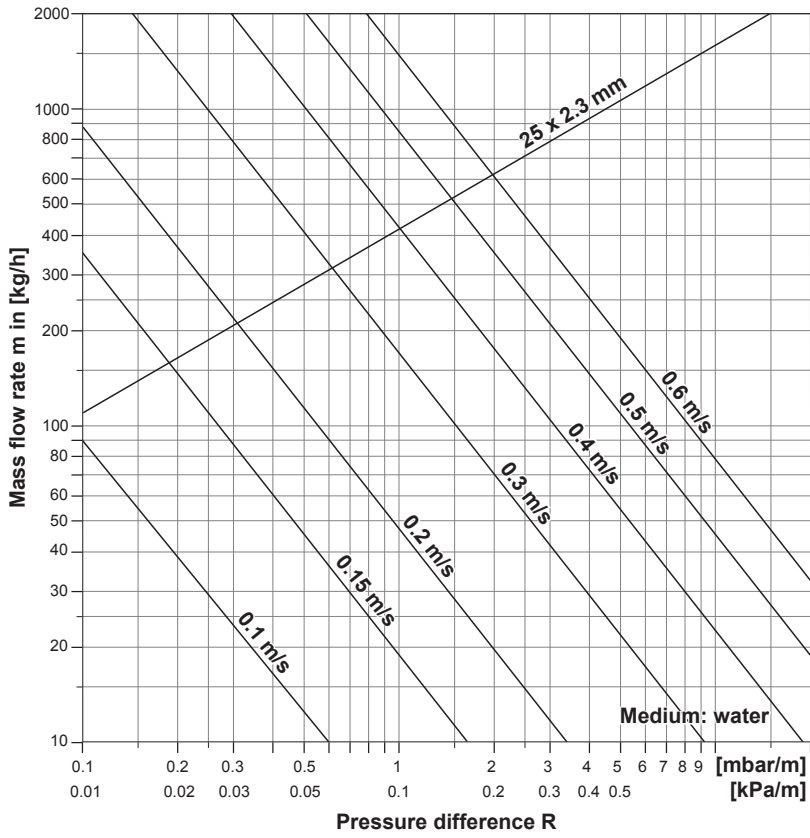
Uponor PE-Xa pipe, 25 x 2.3 mm	
Pipe dimensions	25 x 2.3 mm
Material	PE-Xa
Manufacture	As per EN ISO 15875
Density	0.938 g/cm ³
Thermal conductivity	0.35 W/mK
Lin. expansion coefficient	At 20 °C, 1.4 x 10 ⁻⁴ 1/K At 100 °C, 2.05 x 10 ⁻⁴ 1/K
Crystalline melting temperature	133 °C
Materials class	E
Min. bending radius	200 mm
Surface roughness of pipe	0.007 mm
Water content	0.33 l/m
Range of heating application	70 °C/7.2 bar
Max. cont. operating pressure (water at 20 °C)	15.4 bar (safety factor ≥ 1.25)
Max. cont. operating pressure (water at 70 °C)	7.2 bar (safety factor ≥ 1.5)
DIN-CERTCO registration no.	3V209 PE-X
Pipe connections	Connector couplings and clamp ring screw connections, Q&E joints, type Uponor 25 x 2.3
Preferred installation temperature	≥ 0 °C
Approved water additive	Uponor GNF antifreeze
UV protection	Optically opaque cardboard (unused portion must be stored in the box)



Dimensions

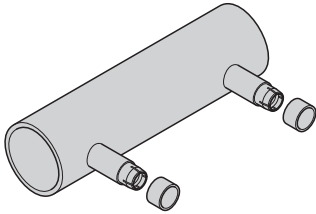
Article No.	d [mm]	s [mm]	L [m]
1087528	25	2.3	3000
1087526	25	2.3	640

Pressure loss diagram for Uponor PE-Xa pipe, 25 x 2.3 mm



The pressure gradient in Uponor PE-Xa pipes can be determined using this diagram

Distribution pipes

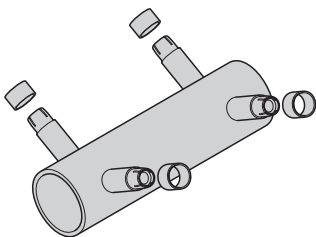


Uponor Meltaway single manifold

Meltaway single manifold made of HDPE pipe and equipped with compact-welded Meltaway couplings. The distribution pipes can be made in shorter lengths and/or with different distances between centres, although no less than 100 mm.

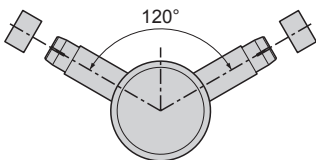
Dimensions

Article No.	O.D. x T [mm]	ID. [mm]	L [mm]	Meltaway couplings between centres [mm]
1033631	75 x 6.8	6.4	6000	500
1033640	75 x 6.8	6.4	6000	150
1033632	110 x 6.6	96.8	6000	500
1033633	160 x 9.5	141	6000	500



Uponor Meltaway double manifold

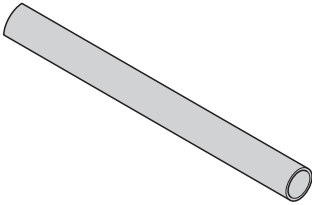
Meltaway double manifold made of HDPE pipe and equipped with compact-welded Meltaway couplings oriented in two directions with an angle of 120° between them. Can also be manufactured with a different angle and different distances between centres.



Dimensions

Article No.	O.D. x T [mm]	ID. [mm]	L [mm]	Meltaway couplings between centres [mm]
1033634	75 x 6.8	6.4	6000	500
1033635	110 x 6.6	96.8	6000	500

Supply pipes

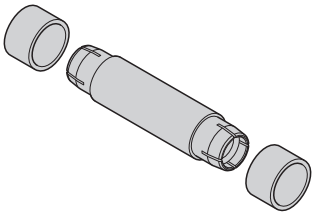


Uponor Meltaway feeder tubes

Uponor Feeder tubes made in HDPE for the creation of the Tichelmann distribution.

Dimensions

Article No.	O.D. x T [mm]	ID. [mm]	L [mm]
1033628	75 x 6.8	6.4	6000
1033629	110 x 6.6	96.8	6000
1033630	160 x 9.5	141	6000



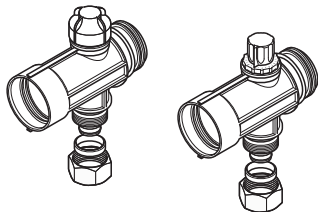
Meltaway Straight coupling

Uponor Meltaway straight coupling for the connection of two different Uponor Meltaway pipe.

Dimensions

Article No.	Dimension for Meltaway PEX pipe [mm]	L [mm]
1033672	25 x 2.3	145

Meltaway manifolds and fittings



Uponor industrial manifold 25-G 1½

Uponor Industrial Manifold 25-G 1½ as supply and return for Industrial heating.

Consists of:

- Supply-segment with control valves for pre-adjustment, heating loop connection for PE-Xa Pipe 25x2.3 with compression adapter.
- Return-segment with thermostat upper section incl. cap for locking. Uponor actuator can be mounted directly on the return manifold, heating loop connection for PE-Xa Pipe 25x2.3 with compression adapter.

Spacing of outlet: 100 mm

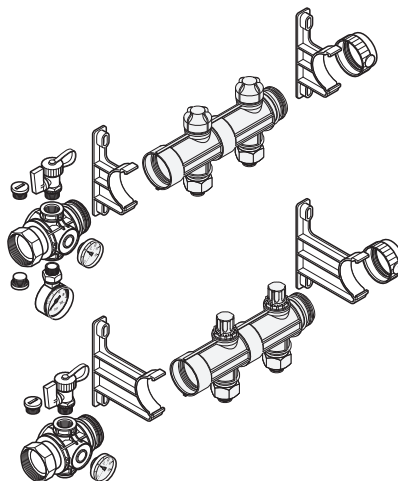
Article No.: 1045813

Uponor industrial manifold basic kit

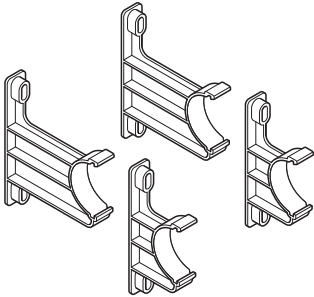
Uponor Industrial Manifold Basic Kit for assembly and mounting the industrial manifold.

Consists of:

- 2 brackets short
- 2 brackets long
- 2 filling valves brass
- 2 thermometers 0 – 60°C
- 1 manometer
- 2 endcaps
- 2 flat sealing screw connection pieces with swivel nut
- 1 mounting material:
 - 8x screws 6x60mm
 - 8x plastic anchors 8x40mm
 - 2x flat sealings 44x32x2



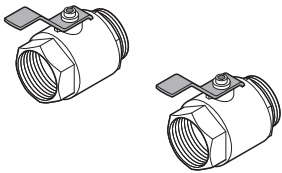
Article No.: 1045815



Uponor industrial manifold bracket kit

Uponor Industrial Manifold Bracket Kit for mounting the industrial manifold. Includes mounting materials.

Article No.: 1045816



Uponor industrial ball valve G1½

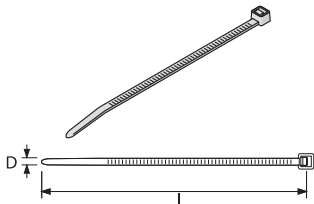
Uponor Industrial Ball Valve G 1½ for use with the Uponor Industrial manifold G 1½ connection:

- G 1½ FT
- G 1½ MT

Article No.: 1030135

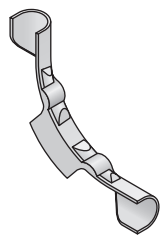
Uponor Cable Tie

For fastening Uponor pipes on reinforcement steel mesh. Made of polyamide.



Dimensions

Article No.	D [mm]	l [mm]
1005287	5	200
1005372	7	300

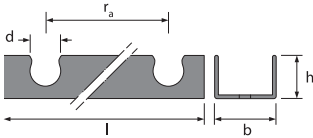
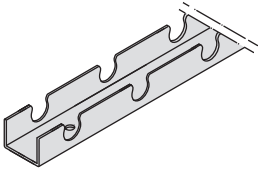


Uponor Pipe Bend Support

Made of impact resistant plastic to provide 90° bend.

Article No.: 1001230

D [mm]: 25

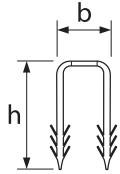
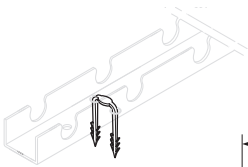


Uponor Industrial Clamp track for 25mm pipe

Uponor clamp track for 25 mm pipes.

Dimensions

Article No.	b [mm]	h [mm]	d [mm]	ra [mm]	l [mm]
1005290	50	34	25	50	3000

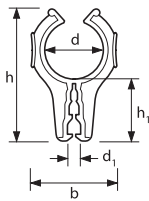


Uponor Fastening Nails for Clamp Track

For fastening the Uponor clamp track 25.

Dimensions

Article No.	b [mm]	h [mm]
1005291	36	50



Uponor Pipe Clip

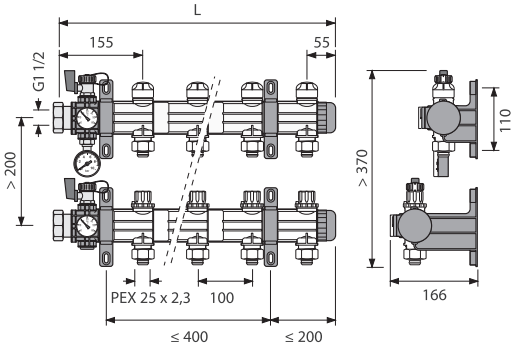
For fastening Uponor pipes on reinforcement steel mesh.

Dimensions

Article No.	h [mm]	h1 [mm]	b [mm]	d [mm]	d1 [mm]
1005289	57	27	38	25	3-8

Installation of Uponor industrial manifold

Mounting

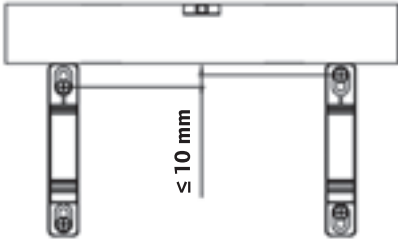
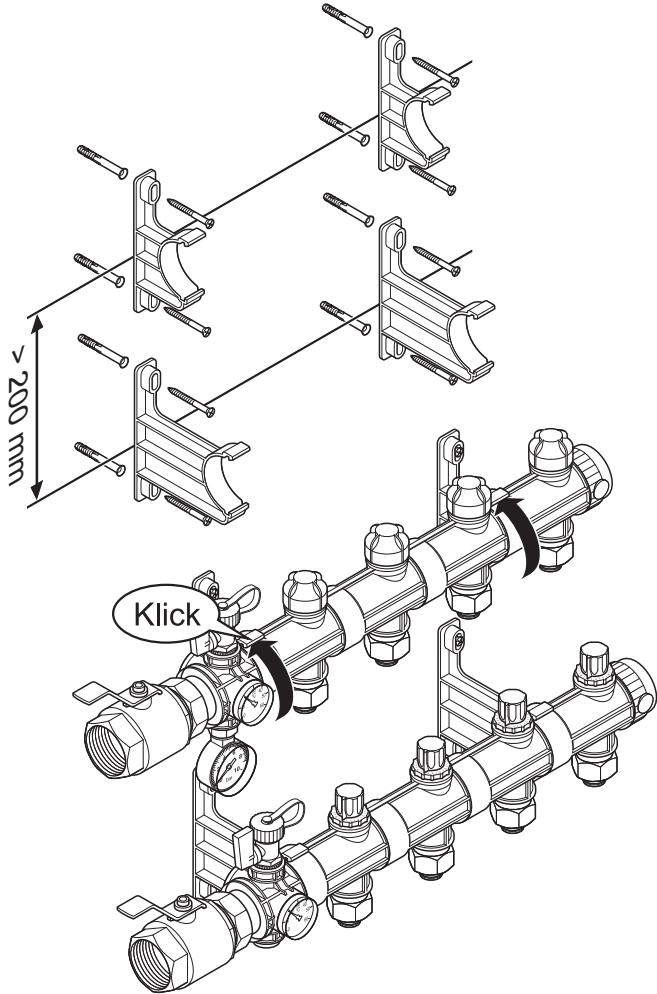


Technical data

Connection dimensions	G 1½
Max. operating temperature	70°C
Max. operating pressure	6 bar
Max. test pressure	10 bar (24 h, ≤ 30°C)
kvs value inlet/outlet valves	2,35 m³/h
Max. flow rate per manifold	10 m³/h
Maximum number of loops	20

Dimensions

Circuits	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L [mm]	310	410	510	610	710	810	910	1010	1110	1210	1310	1410	1510	1610	1710	1810	1910	2010	2110
Required clamps	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6



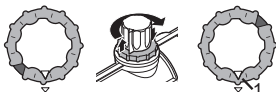
Hydraulic balancing

For the optimal system operation in case of different loops lengths a hydraulic balancing is recommended.

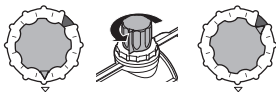
With the Uponor manifold the adjust is easy, just following the instruction below.



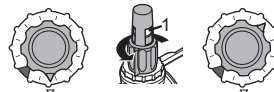
- 1** Use the diagram below to determinate the valve setting, depending on the values in the system.
- 2** Close the supply valves using the red cap.
- 3** Set the setting value (1) on the white ring.



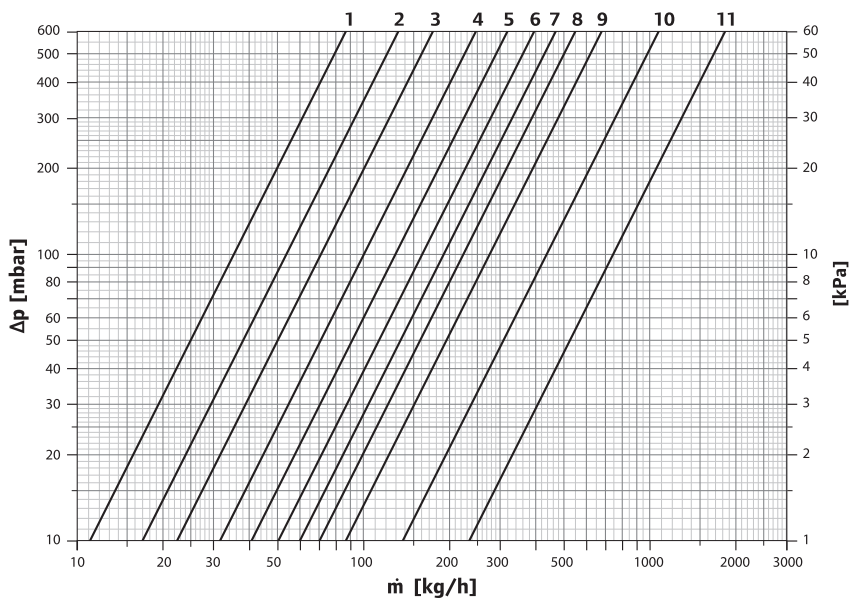
- 4** Open the supply valves.



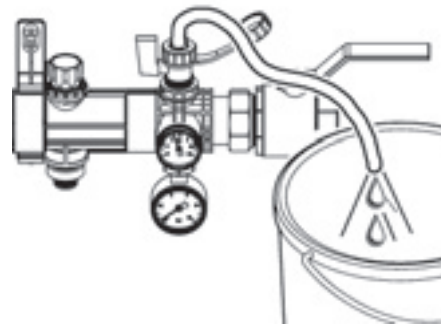
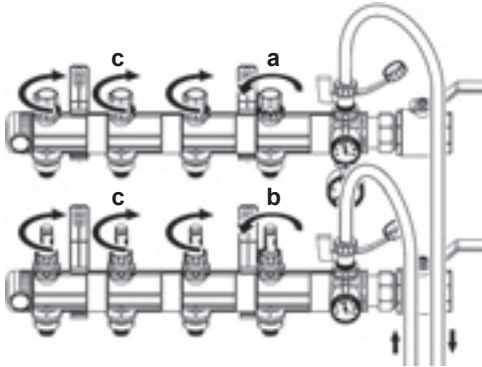
- 1** Open the supply valve until the calculated water quantity (1) is displayed on the flow meter.



- 2** Turn the ring to the stop of the supply valve.



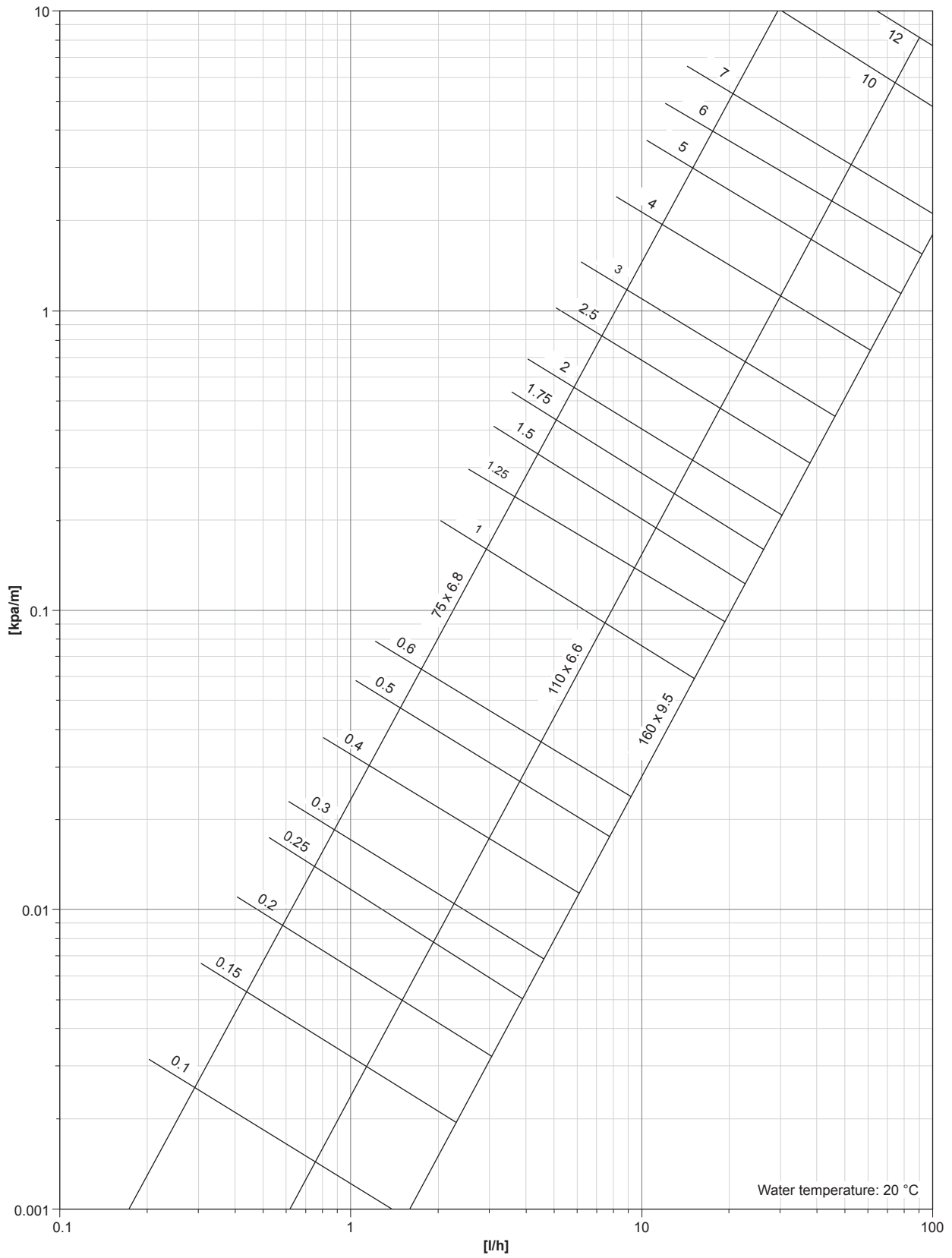
Startup and testing



Pressure test

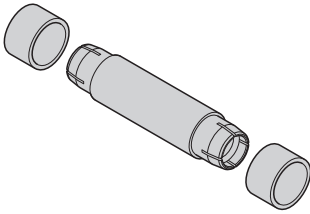
- 1** Pressurise the system to 6 bar for 2 hours.
- 2** After 2 hours perform a leak test (the decrease in pressure may not exceed 0.2 bar)
- 3** Fill the system with water until the operating pressure is reached

Pressure loss nomogram for Meltaway supply and distribution pipes

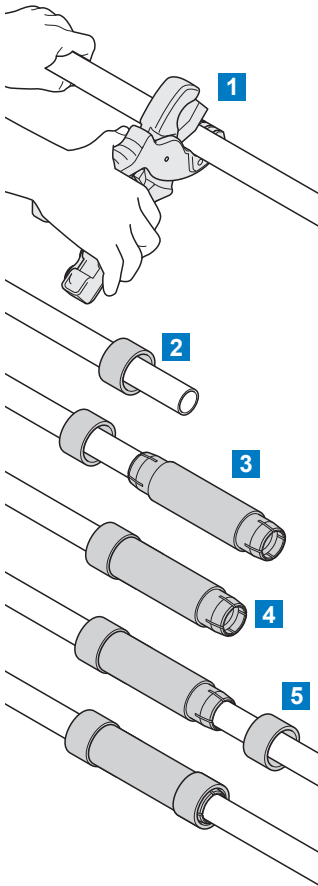


Mounting instruction Meltaway-coupling

How to joint Meltaway PEX-pipes with Meltaway-coupling



The coupling consists of two lock rings and one joint sleeve with prefabricated o-rings and grip rings.



1

Cut the pipe perpendicular. Chamfer the pipe ends with a suitable knife.

2

Slide a lock ring over the pipe.

3

Apply silicone to the o-ring and pipe. Fully insert the pipe into the fitting and push the pipe over the o-ring.

4

Pull the lock ring over the joint sleeve.

5

Repeat the procedure with the other pipe end.

Pipe and system description



Handling

- Uponor Meltaway is not an oxygen diffusion tight system and must not be connected to other heating systems without a heat exchanger between the two.
- Store Meltaway PEX pipe indoors, or outdoors under a tarpaulin. Do not remove the black packaging. An extended period of storage in sunlight will damage the product.
- The pipe can be covered with asphalt surfacing at a maximum temperature of 120°C, provided cold water flows through the pipes while the asphalt is being laid, and that the pipe is kept under pressure of 0.2 MPa.
- The pipe is made of silane cross-linked polyethylene (XLPE).
- Meltaway PEX pipe is soft and easy to handle.

Installation technique

- The pipe can be covered with asphalt, gravel, sand and slab or can be cast into concrete.
- For surface heating, the pipe should be laid about 100 mm below the finished surface level and at a centre-to-centre distance of 250 mm in order to ensure a uniform temperature on the surface.
- Mark the U-bends on site before laying the pipes.
- When Meltaway pipes are laid, they should be secured in position with spacers which should be removed when the pipes are covered, or using plastic holder bands that remain. In a concrete installation the pipe is fixed using tying wire.
- Fill the pipes with water and pressurize them before the surfacing work is started (internal pressure of 0.2 MPa).
- Use butt welding for jointing the supply pipes and the distribution pipes.

Miscellaneous

- Meltaway PEX pipe is used for snow and ice melting in larger premises, such as hangars, workshops and warehouse premises. The supply pipes and distribution pipes for such areas are made of plastic, copper or stainless steel.
- The Uponor Surface Heating System has been installed in numerous football pitches around Europe.
- Supply and distribution pipes, including couplings, are of high-density polyethylene (HDPE), so all components are made of the same material, with the same coefficient of linear expansion.
- Straight couplings for Meltaway PEX pipe are made entirely of HDPE and have O-ring seals.

Leakage testing

- Leakage testing should be carried out as follows:
- purge the air out of the system, and pressurize the system to approx. 2 x working pressure.
- if the ambient temperature is lower than the leakage testing water temperature, the pressure will increase.
- if the ambient temperature is higher than the leakage testing water temperature, the pressure will drop.
- this pressure variation is due to the fact that the plastic expands and contracts more than the water.
- maintain the pressure for 30 minutes, and visually inspect the pipes and joints.
- adjust the test pressure by means of the filler and drain valves. If the test pressure in the system remains constant for 90 minutes, the system is tight and the loops can be covered.
- N.B. Meltaway PEX pipes can be asphalted only if cold water is kept flowing through them (the asphalt temperature must not exceed 120°C). Uponor will be pleased to assist with further information.



Notes

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