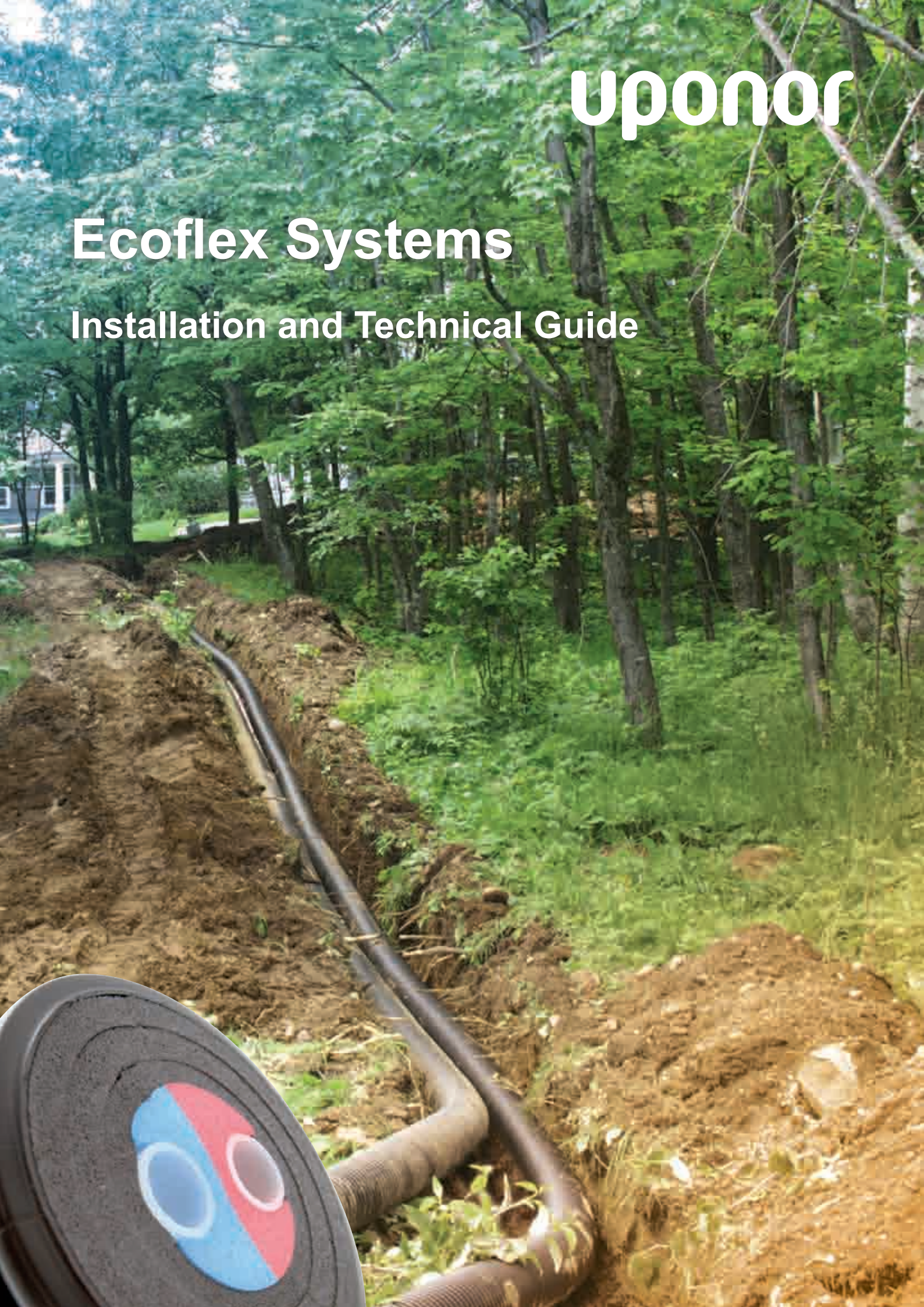


**Uponor**

# **Ecoflex Systems**

## **Installation and Technical Guide**







# From heat source... ...to building

## Pre-Insulated Pipe Systems Connecting you to renewable heat

No special tools, no welding and no fuss Quality product, long lifetime

Uponor Pre-Insulated Pipes - the only choice for economical transport of hot and cold fluids for both domestic and commercial applications.

Besides excellent insulating efficiency, our light weight pre-insulated pipes offer flexibility, ease of installation and a service life in excess of 25 years.

### Applications:

- Remote boilers
- Biomass
- CHP
- District heating
- District cooling

### Suitable for:

- Heating water
- Hot tap water
- Cooling water
- Industrial fluids

### Solutions for:

- Family homes
- Social housing
- Farm buildings
- Smallholdings
- Outbuildings

### The Advantages:

- Easy to handle, light weight and highly flexible
- Easy to assemble, no special tools required
- Rapid work progress, up to 200m joint free installation
- Cut to length service, delivered directly to site
- Full design service, pipe sizing and material take-offs
- Load bearing, up to 60 tonnes at 0.5m depth



Thermo Single  
25 - 125mm



Thermo Twin  
25 - 63mm



Quattro  
25/32mm



Thermo Mini  
25 and 32mm

**Over 30 million metres installed worldwide!**

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# System Description and Fields of Use

## System description

From practice - for practice. This is the fundamental idea behind our flexible, pre-insulated piping systems. The flexibility of the material, the convenient connecting methods and the well-attested service life and robustness of our pre-insulated pipes ultimately ensure that you, as the expert, can complete your projects quickly, economically and reliably. Just the same, whether you are dealing with an extensive supply network or a single connection to one building. Hot water, drinking water, cooling and waste water are transported as reliably as many other liquid media in industrial applications. The service we provide in association with our pre-insulated pipe systems also offers you comprehensive support at every phase of your project.



### Quality, signed and sealed

Uncompromising quality is our number-one policy. Fully comprehensive quality control in production is just one aspect of our quality management system. And we regularly make sure that independent inspection organisations certify that our products meet the strictest standards.

### Kiwa KOMO approval and certification

The interplay between components (Thermo Single, Thermo Twin, rubber end caps, Wipex fitting range and insulation sets) is examined in the twice-yearly system approval according to the current BRL 5609 guideline. The approval certifies a system service life of at least 30 years, as well as absence of leaks at a water pressure of 0.3 bar and an ambient temperature of 30°C. In addition, the heat losses, static strength and creep behaviour of the pipes are checked according to consistent specifications.

### DIN Certco certification

The annual certification according to VDI 2055 verifies the heat loss figures. The heat loss graphs for the flexible, pre-insulated pipes are prepared on this basis. The certification is based on defined layout conditions, and that means that the values are a good reflection of real life.

### Static strength certification

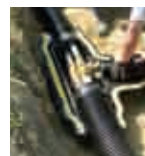
The certificate, based on ATV DVWK-A127, demonstrates that our pipes, when laid in accordance with defined conditions, are suitable for loading by heavy traffic (SWL 60 = 60 t) according to worksheet ATV-A 127. The ring stiffness of the jacket pipe is proven according to EN ISO 9969.

### Unchanging minimal thermal conductivity of the insulation

Material tests according to EN 15632 at 80°C demonstrate that our insulation material absorbs less than 1 % water by volume. This low water absorption means that the insulating properties are practically unchanged.



Supplied to the right dimensions and laid directly from the roll.



Connect easily, permanently and practically.



Flexibly and quickly through the brickwork to the main distribution point.



## Flexibility - from the beginning through to the house lead-in

No welding, no special tools. The flexibility and the low weight of our pre-insulated pipes mean that they are easy to handle and that building work proceeds fast. They are also supported by a comprehensive range of accessories. From a variety of wall lead-throughs, insulation kits and the proven range of fittings.

- The most important advantages for laying and connecting
- Problem-free laying around corners and obstacles
- Up to 200 meters of joint-free installation in one piece
- Self-adjusting tube structure make it unnecessary to fit expansion compensators.
- Fast building progress / short assembly times
- Easy, reliable jointing method, including subsequent insulation of connections and branches



- Cutting service: shorter lengths, individually trimmed for your building site
- Both standard and partial lengths are delivered in shortest time.
- Comprehensive support from experienced engineers for planning and layout
- Project support and product training on-site



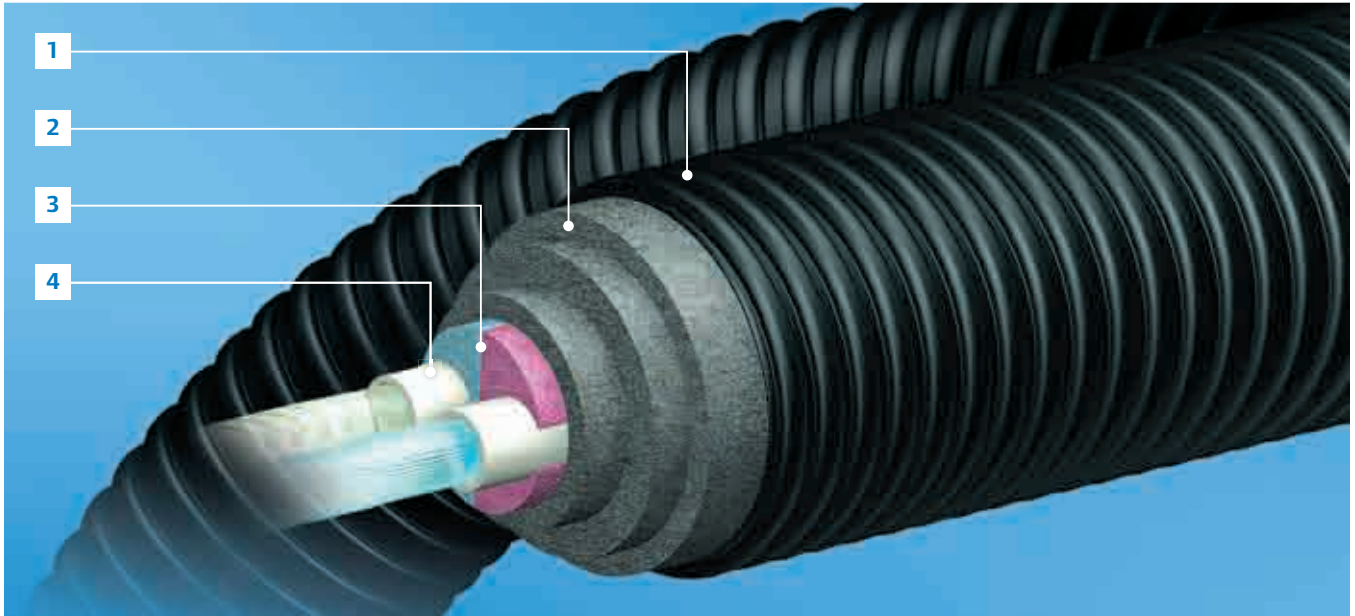
Easy handling thanks to extraordinary flexibility: it is not just when rolling out in a ditch, but particularly at house lead-ins that our customers appreciate these advantages of the product.



# Product Construction

The high quality of the flexible, pre-insulated pipes from Uponor is a consequence of the strengths of the individual elements. The combination of stable yet flexible jacket pipes,

ageing-resistant, cross-linked polyethylene insulating layers and robust, long-life media pipes creates system pipes that can be laid easily and quickly and that function reliably.







- 1** The PE-HD jacket pipe: impact-resistant, long-life yet flexible due to the Uponor pipe geometry
- 2** The insulation made from cross-linked polyethylene foam: ideal insulating properties, ageing-resistant, resistance to moisture and very high flexibility
- 3** The coloured centring profile effectively avoids confusion between the flow and return pipes
- 4** The PE-Xa medium pipe: temperature-resistant, and resistant to incrustation and stress cracking

- The most important properties at a glance
- Easy handling and fast building progress through exceptional flexibility
- Age-resistant, permanently elastic insulation of closed-cell cross-linked polyethylene foam, water absorption < 1% by volume
- Heat losses <sup>1)</sup> externally monitored by DIN Certco
- Medium pipe resistant to corrosion and incrustation
- The medium pipe made of crosslinked polyethylene (PE-Xa) offers exceptional resistance to stress cracking, aggressive media, frost and micro-organisms
- Optimum ring stiffness, resistant to impact and pressure at the same time as offering high flexibility when laying and low specific weight of all the materials

<sup>1)</sup> Uponor Thermo, see Appendix

# Fields of Use

An overview of key product information

	Medium temperature	Operating pressure	 Uponor Thermo	 Uponor Aqua	 Uponor Quattro	 Uponor Supra
--	--------------------	--------------------	---	--	--	--

<b>Application</b>						
Potable water, cold	20 °C	16 bar				●
Potable water, warm	95 °C	10 bar		●	●	
Heating water	95 °C	6 bar	●		●	
Cooling water	-10 °C	16 bar				●
Chemicals			on request	on request		on request
Foodstuffs				on request		on request
Pressurized waste water			on request			on request

<b>Variations</b>						
Anti-freeze cable*						●
Heating tape*			●	●		

<b>Material</b>						
Medium pipe			PE-Xa with EVOH	PE-Xa	PE-Xa and PE-Xa with EVOH	PE-100
Insulating material			PE-X	PE-X	PE-X	PE-X
Jacket pipe			PE-HD	PE-HD	PE-HD	PE-HD

\*optional

# Product Profile: Uponor Thermo



**Practical, perfect and multi-functional for heating water supply systems**

The ideal solution for the distribution of heating water in local heat supply networks or as tie-ins to building complexes and individual housing. The Uponor Thermo Twin variant combines flow and return in just one pipe system.



6 V 046  
6 V 047

## Uponor Thermo Mini



95 °C



6 bar



25-32mm

Main application

- Heating water

Other applications

- Waste water
- Chemicals

Medium pipe

- PE-Xa with EVOH, SDR 11

Insulating material

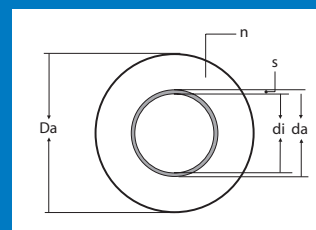
- PE-X foam

Material jacket pipe

- HDPE

**Note:**

For small-scale applications in the private sector (e.g. in a greenhouse) Especially suitable for installation in empty conduits.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500052	1018132	25 / 20.4 / 2.3	1	68	0.50	200	0.20	15
500053	1018133	32 / 26.2 / 2.9	1	68	0.55	200	0.25	12



## Uponor Thermo Single



95 °C



6 bar



25-125mm

Main application

- Heating water

Other applications

- Waste water
- Chemicals

Medium pipe

- PE-Xa with EVOH, SDR 11

Option

- Heating cable

Insulating material

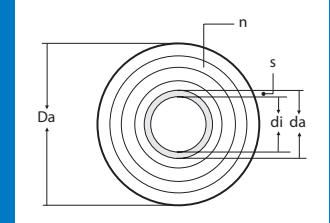
- PE-X foam

Material jacket pipe

- HDPE

Note:

The tried-and-tested solution for heating water distribution in local heating networks and for individual building tie-ins.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500002	1018109	25 / 20.4 / 2.3	4	140	1.10	200	0.25	45
500003	1018110	32 / 26.2 / 2.9	3	140	1.20	200	0.30	42
500004	1018111	40 / 32.6 / 3.7	4	175	2.20	200	0.35	55
500005	1018112	50 / 40.8 / 4.6	4	175	2.43	200	0.45	50
500006	1018113	63 / 51.4 / 5.8	3	175	2.73	200	0.55	43
500007	1018114	75 / 61.4 / 6.8	3	200	3.74	100	0.80	49
500008	1018115	90 / 73.6 / 8.2	3	200	4.20	100	1.10	39
500009	1018116	110 / 90.0 / 10.0	3	200	5.24	100	1.20	30
-	1083868	125 / 102.2 / 11.4	3	250	7.30	80	1.40	45

## Uponor Thermo Twin



95 °C



6 bar



25-63mm

Main application

- Heating water

Other applications

- Waste water
- Chemicals

Medium pipe

- PE-Xa with EVOH, SDR 11

Insulating material

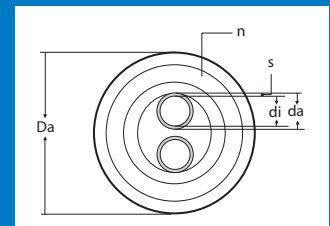
- PE-X foam

Material jacket pipe

- HDPE

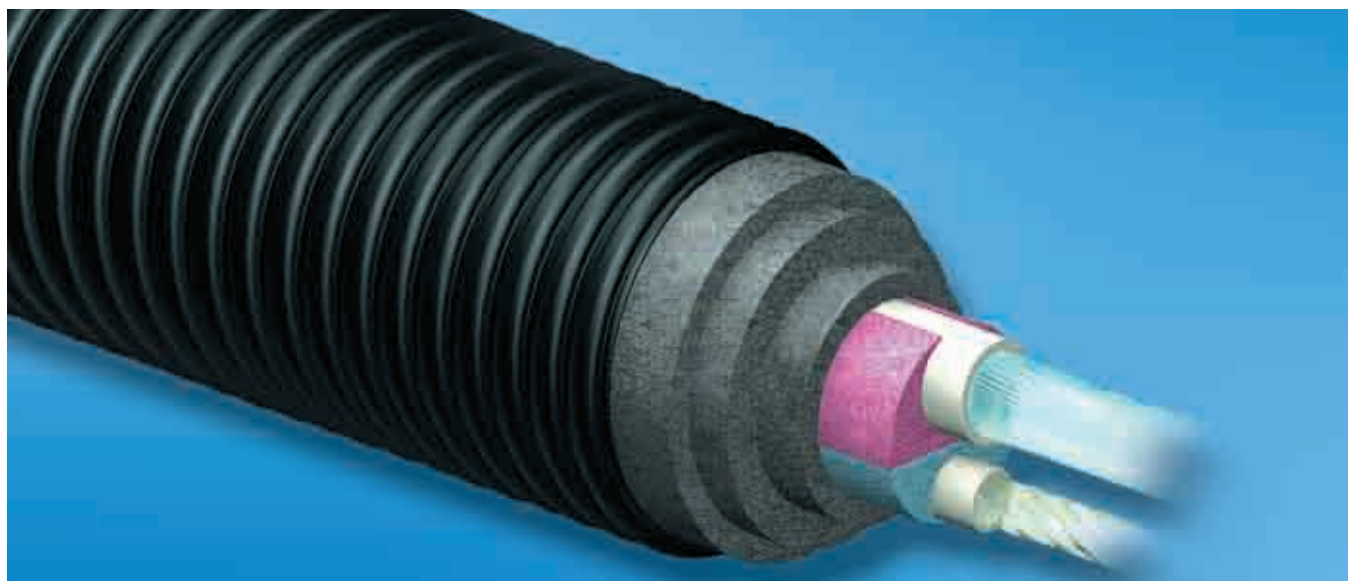
Note:

Combined flow and return in one pipe system incl. dog bone to prevent confusion when the pipes are being connected.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500102	1018134	(2x) 25 / 20.4 / 2.3	3	175	2.09	200	0.5	43
500103	1018135	(2x) 32 / 26.2 / 2.9	3	175	2.16	200	0.6	38
500104	1018136	(2x) 40 / 32.6 / 3.7	2	175	2.50	200	0.8	28
500105	1018137	(2x) 50 / 40.8 / 4.6	3	200	3.59	100	1.0	32
500106	1018138	(2x) 63 / 51.4 / 5.8	2	200	4.49	100	1.2	18

## Product Profile: Uponor Aqua



### Your flexible specialist for warm potable water

Simply unbeatable for quick, safe and cost-efficient installations in the warm water supply sector. The twin design is supplied with a solution using integrated circulation lines.

DIN

DVGW

OVGW



## Uponor Aqua Single



95 °C



10 bar



25-110mm

### Main application

- Potable water, warm

### Other applications

- Foodstuffs
- Chemicals

### Medium pipe

- PE-Xa, SDR 7.4

### Option

- Heating cable

### Insulating material

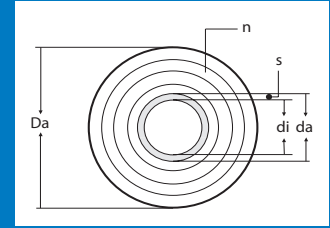
- PE-X foam

### Material jacket pipe

- HDPE

### Note:

The safe and cost-effective pipeline for warm water installations.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500020	1018117	25 / 18.0 / 3.5	3	140	1.20	200	0.35	45
500021	1018118	32 / 23.2 / 4.4	3	140	1.30	200	0.40	42
500022	1018119	40 / 29.0 / 5.5	4	175	2.37	200	0.45	55
500023	1018120	50 / 36.2 / 6.9	4	175	2.71	200	0.55	50
500024	1018121	63 / 45.6 / 8.7	3	175	3.17	200	0.65	43
-	1018122	75 / 54.4 / 10.3	3	200	4.3	100	0.9	49
-	1018123	90 / 65.4 / 12.3	3	200	5.3	100	1.2	39
-	1036036	110 / 79.8 / 15.1	3	200	6.5	100	1.3	30

## Uponor Aqua Twin



95 °C



10 bar



25-50mm

### Main application

- Potable water, warm with circulation

### Other applications

- Foodstuffs
- Chemicals

### Medium pipe

- PE-Xa, SDR 7.4

### Insulating material

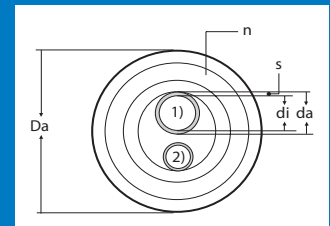
- PE-X foam

### Material jacket pipe

- HDPE

### Note:

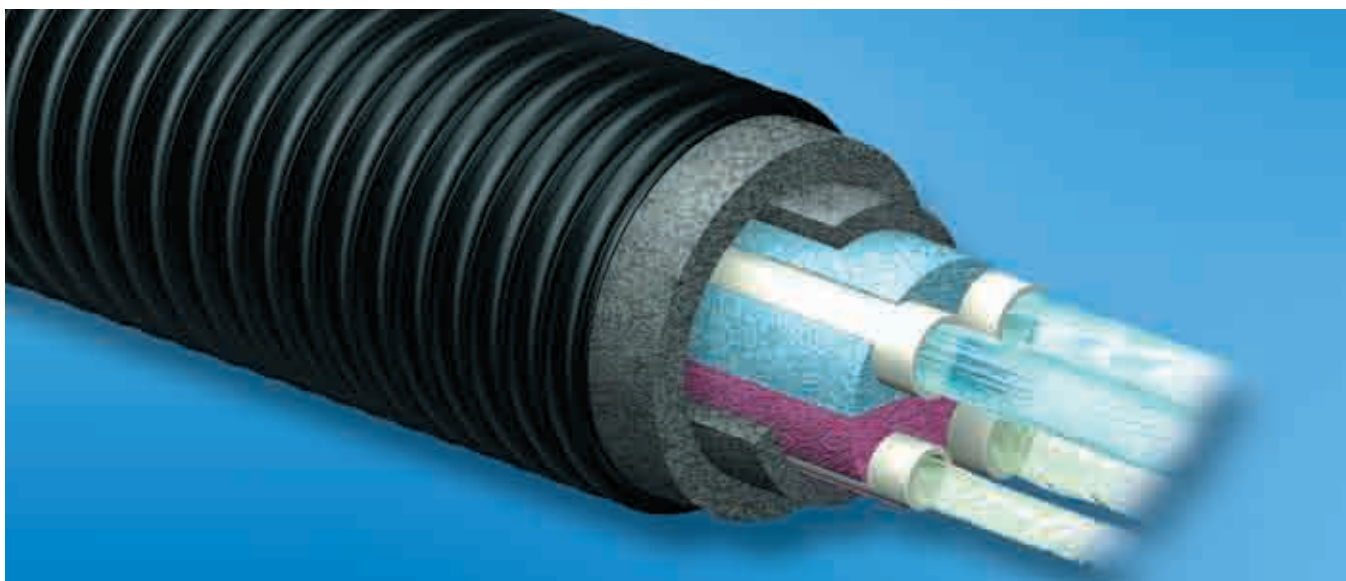
Including circulation line. The two-coloured Dog Bone prevents confusion when connecting the medium pipe.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500113	1018139	1) 25 / 18.0 / 3.5 2) 25 / 18.0 / 3.5	3	175	2.22	200	0.65	43
500114	1018140	1) 32 / 23.2 / 4.4 2) 25 / 18.0 / 3.5	3	175	2.37	200	0.70	38
500116	1018141	1) 40 / 29.0 / 5.5 2) 25 / 18.0 / 3.5	3	175	2.62	200	0.90	38
500118	1018142	1) 50 / 36.2 / 6.9 2) 25 / 18.0 / 3.5	2	175	2.90	200	1.00	28



# Product Profile: Uponor Quattro



## Just the thing for individual building tie-ins

“One for all!” heating water, flow and return, potable water plus circulation – all in just one pipe: there is no easier nor more cost-efficient way of safely linking up individual buildings or building complexes.

## Uponor Quattro



95 °C



6/10 bar



25-32mm

### • Main application

- Heating water
- Potable water, warm with circulation

### • Medium pipe

- PE-Xa, SDR 7.4
- PE-Xa with EVOH, SDR 11

### • Insulating material

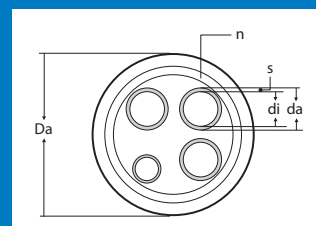
- PE-X foam

### • Material jacket pipe

- HDPE

### Note:

Uponor Quattro pipelines are also particularly practical and cost-efficient for linking up annex buildings. The two-coloured Dog Bone prevents confusion when connecting the medium pipe.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500311	1018147	2x 25 / 20.4 / 2.3 2x 25 / 18.0 / 3.5	3	175	2.40	200	0.80	35
500331	1018148	2x 32 / 26.2 / 2.9 2x 25 / 18.0 / 3.5	2	175	2.60	200	0.80	35
500351	1018149	2x 32 / 26.2 / 2.9 32 / 23.2 / 4.4 25 / 18.0 / 3.5	2	175	2.70	200	0.80	34

# Product Profile: Supra

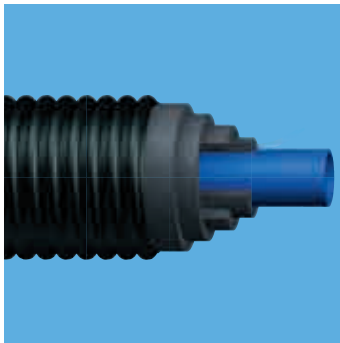


## The ultimate for cold potable water and cooling water networks

Refreshingly consistent for cold liquid media. Besides cold potable water applications, the preferred fields of use for Uponor Supra are cooling water networks in hotel complexes or industrial facilities.



## Uponor Supra



20 °C



16 bar



25-110mm

### Main application

- Potable water, cold
- Cooling water

### Other applications

- Waste water

### Medium pipe

- HDPE (PE 100), SDR 11

### Option

- Frost cable (Supra Plus)

### Insulating material

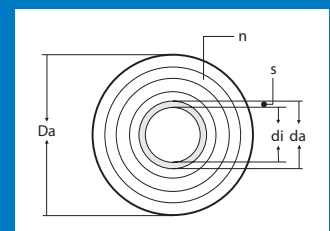
- PE-X foam

### Material jacket pipe

- HDPE

### Note:

For swimming pools, hotels, wellness centres or in industry. Supra is optimized for media temperatures from - 10 °C to + 20 °C.



Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
500042	1018124	25 / 20.4 / 2.3	1	68	0.52	200	0.20	15
500043	1018125	32 / 26.2 / 2.9	1	68	0.62	200	0.25	12
500044	1018126	40 / 32.6 / 3.7	3	140	1.44	200	0.30	39
500045	1018127	50 / 40.8 / 4.6	3	140	1.67	200	0.40	34
500046	1018128	63 / 51.4 / 5.8	2	140	1.97	200	0.50	27
500047	1018129	75 / 61.4 / 6.8	3	175	2.89	100	0.60	38
500048	1018130	90 / 73.6 / 8.2	2	175	3.31	100	0.70	28
500049	1018131	110 / 90.0 / 10.0	3	200	5.24	100	1.20	30

# Product Profile: Supra Plus



For liquids and water transport at extremely low temperatures, Uponor Supra Plus is supplied with a self-regulating freeze protection cable. It makes good sense to use this product if the pipeline is installed in conditions lacking weather protection, i.e. above ground or in shallow burial situations. The cable, rated at 10 W/m will prevent freezing down to -20°C.

## Uponor Plus



### Note:

When ordering Supra Plus, an additional 0.5m allowance should be made at each end to facilitate easier cable connection. Burial depth should also be considered to ensure sufficient pipe length is ordered.

Old Code	Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
-	1048902	25 / 20.4 / 2.3	1	68	0.52	150	0.20	15
-	1048903	32 / 26.2 / 2.9	1	68	0.62	150	0.25	12
-	1048904	40 / 32.6 / 3.7	3	140	1.44	150	0.30	39
-	1048905	50 / 40.8 / 4.6	3	140	1.67	150	0.40	34
-	1048906	63 / 51.4 / 5.8	2	140	1.97	150	0.50	27
-	1048907	75 / 61.4 / 6.8	3	175	2.89	100	0.60	38
-	1048908	90 / 73.6 / 8.2	2	175	3.31	100	0.70	28
-	1048909	110 / 90.0 / 10.0	3	200	5.24	100	1.20	30



# Joining Systems

## Wipex fittings

### Uponor Wipex joining technology – for our Thermo, Aqua and Quattro products

The Wipex Coupling is specifically designed for connecting cross-linked polyethylene pipes, produced by Uponor, for hot and cold water in domestic and district heating installations. The coupling is available for pipe dimensions 25-110 mm, in two series marked PN 6 for Thermo pipes and PN 10 for Aqua pipes.

The Wipex Coupling is designed to give an excellent tight grip. The gripping strength is higher than the tensile strength of the pipe, and the sealing performance is unaffected by temperature fluctuations.

Wipex Couplings are robust and simple in design, can be fitted very easily and quickly even in difficult locations and confined spaces.

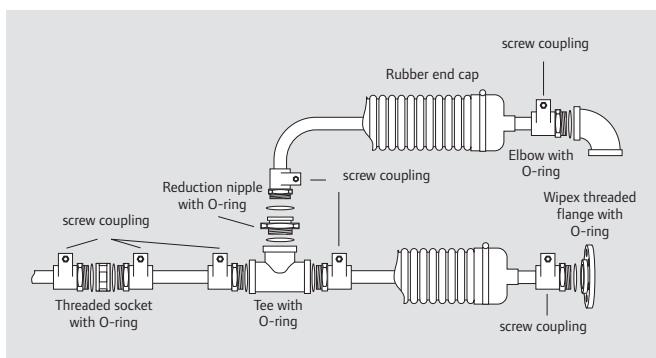
- The Wipex Coupling is patented, tested according to DVGW (Germany), NKB (Sweden), CSTB (France), KIWA (Holland) and approved.
- The main components of the fittings are made of DR brass (resistant to dezincification).
- O-rings are used to make a seal between the couplings and pipe fittings.
- Additional sealing using teflon or hemp is not required
- The Wipex fitting system allows for an extremely wide range of connection combinations.



#### Design recommendation:

When connecting from the Uponor Wipex system to third-party components, the terminating Uponor Wipex element must consist of a fitting (bend or socket) with an internal thread.

## Uponor Wipex joining technology



**Note:** For guidance on correct choice of fitting, refer to Appendix, 'Pipe and Fittings Selector Tool'.

## Uponor insulation sets

Suitable insulation sets are available for insulating and sealing the 140, 175 and 200 mm jacket pipes on all straight, elbow and T-joints. They fit single and twin pipes equally well. An H-insulation set is also available for the conversion from single main pipes to twin branch pipes. The insulation sets consist of insulated half-shells, which are joined using bolts and sealant. Jacket pipe diameter 68 mm can be fitted to the insulation sets using Uponor reducing rings.



### Note:

Joints should not be located underneath roads because this makes later access difficult.

H insulation sets are not resistant to heavy vehicles. If an H insulation set must be installed underneath the road, a concrete slab can be used above the joint to distribute the heavy traffic load.



### Note:

Please use the Uponor chamber for Quattro connections



Uponor T insulation set



Uponor elbow insulation set



Uponor straight insulation set



Uponor H insulation set



Uponor reducer rings

## Rubber end caps

### To protect the pipe ends and for component partitioning

Uponor rubber end caps protect the insulation at cut pipe ends and provide partitions between components. It is important to provide this protection against moisture ingress or damage, so that the whole system can fulfil its purpose optimally over many years. A gasket ring is also supplied to prevent the entry of water. The end caps can be assembled easily and conveniently by pulling them over the ends of the pipes, after which they are fully secured with a jubilee clip.



**Note:**

The jubilee clip must not be mounted when Uponor H insulation sets are being used!



**Note:**

The Uponor rubber end caps must be fitted to the ends of the jacket pipes before making a connection to a medium pipe!

**Note:**

Before the rubber end caps are fitted, the insulation must be removed from the pipe back to the proper length. The dimensions of the insulating kit must be observed here.



Uponor Single end cap



Uponor Twin end cap



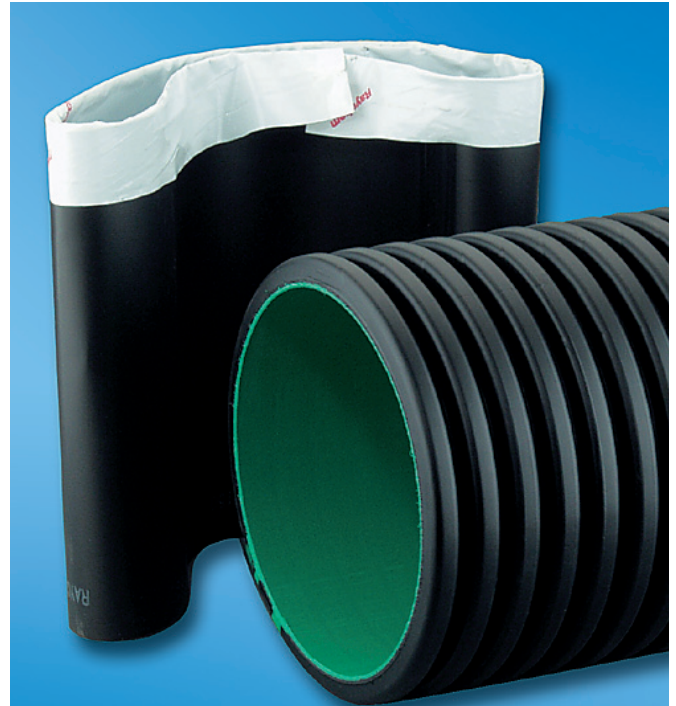
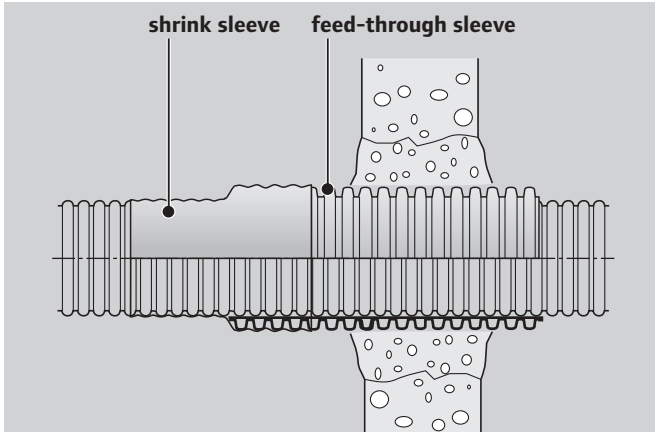
Uponor Quattro end cap



## Wall Sleeves and Seals

### Uponor wall sleeve NPW (non-pressure waterproof)

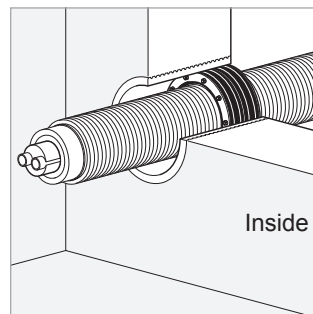
This wall sleeve can be used for the feed-through in building foundations wherever there is no pressurized water. It is mounted in place when the foundations are cast or is bricked in a hole drilled afterwards. The shrink sleeve prevents water from leaking into the foundations from in between the pipe and the feedthrough sleeve. The kit contains a 400 mm long feed-through sleeve and a wide shrink sleeve.



### Uponor PWP wall seal (pressure-waterproof)

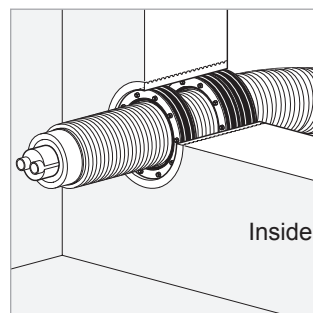
#### Uponor PWP wall seal

An Uponor PWP wall seal must be used wherever water at pressure is to be expected. They can either be used directly in a coated tapping drill hole into waterproof concrete, or in a fibre cement pipe that is concreted or bricked into place.



#### Uponor supplementary kit

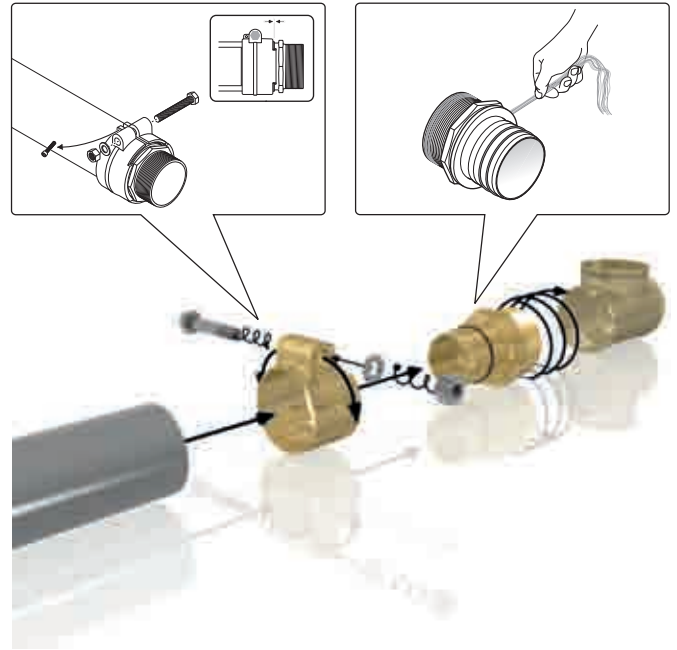
If it is not possible to introduce the jacket pipe perpendicularly into the wall duct, we recommend that the Uponor supplementary kit is used to disperse any possible stresses.



## Fittings for 125mm pipe

### Uponor Ecoflex coupling for 125 mm

The Ecoflex coupling is designed for connecting cross-linked polyethylene pipes for district heating installations. The coupling is available for pipe dimension 125 x 11.4 mm, PN 6 and fitting base parts in 4 inch. Hemp is used to make a seal between the couplings and base parts.



Uponor Ecoflex coupling for pipe dimensions 125 x 11.4 mm, PN 6

### Uponor Ecoflex pre-insulated fitting range

The Uponor Ecoflex pre-insulated fitting is used for the connection with pre-insulated Ecoflex pipes in buried installation. The fittings are made from stainless steel, are pre-insulated with foam and covered with a PE-casing. The ends of those fittings are welded with female thread adapters.

#### Note:

Since these are made to order items, please ask for the delivery time.



Uponor Ecoflex tee twin



Uponor Ecoflex tee single

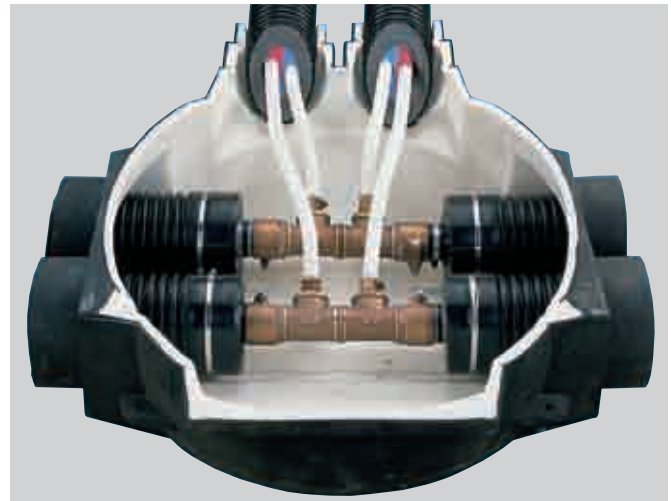


Uponor Ecoflex elbow single

# Chamber

Uponor connecting chambers are designed for pipe joints that cannot be made with an Uponor insulation kit. This includes, for instance, connections between Uponor Single to two or more twin pipes, or for the Uponor Quattro pipes. The rotationally moulded chamber has walls made of polyethylene and, on the inside, it is coated with a PE insulant.

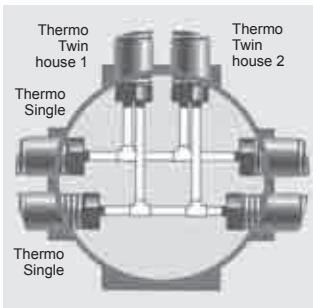
The branching chamber enables the joining of other connections at a later date. The chamber has a watertight structure and is suitable for all pipe dimensions (casing pipe size 140-200 mm).



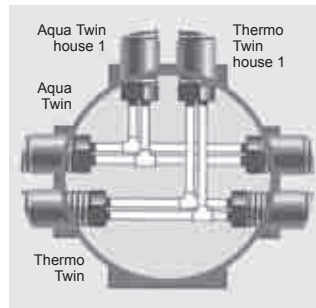
**Note:**

Joints should not be located underneath roads because this makes later access difficult and heavy vehicles could damage the joint.

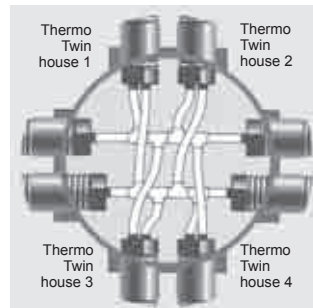
If joints underneath roads are unavoidable a concrete slab can be used above the joint to distribute the heavy traffic load.



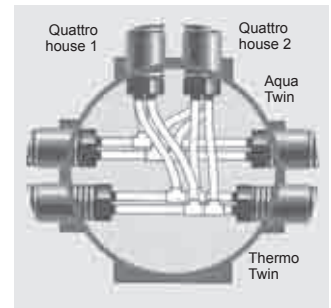
Heating supply from the main line to 2 houses



Heating and tap water from the main lines to the house



Heating supply from the main line to 4 houses



Heating and tap water from the main line to 2 houses using Quattro

The rotomolded chambers are made of polyethylene and the insulative layer on the inside ensures minimized heat losses.





# Dimensioning Pipes

## Thermo

### Quick dimensioning table PN 6

#### Heating pipe PN 6

Spread							Mass flow rate	Pipe type $\Delta p$ , v	Pipe type $\Delta p$ , v	Pipe type $\Delta p$ , v
$\Delta T = 10$ K	$\Delta T = 15$ K	$\Delta T = 20$ K	$\Delta T = 25$ K	$\Delta T = 30$ K	$\Delta T = 35$ K	$\Delta T = 40$ K				
10 kW	15 kW	20 kW	25 kW	30 kW	35 kW	40 kW	860 kg/h	25/20.4 0.3016 kPa/m 0.740 m/s	32/26.2 0.0909 kPa/m 0.449 m/s	40/32.6 0.0319 kPa/m 0.290 m/s
20 kW	30 kW	40 kW	50 kW	60 kW	70 kW	80 kW	1720 kg/h	32/26.2 0.3157 kPa/m 0.897 m/s	40/32.6 0.1106 kPa/m 0.579 m/s	50/40.8 0.0377 kPa/m 0.370 m/s
30 kW	45 kW	60 kW	75 kW	90 kW	105 kW	120 kW	2581 kg/h	32/26.2 0.6553 kPa/m 1.346 m/s	40/32.6 0.2294 kPa/m 0.869 m/s	50/40.8 0.0782 kPa/m 0.555 m/s
40 kW	60 kW	80 kW	100 kW	120 kW	140 kW	160 kW	3441 kg/h	40/32.6 0.3853 kPa/m 1.159 m/s	50/40.8 0.1312 kPa/m 0.740 m/s	63/51.4 0.0433 kPa/m 0.466 m/s
50 kW	75 kW	100 kW	125 kW	150 kW	175 kW	200 kW	4301 kg/h	50/40.8 0.1961 kPa/m 0.925 m/s	63/51.4 0.0647 kPa/m 0.583 m/s	75/61.4 0.0276 kPa/m 0.408 m/s
60 kW	90 kW	120 kW	150 kW	180 kW	210 kW	240 kW	5161 kg/h	50/40.8 0.2725 kPa/m 1.110 m/s	63/51.4 0.0899 kPa/m 0.699 m/s	75/61.4 0.0383 kPa/m 0.490 m/s
70 kW	105 kW	140 kW	175 kW	210 kW	245 kW	280 kW	6022 kg/h	50/40.8 0.3599 kPa/m 1.295 m/s	63/51.4 0.1186 kPa/m 0.816 m/s	75/61.4 0.0505 kPa/m 0.572 m/s
80 kW	120 kW	160 kW	200 kW	240 kW	280 kW	320 kW	6882 kg/h	63/51.4 0.1510 kPa/m 0.932 m/s	75/61.4 0.0643 kPa/m 0.653 m/s	90/73.6 0.0269 kPa/m 0.455 m/s
90 kW	135 kW	180 kW	225 kW	270 kW	315 kW	360 kW	7742 kg/h	63/51.4 0.1867 kPa/m 1.049 m/s	75/61.4 0.0795 kPa/m 0.735 m/s	90/73.6 0.0333 kPa/m 0.512 m/s
100 kW	150 kW	200 kW	250 kW	300 kW	350 kW	400 kW	8602 kg/h	63/51.4 0.2259 kPa/m 1.165 m/s	75/61.4 0.0961 kPa/m 0.817 m/s	90/73.6 0.0402 kPa/m 0.568 m/s
110 kW	165 kW	220 kW	275 kW	330 kW	385 kW	440 kW	9.462 kg/h	63/51.4 0.2684 kPa/m 1.282 m/s	75/61.4 0.1142 kPa/m 0.898 m/s	90/73.6 0.0478 kPa/m 0.625 m/s
120 kW	180 kW	240 kW	300 kW	360 kW	420 kW	480 kW	10323 kg/h	75/61.4 0.1336 kPa/m 0.980 m/s	90/73.6 0.0559 kPa/m 0.682 m/s	110/90.0 0.0213 kPa/m 0.456 m/s
130 kW	195 kW	260 kW	325 kW	390 kW	455 kW	520 kW	11183 kg/h	75/61.4 0.1544 kPa/m 1.062 m/s	90/73.6 0.0646 kPa/m 0.739 m/s	110/90.0 0.0246 kPa/m 0.494 m/s
140 kW	210 kW	280 kW	350 kW	420 kW	490 kW	560 kW	12043 kg/h	75/61.4 0.1766 kPa/m 1.143 m/s	90/73.6 0.0739 kPa/m 0.796 m/s	110/90.0 0.0281 kPa/m 0.532 m/s
150 kW	225 kW	300 kW	375 kW	450 kW	525 kW	600 kW	12903 kg/h	75/61.4 0.2000 kPa/m 1.225 m/s	90/73.6 0.0837 kPa/m 0.853 m/s	110/90.0 0.0318 kPa/m 0.570 m/s
160 kW	240 kW	320 kW	400 kW	480 kW	560 kW	640 kW	13763 kg/h	75/61.4 0.2248 kPa/m 1.307 m/s	90/73.6 0.0940 kPa/m 0.909 m/s	110/90.0 0.0358 kPa/m 0.608 m/s
170 kW	255 kW	340 kW	425 kW	510 kW	595 kW	680 kW	14624 kg/h	90/73.6 0.1049 kPa/m 0.966 m/s	110/90.0 0.0399 kPa/m 0.646 m/s	125/102 0.0217 kPa/m 0.501 m/s
180 kW	270 kW	360 kW	450 kW	540 kW	630 kW	720 kW	15484 kg/h	90/73.6 0.1164 kPa/m 1.023 m/s	110/90.0 0.0442 kPa/m 0.684 m/s	125/102 0.0240 kPa/m 0.531 m/s
190 kW	285 kW	380 kW	475 kW	570 kW	665 kW	760 kW	16344 kg/h	90/73.6 0.1283 kPa/m 1.080 m/s	110/90.0 0.0488 kPa/m 0.722 m/s	125/102 0.0265 kPa/m 0.560 m/s

## Heating pipe PN 6

Spread							Mass flow rate	Pipe type $\Delta p \cdot v$	Pipe type $\Delta p \cdot v$	Pipe type $\Delta p \cdot v$
$\Delta T = 10 \text{ K}$	$\Delta T = 15 \text{ K}$	$\Delta T = 20 \text{ K}$	$\Delta T = 25 \text{ K}$	$\Delta T = 30 \text{ K}$	$\Delta T = 35 \text{ K}$	$\Delta T = 40 \text{ K}$				
200 kW	300 kW	400 kW	500 kW	600 kW	700 kW	800 kW	17204 kg/h	90/73.6 0.1408 kPa/m 1.137 m/s	110/90 0.0535 kPa/m 0.760 m/s	125/102 0.0290 kPa/m 0.590 m/s
210 kW	315 kW	420 kW	525 kW	630 kW	735 kW	840 kW	18065 kg/h	90/73.6 0.1538 kPa/m 1.194 m/s	110/90 0.0584 kPa/m 0.798 m/s	125/102 0.0317 kPa/m 0.619 m/s
220 kW	330 kW	440 kW	550 kW	660 kW	770 kW	880 kW	18925 kg/h	90/73.6 0.1673 kPa/m 1.251 m/s	110/90 0.0636 kPa/m 0.836 m/s	125/102 0.0345 kPa/m 0.649 m/s
230 kW	345 kW	460 kW	575 kW	690 kW	805 kW	920 kW	19785 kg/h	90/73.6 0.1813 kPa/m 1.307 m/s	110/90 0.0689 kPa/m 0.874 m/s	125/102 0.0374 kPa/m 0.678 m/s
240 kW	360 kW	480 kW	600 kW	720 kW	840 kW	960 kW	20640 kg/h	110/90 0.0744 kPa/m 0.912 m/s	125/102 0.0404 kPa/m 0.708 m/s	
250 kW	375 kW	500 kW	625 kW	750 kW	875 kW	1000 kW	21505 kg/h	110/90 0.0801 kPa/m 0.950 m/s	125/102 0.0435 kPa/m 0.737 m/s	
260 kW	390 kW	520 kW	650 kW	780 kW	910 kW	1040 kW	22366 kg/h	110/90 0.0860 kPa/m 0.988 m/s	125/102 0.0467 kPa/m 0.766 m/s	
270 kW	405 kW	540 kW	675 kW	810 kW	945 kW	1080 kW	23220 kg/h	110/90 0.0921 kPa/m 1.026 m/s	125/102 0.0500 kPa/m 0.796 m/s	
280 kW	420 kW	560 kW	700 kW	840 kW	980 kW	1120 kW	24086 kg/h	110/90 0.0984 kPa/m 1.064 m/s	125/102 0.0534 kPa/m 0.825 m/s	
290 kW	435 kW	580 kW	725 kW	870 kW	1015 kW	1160 kW	24946 kg/h	110/90 0.1048 kPa/m 1.102 m/s	125/102 0.0569 kPa/m 0.855 m/s	
300 kW	450 kW	600 kW	750 kW	900 kW	1050 kW	1200 kW	25806 kg/h	110/90 0.1115 kPa/m 1.140 m/s	125/102 0.0605 kPa/m 0.884 m/s	
310 kW	465 kW	620 kW	775 kW	930 kW	1085 kW	1240 kW	26667 kg/h	110/90 0.1183 kPa/m 1.178 m/s	125/102 0.0642 kPa/m 0.914 m/s	
320 kW	480 kW	640 kW	800 kW	960 kW	1120 kW	1280 kW	27527 kg/h	110/90 0.1253 kPa/m 1.216 m/s	125/102 0.0680 kPa/m 0.943 m/s	
330 kW	495 kW	660 kW	825 kW	990 kW	1155 kW	1320 kW	28387 kg/h	110/90 0.1325 kPa/m 1.254 m/s	125/102 0.0719 kPa/m 0.973 m/s	
340 kW	510 kW	680 kW	850 kW	1020 kW	1190 kW	1360 kW	29247 kg/h	110/90 0.1398 kPa/m 1.292 m/s	125/102 0.0759 kPa/m 1.002 m/s	
350 kW	525 kW	700 kW	875 kW	1050 kW	1225 kW	1400 kW	30108 kg/h	125/102 0.0799 kPa/m 1.032 m/s		
360 kW	540 kW	720 kW	900 kW	1080 kW	1260 kW	1440 kW	30968 kg/h	125/102 0.0841 kPa/m 1.061 m/s		
370 kW	555 kW	740 kW	925 kW	1110 kW	1295 kW	1480 kW	31828 kg/h	125/102 0.0884 kPa/m 1.091 m/s		
380 kW	570 kW	760 kW	950 kW	1140 kW	1330 kW	1520 kW	32688 kg/h	125/102 0.0928 kPa/m 1.120 m/s		

## Heating pipe PN 6

Spread							Mass flow rate	Pipe type $\Delta p \cdot v$	Pipe type $\Delta p \cdot v$	Pipe type $\Delta p \cdot v$
$\Delta T = 10 \text{ K}$	$\Delta T = 15 \text{ K}$	$\Delta T = 20 \text{ K}$	$\Delta T = 25 \text{ K}$	$\Delta T = 30 \text{ K}$	$\Delta T = 35 \text{ K}$	$\Delta T = 40 \text{ K}$				
390 kW	585 kW	780 kW	975 kW	1170 kW	1365 kW	1560 kW	33548 kg/h	125/102 0.0973 kPa/m 1.150 m/s		
400 kW	600 kW	800 kW	1000 kW	1200 kW	1400 kW	1600 kW	34409 kg/h	125/102 0.1018 kPa/m 1.179 m/s		
410 kW	615 kW	820 kW	1025 kW	1230 kW	1435 kW	1640 kW	35269 kg/h	125/102 0.1065 kPa/m 1.209 m/s		
420 kW	630 kW	840 kW	1050 kW	1260 kW	1470 kW	1680 kW	36129 kg/h	125/102 0.1112 kPa/m 1.238 m/s		
430 kW	645 kW	860 kW	1075 kW	1290 kW	1505 kW	1720 kW	36989 kg/h	125/102 0.1161 kPa/m 1.268 m/s		
440 kW	660 kW	880 kW	1100 kW	1320 kW	1540 kW	1760 kW	37849 kg/h	125/102 0.1210 kPa/m 1.297 m/s		
450 kW	675 kW	900 kW	1125 kW	1350 kW	1575 kW	1800 kW	38710 kg/h	125/102 0.1261 kPa/m 1.327 m/s		

For sizing pipes, the following equation applies

<b><math>Q = \dot{m} C_p \Delta T</math></b>	<b>Where</b>	<b>Q = heating power (kW)</b> <b><math>\dot{m}</math> = mass flow rate kg/s</b>	<b><math>C_p</math> = water specific heat capacity</b> <b><math>\Delta T</math> = temperature difference</b>
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The following table enables determination of the pressure loss at a specified flow rate. It is recommended to keep the pressure loss below 0.3kPa/m.



## Pressure loss tables for PN 6 pipes

Heating pipe: Based on 50°C water temperature\*

DIM: d <sub>i</sub> [mm]:		25 x 2.3 20.4	32 x 2.9 26.2	40 x 3.7 32.6	50 x 4.6 40.8	63 x 5.8 51.4	75 x 6.8 61.4	90 x 8.2 73.6	110 x 10 90.0	125 x 11.4 102.2									
Volumetric flow rate		kPa/m m/s		kPa/m m/s		kPa/m m/s		kPa/m m/s		kPa/m m/s		kPa/m m/s							
l/h	l/s																		
36	0.01																		
72	0.02																		
108	0.03																		
144	0.04																		
180	0.05	0.018	0.153																
216	0.06	0.025	0.184																
252	0.07	0.033	0.214																
288	0.08	0.042	0.245																
324	0.09	0.051	0.275																
360	0.1	0.062	0.306	0.019	0.185														
720	0.2	0.214	0.612	0.065	0.371	0.023	0.240												
1080	0.3	0.444	0.918	0.134	0.556	0.047	0.359												
1440	0.4	0.745	1.224	0.224	0.742	0.079	0.479	0.027	0.306										
1800	0.5	1.114	1.530	0.335	0.927	0.117	0.599	0.040	0.382										
2160	0.6	1.548	1.836	0.465	1.113	0.163	0.719	0.056	0.459										
2520	0.7	2.044	2.142	0.614	1.298	0.215	0.839	0.073	0.535										
2880	0.8	2.601	2.448	0.782	1.484	0.274	0.958	0.093	0.612	0.031	0.386								
3240	0.9	3.217	2.754	0.967	1.669	0.338	1.078	0.115	0.688	0.038	0.434								
3600	1	3.891	3.059	1.169	1.855	0.409	1.198	0.139	0.765	0.046	0.482								
3960	1.1	4.623	3.665	1.389	2.040	0.486	1.318	0.165	0.841	0.055	0.530								
4320	1.2	5.411	3.671	1.625	2.226	0.568	1.438	0.193	0.918	0.064	0.578	0.027	0.405						
5040	1.4	7.152	4.283	2.147	2.597	0.751	1.677	0.255	1.071	0.084	0.675	0.036	0.473						
5760	1.6	9.108	4.895	2.733	2.968	0.956	1.917	0.325	1.224	0.107	0.771	0.046	0.540						
6480	1.8	11.274	5.507	3.383	3.339	1.182	2.156	0.402	1.377	0.133	0.867	0.056	0.608	0.024	0.423				
7200	2	13.647	6.119	4.093	3.710	1.431	2.396	0.486	1.530	0.160	0.964	0.068	0.675	0.029	0.470				
7920	2.2	16.223	6.731	4.865	4.081	1.700	2.636	0.578	1.683	0.190	1.060	0.081	0.743	0.034	0.517				
8640	2.4	18.998	7.343	5.696	4.452	1.990	2.875	0.676	1.836	0.223	1.157	0.095	0.811	0.040	0.564				
9360	2.6	21.969	7.955	6.586	4.823	2.300	3.115	0.782	1.989	0.257	1.253	0.110	0.878	0.046	0.611				
10080	2.8	25.134	8.567	7.533	5.194	2.631	3.355	0.894	2.142	0.294	1.349	0.125	0.946	0.052	0.658				
10800	3	28.491	9.178	8.538	5.565	2.981	3.594	1.013	2.295	0.334	1.446	0.142	1.013	0.059	0.705	0.023	0.472		
12600	3.5	37.707	10.708	11.295	6.492	3.943	4.193	1.339	2.677	0.441	1.687	0.187	1.182	0.078	0.823	0.030	0.550		
14400	4	48.077	12.238	14.397	7.419	5.024	4.792	1.706	3.059	0.561	1.928	0.239	1.351	0.100	0.940	0.038	0.629	0.021	0.488
16200	4.5			17.835	8.347	6.223	5.391	2.112	3.442	0.695	2.169	0.295	1.520	0.124	1.058	0.047	0.707	0.025	0.549
18000	5			21.603	9.274	7.536	5.990	2.557	3.824	0.841	2.410	0.358	1.689	0.150	1.175	0.057	0.786	0.031	0.610
19800	5.5			25.696	10.202	8.962	6.589	3.041	4.207	1.000	2.651	0.425	1.858	0.178	1.293	0.068	0.865	0.037	0.670
21600	6			30.109	11.129	10.499	7.188	3.561	4.589	1.171	2.892	0.498	2.026	0.208	1.410	0.079	0.943	0.043	0.731
23400	6.5			34.837	12.056	12.145	7.787	4.119	4.972	1.354	3.133	0.575	2.195	0.240	1.528	0.091	1.022	0.050	0.792
25200	7					13.900	8.386	4.713	5.354	1.549	3.374	0.658	2.364	0.275	1.645	0.104	1.100	0.057	0.853
27000	7.5					15.761	8.985	5.344	5.737	1.756	3.614	0.746	2.533	0.312	1.763	0.118	1.179	0.064	0.914
28800	8					17.728	9.584	6.010	6.119	1.975	3.855	0.839	2.702	0.350	1.880	0.133	1.258	0.072	0.975
30600	8.5					19.799	10.183	6.711	6.501	2.205	4.096	0.936	2.871	0.391	1.998	0.149	1.336	0.081	1.036
32400	9					21.974	10.782	7.447	6.884	2.446	4.337	1.039	3.040	0.434	2.115	0.165	1.415	0.089	1.097

Heating pipe: Based on 50°C water temperature\*

DIM:		25 x 2.3	32 x 2.9	40 x 3.7	50 x 4.6	63 x 5.8	75 x 6.8	90 x 8.2	110 x 10	125 x 11.4									
d <sub>i</sub> [mm]:		20.4	26.2	32.6	40.8	51.4	61.4	73.6	90.0	102.2									
Volumetric flow rate																			
l/h	l/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s
34200	9.5			24.252	11.381	8.218	7.266	2.699	4.578	1.146	3.208	0.479	2.233	0.182	1.493	0.099	1.158		
36000	10			26.632	11.980	9.023	7.649	2.963	4.819	1.258	3.377	0.525	2.350	0.199	1.572	0.108	1.219		
37800	10.5					9.862	8.031	3.238	5.060	1.375	3.546	0.574	2.468	0.218	1.650	0.118	1.280		
39600	11					10.735	8.414	3.525	5.301	1.496	3.715	0.625	2.586	0.237	1.729	0.129	1.341		
43200	12					12.582	9.178	4.130	5.783	1.753	4.053	0.732	2.821	0.278	1.886	0.151	1.463		
46800	13					14.561	9.943	4.779	6.265	2.028	4.391	0.847	3.056	0.321	2.043	0.174	1.585		
50400	14					116.670	10.708	5.470	6.747	2.321	4.728	0.969	3.291	0.367	2.201	0.199	1.707		
54000	15					18.909	11.473	6.204	7.229	2.632	5.066	1.098	3.526	0.417	2.358	0.226	1.829		
57600	16					21.276	12.238	6.979	7.711	2.960	5.404	1.235	3.761	0.468	2.515	0.254	1.950		
61200	17							7.796	8.193	3.306	5.741	1.380	3.996	0.523	2.672	0.283	2.072		
64800	18							8.653	8.675	3.670	6.079	1.531	4.231	0.580	2.829	0.315	2.194		
68400	19							9.552	9.157	4.050	6.417	1.690	4.466	0.640	2.987	0.347	2.316		
72000	20							10.490	9.639	4.448	6.755	1.855	4.701	0.703	3.144	0.381	2.438		
79200	22							12.487	10.602	5.293	7.430	2.208	5.171	0.837	3.458	0.453	2.682		
86400	24							14.641	11.566	6.206	8.106	2.587	5.641	0.980	3.773	0.531	2.926		
93600	26							16.951	12.530	7.183	8.781	2.995	6.111	1.134	4.087	0.614	3.169		
100800	28									8.226	9.457	3.429	6.581	1.299	4.401	0.703	3.413		
108000	30									9.333	10.132	3.890	7.051	1.473	4.716	0.798	3.657		
115200	32									10.503	10.807	4.377	7.522	1.657	5.030	0.897	3.901		
122400	34									11.736	11.483	4.890	7.992	1.851	5.344	1.002	4.145		
129600	36									13.032	12.158	5.429	8.462	2.055	5.659	1.113	4.388		
136800	38											5.994	8.932	2.269	5.973	1.228	4.632		
144000	40											6.584	9.402	2.492	6.288	1.349	4.876		
162000	45											8.170	10.577	3.091	7.074	1.673	5.486		
180000	50											9.911	11.752	3.749	7.860	2.029	6.095		
198000	55											11.805	12.928	4.464	8.645	2.415	6.705		
216000	60													5.236	9.431	2.833	7.314		
234000	65													6.064	10.217	3.280	7.924		
252000	70													6.948	11.003	3.758	8.533		
270000	75													7.886	11.789	4.265	9.143		
288000	80													8.878	12.575	4.801	9.752		
306000	85															5.366	10.362		
324000	90															5.960	10.971		
342000	95															6.583	11.581		
360000	100															7.233	12.190		

\*Pressure loss correction factors for other water temperatures

°C	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Factor	1.217	1.183	1.150	1.117	1.100	1.067	1.050	1.017	1.000	0.983	0.967	0.952	0.938	0.933	0.918	0.904	0.890	0.873

# Aqua

Potable water pipe: Basis 50 °C water temperature\*

DIM:	25 x 3.5	32 x 4.4	40 x 5.5	50 x 6.9	63 x 8.6	75 x 10.3	90 x 12.3	110 x 15.1									
d, [mm]:	18.0	23.2	29.0	36.2	45.6	54.4	65.4	79.8									
Volumetric flow rate																	
	l/h	l/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	kPa/m	m/s	
36	0.01																
72	0.02																
108	0.03																
144	0.04																
180	0.05	0.033	0.196														
216	0.06	0.045	0.236														
252	0.07	0.060	0.275														
288	0.08	0.076	0.314														
324	0.09	0.093	0.354	0.028	0.213												
360	0.1	0.113	0.393	0.033	0.237												
720	0.2	0.391	0.786	0.116	0.473	0.040	0.303										
1080	0.3	0.810	1.179	0.240	0.710	0.082	0.454	0.028	0.291								
1440	0.4	1.360	1.572	0.402	0.946	0.138	0.606	0.048	0.389								
1800	0.5	2.032	1.965	0.601	1.183	0.206	0.757	0.071	0.486	0.023	0.303						
2160	0.6	2.823	2.358	0.834	1.419	0.286	0.908	0.099	0.583	0.032	0.364						
2520	0.7	3.729	2.751	1.102	1.656	0.377	1.060	0.130	0.680	0.042	0.425	0.018	0.301				
2880	0.8	4.746	3.144	1.402	1.892	0.480	1.211	0.165	0.777	0.054	0.486	0.023	0.344				
3240	0.9	5.871	3.537	1.734	2.129	0.593	1.363	0.205	0.874	0.066	0.546	0.029	0.387				
3600	1.0	7.103	3.930	2.097	2.366	0.718	1.514	0.247	0.972	0.080	0.607	0.035	0.430				
3960	1.1	8.439	4.323	2.491	2.602	0.852	1.665	0.294	1.069	0.095	0.668	0.042	0.473				
4320	1.2	9.878	4.716	2.915	2.839	0.997	1.817	0.344	1.166	0.111	0.728	0.049	0.516				
5040	1.4	13.059	5.502	3.853	3.312	1.318	2.120	0.454	1.360	0.147	0.850	0.064	0.602				
5760	1.6	16.633	6.288	4.906	3.785	1.677	2.422	0.578	1.555	0.187	0.971	0.082	0.688	0.034	0.476		
6480	1.8	20.593	7.074	6.072	4.258	2.076	2.725	0.715	1.749	0.231	1.093	0.101	0.774	0.042	0.536		
7200	2.0	24.930	7.860	7.349	4.731	2.512	3.028	0.865	1.943	0.279	1.214	0.122	0.860	0.050	0.595		
7920	2.2	29.638	8.645	8.735	5.204	2.985	3.331	1.027	2.138	0.331	1.335	0.145	0.947	0.060	0.655		
8640	2.4	34.711	9.431	10.228	5.677	3.494	3.634	1.202	2.332	0.388	1.457	0.170	1.033	0.070	0.714		
9360	2.6	40.144	10.217	11.826	6.150	4.040	3.936	1.390	2.526	0.448	1.578	0.196	1.119	0.081	0.774	0.031	0.520
10080	2.8	45.932	11.003	13.529	6.624	4.621	4.239	1.589	2.721	0.513	1.700	0.224	1.205	0.092	0.834	0.036	0.560
10800	3.0	52.071	11.789	15.334	7.097	5.236	4.542	1.801	2.915	0.581	1.821	0.254	1.291	0.105	0.893	0.040	0.600
12600	3.5			20.290	8.279	6.927	5.299	2.382	3.401	0.768	2.124	0.336	1.506	0.138	1.042	0.053	0.700
14400	4.0			25.866	9.462	8.828	6.056	3.034	3.886	0.978	2.428	0.427	1.721	0.176	1.191	0.068	0.800
16200	4.5			32.048	10.645	10.934	6.813	3.757	4.372	1.211	2.731	0.529	1.936	0.218	1.340	0.084	0.900
18000	5.0			38.825	11.828	13.243	7.570	4.550	4.858	1.466	3.035	0.640	2.151	0.264	1.488	0.101	1.000
19800	5.5			46.187	13.011	15.751	8.327	5.410	5.344	1.743	3.338	0.761	2.366	0.314	1.637	0.120	1.100
21600	6.0				18.454	9.084	6.337	5.830	2.041	3.642	0.891	2.581	0.367	1.786	0.141	1.200	
23400	6.5				21.350	9.841	7.331	6.315	2.360	3.945	1.030	2.797	0.425	1.935	0.163	1.300	
25200	7.0				24.437	10.598	8.389	6.801	2.700	4.249	1.179	3.012	0.486	2.084	0.186	1.400	
27000	7.5				27.712	11.355	9.512	7.287	3.061	4.552	1.336	3.227	0.550	2.233	0.211	1.500	
28800	8.0				31.172	12.112	10.698	7.773	3.443	4.856	1.502	3.442	0.619	2.381	0.237	1.600	
30600	8.5						11.947	8.259	3.844	5.159	1.677	3.657	0.691	2.530	0.265	1.700	
32400	9.0						13.259	8.745	4.265	5.463	1.861	3.872	0.766	2.679	0.294	1.799	
34200	9.5						14.632	9.230	4.707	5.766	2.054	4.087	0.846	2.828	0.324	1.899	
36000	10.0						16.067	9.716	5.167	6.070	2.254	4.302	0.928	2.977	0.356	1.999	
37800	10.5						17.562	10.202	5.648	6.373	2.464	4.518	1.014	3.126	0.389	2.099	
39600	11						19.118	10.688	6.147	6.677	2.681	4.733	1.104	3.275	0.423	2.199	
43200	12						22.409	11.659	7.204	7.284	3.142	5.163	1.293	3.572	0.496	2.399	
46800	13						25.936	12.631	8.336	7.891	3.635	5.593	1.496	3.870	0.573	2.599	
50400	14								9.543	8.498	4.161	6.023	1.712	4.168	0.656	2.799	

\*Pressure loss correction factors for other water temperatures

°C	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Factor	1.208	1.174	1.144	1.115	1.087	1.060	1.039	1.019	1.000	0.982	0.965	0.954	0.943	0.928	0.923	0.907	0.896	0.878



# Supra

## Potable water/cooling water pipe: Basis 20°C water temperature

V l/s	25 / 20.4 / 2.3		32 / 26.2 / 2.9		40 / 32.6 / 3.7		50 / 40.8 / 4.6		63 / 51.4 / 5.8		75 / 61.4 / 6.8		90 / 73.6 / 8.2		110 / 90.0 / 10.0	
	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]	v [m/s]	Δp [bar/ 100 m]
0.0315	0.096	0.0127	0.059	0.0041												
0.04	0.122	0.0189	0.075	0.0061												
0.05	0.153	0.0275	0.094	0.0088	0.060	0.0031										
0.063	0.193	0.0407	0.119	0.0130	0.075	0.0045										
0.08	0.245	0.0611	0.151	0.0195	0.096	0.0067	0.061	0.0024								
0.1	0.306	0.0895	0.188	0.0285	0.120	0.0098	0.076	0.0034								
0.125	0.382	0.1315	0.235	0.0417	0.150	0.0144	0.096	0.0050	0.060	0.0017						
0.16	0.490	0.2016	0.301	0.0638	0.192	0.0219	0.122	0.0076	0.077	0.0026	0.054	0.0011				
0.2	0.612	0.2974	0.377	0.0939	0.240	0.0321	0.153	0.0111	0.096	0.0037	0.068	0.0016				
0.25	0.765	0.4394	0.471	0.1384	0.300	0.0473	0.191	0.0163	0.120	0.0055	0.085	0.0024	0.059	0.0010		
0.315	0.964	0.6599	0.593	0.2072	0.377	0.0706	0.241	0.0244	0.152	0.0082	0.107	0.0036	0.074	0.0015		
0.4	1.224	1.0068	0.753	0.3152	0.479	0.1071	0.306	0.0369	0.193	0.0123	0.136	0.0054	0.094	0.0023	0.063	0.0009
0.5	1.530	1.4972	0.942	0.4672	0.599	0.1585	0.382	0.0544	0.241	0.0182	0.170	0.0079	0.118	0.0033	0.079	0.0013
0.63	1.927	2.2631	1.187	0.7039	0.755	0.2381	0.482	0.0816	0.304	0.0272	0.214	0.0119	0.148	0.0049	0.099	0.0019
0.8	2.448	3.4774	1.507	1.0776	0.958	0.3634	0.612	0.1242	0.386	0.0413	0.272	0.0180	0.188	0.0075	0.126	0.0029
1	3.059	5.2062	1.883	1.6072	1.198	0.5405	0.765	0.1842	0.482	0.0611	0.340	0.0266	0.235	0.0111	0.157	0.0043
1.25			2.354	2.4022	1.498	0.8053	0.956	0.2738	0.602	0.0906	0.425	0.0394	0.294	0.0163	0.196	0.0063
1.6			3.014	3.7567	1.917	1.2547	1.224	0.4253	0.771	0.1403	0.544	0.0609	0.376	0.0252	0.252	0.0097
2					2.396	1.8774	1.530	0.6345	0.964	0.2088	0.680	0.0904	0.470	0.0374	0.314	0.0143
2.5					2.995	2.8148	1.912	0.9483	1.205	0.3112	0.850	0.1345	0.588	0.0555	0.393	0.0212
3.15							2.409	1.4406	1.518	0.4714	1.071	0.2033	0.740	0.0838	0.495	0.0320
4							3.059	2.2247	1.928	0.7254	1.360	0.3123	0.940	0.1285	0.629	0.0489
5									2.410	1.0873	1.700	0.4670	1.175	0.1917	0.786	0.0729
6.3									3.036	1.6567	2.142	0.7098	1.481	0.2908	0.990	0.1103
8											2.720	1.0965	1.880	0.4480	1.258	0.1695
10											3.399	1.6493	2.350	0.6722	1.572	0.2537
12.5													2.938	1.0104	1.965	1.3804
16															2.515	0.5966
20															3.144	0.8977



**Flow rates** have a considerable influence on the cost-efficiency and operational safety of a supply system. High flow rates result in high pressure losses and high dynamic pressure losses can occur. Furthermore, particles which have been deposited on the pipe walls may become entrained. Low flow rates result in long retention times whereby the water can become cloudy or contaminated with germs. Adequate water exchange must be observed.



### Dimensioning of lines for industrial water

The dimensioning of pipelines carrying water for domestic use must ensure there is sufficient water supply at each of the tap connections. The pipeline system dimensions must ensure that in the case of the lowest absolute pressure, each tap connection is sufficiently supplied.



#### Note:

Please observe DIN 1988 and the DVGW Work Sheet W551, which include some new items referring to district heating supply.

# Planning

## Design basics

### Lining up the elements

The flexible piping system allows you to plan the trenches flexibly and take the environment into account. When the pipe element is led into the building, the selection of the entry location must take into account the space requirements of the element bending radius.

### Linking

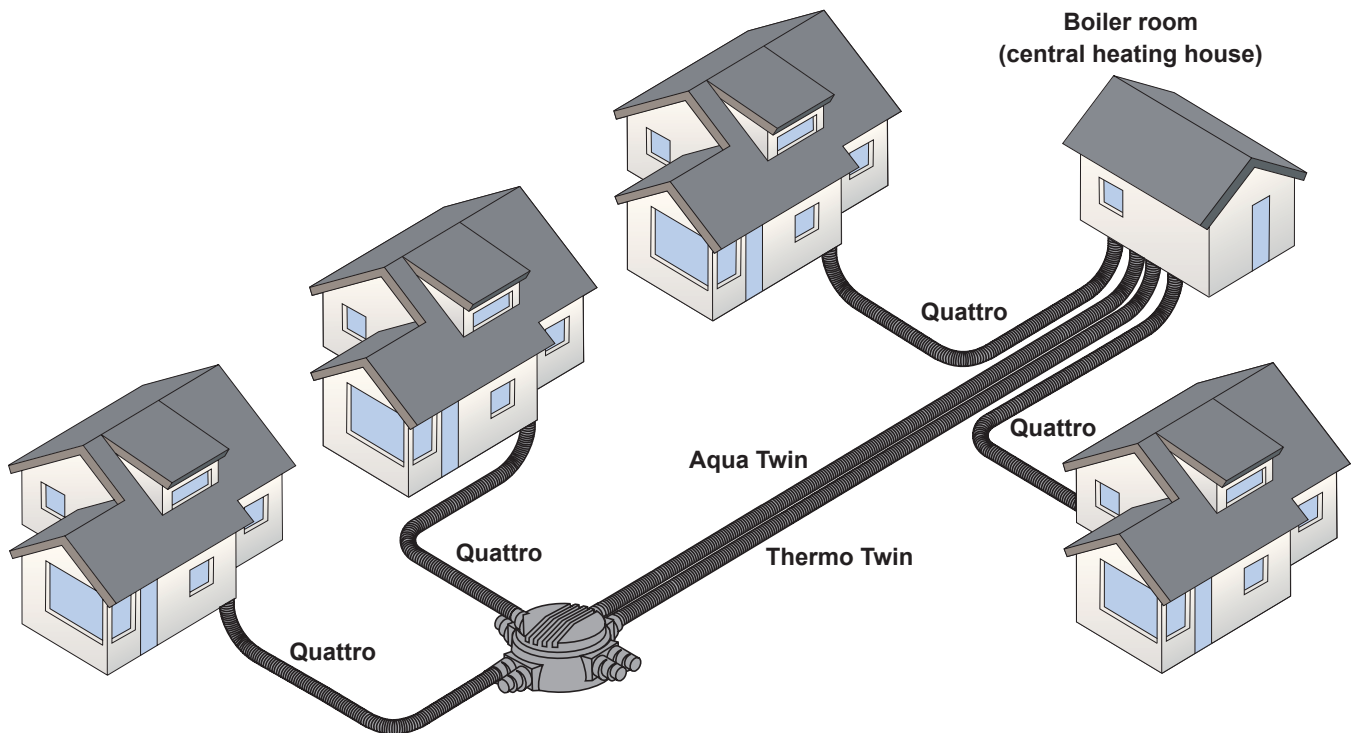
The implementation of the most profitable system in terms of operation and installation costs is best done using multiple pipe elements. Thermal loss is the least in the Quattro products, which are particularly well suited to implementation in terraced houses and small apartment buildings. The number of joints in the ground can be reduced for small buildings by using the linking technique. The technique is particularly well suited to locations where houses are lined up and the dimensions of the Quattro products are adequate. The floor space required by Quattro is very small, allowing for linking joints to be made inside the apartments. For example, the raised base of the hallway cabinet can be used as the linking space.

### Building-specific lines

In developments consisting of several buildings, straight connections from the house to the boiler room are recommended if the boiler room is located in a central location. Installation between buildings is fast straight off the coil and no connections are required. Trenches do not have to be kept open for pressure testing. The used pipe sizes are not large and this allows the use of multiple pipe elements.

### Combining products

Radiator-equipped hot tap water systems can be used with the larger circulation pipe elements Quattro and Aqua Twin. The benefits offered by twin and four-pipe elements can be taken advantage of in these locations. By combining products, a functional system can be created and efficient use of the chambers can be guaranteed.



## Planning the route

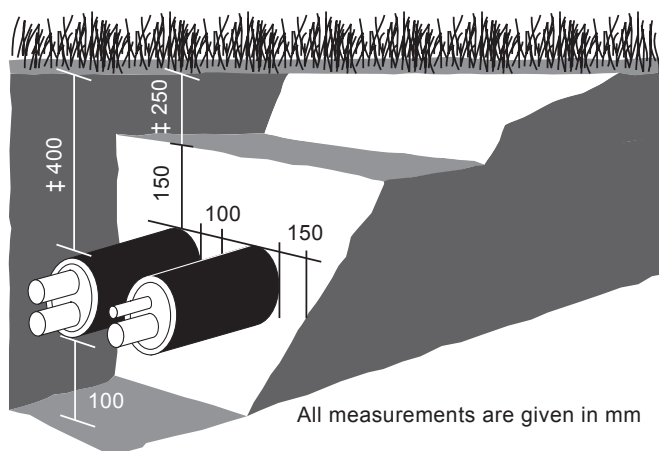
The flexibility of Uponor Pre-insulated pipes allows them to be adapted to almost any type of routing conditions on site. Existing lines can be crossed over or under, and obstacles simply detoured.

The system requires only a shallow narrow trench to be excavated. During installation, the pipe trenches outside of the pipe connections and branches need normally not be walked over so sufficient working space should be created at these points. In any case of changes in pipeline direction the various pipe systems must not fall below the permissible minimum bending radii. The excavated soil can be deposited on just one side of the trench. The pipeline is then rolled out on the other side directly into the trench. It is essential to avoid damage to the jacket pipe.

The trench must have a sandy bed, free of stones. Sand particle size should be 0 to 2/3 mm. Avoid any pointed or sharp-edged objects in the trench. The pipeline must be carefully embedded (at least 10 cm below and above the jacket pipe and between the trench walls) as this has a decisive impact on the service life of the jacket pipe. When determining the minimum coverage, any possible damage through subsequent construction work during the whole of the service life must be taken into consideration. The filling material must be compacted layer for layer, from 500 mm the coverage must also be compacted by machine. Then place the routing barrier tape and fill in the trench. The jacket pipes remain stable under earth and SLW (heavy traffic load) of  $h=0.5$  m up to max. 6 m. The required static evidence is verified according to the current regulation ATV-DVWK-A127 for embedded pipes. The verification applies only to certain installation conditions.



### Minimum coverage without traffic load

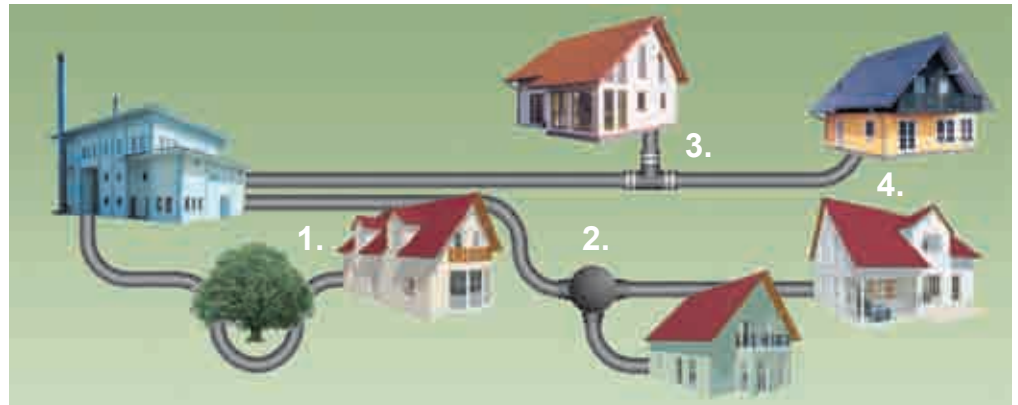


**Warning!** - local frost lines have not been taken into consideration!




### Coverage with heavy traffic load (SLW 60)









# Examples of Installations









## 1. House lead-in : Thermo Twin

Product	Number
Uponor rubber end cap	1 
Uponor Wipex male connectors	2 
Uponor Wipex joint	2 





## 2. Chamber installation Uponor Thermo Twin

Product	Number
Uponor chamber	1 
Uponor heat-shrinkable tube for chamber	3 
Uponor insulation tape for heat-shrinkable tube	1 
Uponor rubber end caps	3 
Uponor Wipex male connectors 6 bar	6 
Uponor Wipex T-pieces	2 

## 3. T-piece with reduced jacket pipe and medium pipe dimensions Uponor Thermo Twin





Product	Number
Uponor T-insulation set	1 
Uponor reducer rings for straight and T-insulation sets	2 
Uponor Wipex male connectors	6 
Uponor Wipex T-pieces	2 
Uponor Wipex reducers	4 
Uponor rubber end caps	3 

## 4. Wall sleeve Uponor Thermo Twin







Product	Number
Uponor wall seal pressure water-proof	1 
Uponor rubber end cap	1 
Uponor Wipex male connectors	2 
Uponor Wipex joint	2 






## Supply of adjacent building with heating water from house to house

Product	Number
Uponor Thermo Twin	1 
Uponor rubber end caps	2 
Uponor Wipex male connectors	4 
Uponor Wipex joint	4 

## Supply of adjacent building with heating water and warm water, including circulation

Product	Number
Uponor Quattro	1 
Uponor rubber end caps	2 
Uponor wall seal pressure water-proof PWP	2 
Uponor Wipex male connectors 6 bar	4 
Uponor Wipex male connectors 10 bar	4 
Uponor Wipex joint	8 

## Supply of adjacent building with potable water from house to house

Product	Number
Uponor Supra	1 
Uponor rubber end caps	2 
Uponor plastic male connectors	2 



# Notes on Processing and Installation

## Standard values for installing Uponor pre-insulated pipe systems



The time taken to install the pipe systems depends on local circumstances. In the following table, obstacles, undercrossings, weather conditions, set-up times and other such factors have not been taken into account, neither the employment of auxiliary aids such as excavators or cable winches.

Pipe type	25 metre fitters / Duration [mins.]	50 metre fitters / Duration [mins.]	100 metre fitters / Duration [mins.]
<b>Single:</b>			
25	2 / 15	2 / 30	3 / 40
32	2 / 15	2 / 30	3 / 40
40	2 / 20	2 / 40	3 / 60
50	2 / 20	2 / 40	3 / 60
63	3 / 20	3 / 40	4 / 60
75	3 / 25	3 / 50	4 / 75
90	3 / 30	4 / 60	5 / 90
110	3 / 30	4 / 60	5 / 90
125	4 / 30	4 / 60	6 / 90
<b>Twin:</b>			
25	2 / 20	2 / 40	3 / 60
32	2 / 20	2 / 40	3 / 60
40	2 / 30	3 / 40	4 / 60
50	3 / 25	3 / 50	5 / 90
63	3 / 30	4 / 60	5 / 90
<b>Quattro:</b>			
	2 / 30	3 / 40	4 / 60

## Standard values for average installation times for connections and accessories:

Number of fitters/group minutes per item (e.g. 2/15 = 2 fitters requires 15 mins. per item)	
Uponor rubber end caps	1 / 5
Uponor Wipex male connectors	2 / 15
Uponor Wipex fitting	2 / 30
Uponor Wipex T-piece (complete)	2 / 40
Uponor straight insulation set	1 / 20
Uponor T-insulation set	1 / 30
Uponor elbow insulation set	1 / 30
Uponor chamber incl. 6 x outlets for jacket pipe	2 / 50
Uponor wall sleeve NPW (non-pressure water-proof)	1 / 30
Uponor wall seal pressure water-proof PWP	1 / 30
Uponor house lead-in, pressure water-proof (PWP)	1 / 30

## Two examples to illustrate average, practice relevant installation times for Uponor pre-insulated pipe systems:

### Example 1:

- Installation of 2 x 20 m Uponor Thermo-Single pipe, dimensions da = 63 mm
- 2 fitters, without the use of auxiliary aids

**Installation time: 2 x 10 minutes  
(x 2 fitters = 40 mins.)**

### Example 2:

- Installations of 2 x 130 m Uponor Thermo-Single pipes, dimension da = 110 mm
- Several undercrossings of intercrossed lines and several changes of direction
- 8 fitters, 1 excavator, cable winch and guide pulley

**Installation time: 2 x 90 minutes  
(x 8 fitters = 1440 mins.)**



The installation times given above are group minutes for the corresponding number of fitters (without trench work). The figures are meant as guidance for calculations.

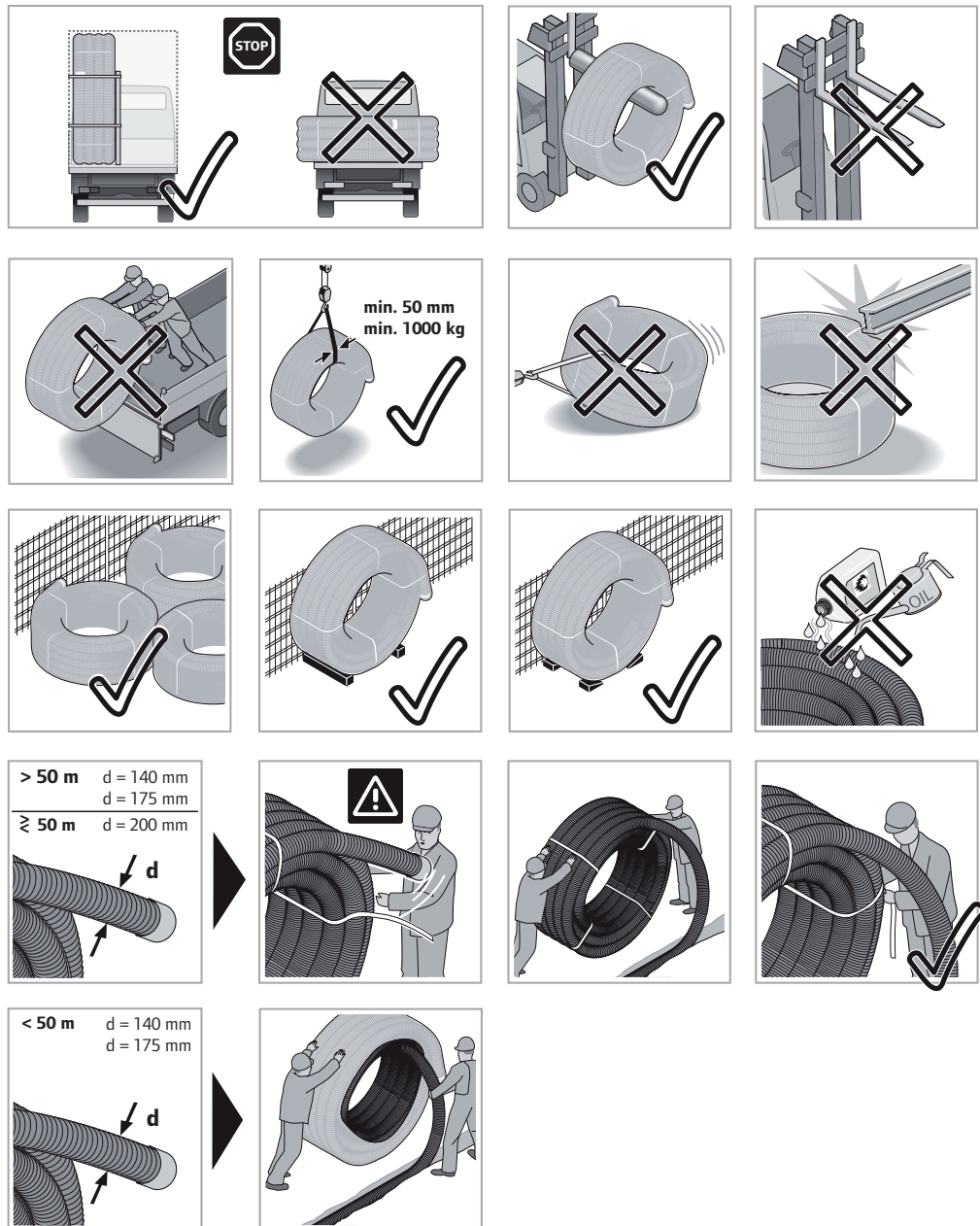
# Pipe handling

## Storing, lifting and handling the pipe coil

Conical end caps have been mounted on the ends of the pipes to protect the flow pipes against sunlight and other damage, including soiling during transportation. Protect the pipe coil from sharp objects during transportation and storage.

Do not drag the coil across rough surfaces. Ensure that the coil is not squashed and that the pipe is not dented when bent during storage. Store all coils in a horizontal position. Pipe coils and chambers can be stored outside, other components of the system should be stored indoors.

When unloading, do not drop the coils. Do not transport a pipe coil by pulling it. Use belts for lifting the coil.



**Please note!**  
When lifting pipe coils, use at least a 50mm diameter nylon or textile loop. If you are lifting the coils with a fork truck or other similar equipment, the forks must be rounded or padded. Due to the flexibility and weight of the coils, the diameter of the coils can vary by up to 30cm.

**Please note!**  
Plastic materials must never be brought into contact with aggressive substances such as motor fuel, solvents, timber preservative or similar.

## Uncoiling

Store the delivered coil as far as possible in its protective packaging until installation! Then uncoil the pipe directly into or beside the trench. Never pull the pipe across the ground as pointed objects could cause damage. Should the jacket pipe become damaged, it can be repaired using a shrinkable sleeve.

All pipeline parts and system accessories must be visually inspected prior to installation or processing for damage of influences which impact its function. Parts which are inacceptably impacted must be discarded! If the pipeline is to be installed horizontally in the open, support points (for example, using sand) must be provided to prevent the pipe from slipping later. If the ground is uneven, these supports must be provided every 25 metres.

When embedding pipe sections, a sufficiently free pipe length of 3 to 5 metres must be provided for installing the connecting systems. Where there is a change of material from steel to plastic medium pipe, stress may be transferred from the steel to the plastic pipe during temperature changes. In this case, shear forces particularly are to be avoided; if necessary, provide fixed points around the ends of the steel medium pipe. If installing in extremely low temperatures (increased pipe rigidity), the pipes should be stored in a heated hall or carry out the installation beneath a heated shelter directly at the trench.

### Rolling out the pipes from the inside. (recommended for jacket pipe diameters 140mm and 175mm or coiled lengths up to 100m):

Do not remove exterior packaging! Cut the nylon securing tapes in the coil. Take out the inner pipe end from the coil (do not remove the end cap until the pipe is connected!). Fix the pipe ends (e.g. by weighing them down or placing sand on top of them). Roll out the pipe, coil by coil.

### Rolling out the pipe from the outside. (recommended for jacket pipe diameters 200mm or coiled lengths in excess of 100m):

Remove the packaging foil. Open the first nylon tape at the outside pipe end, loosen the pipe end from the coil and fix the coil once more with the nylon tape. Warning – when opening the first nylon tape, the pipe end is under tension and can whiplash! Fix the loose pipe end (e.g. by weighing it down or placing sand on it) and roll out as far as the next nylon tape. Repeat this process until the coil is completely unrolled.

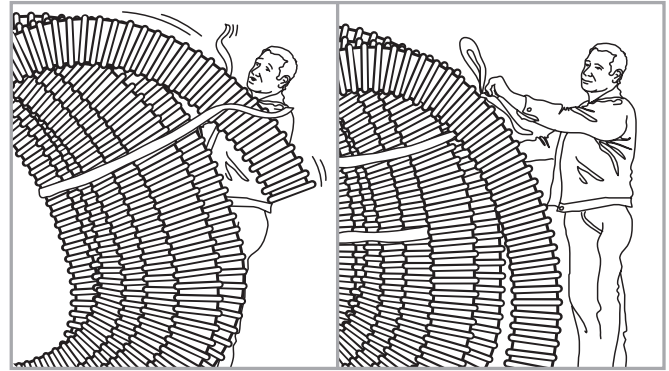
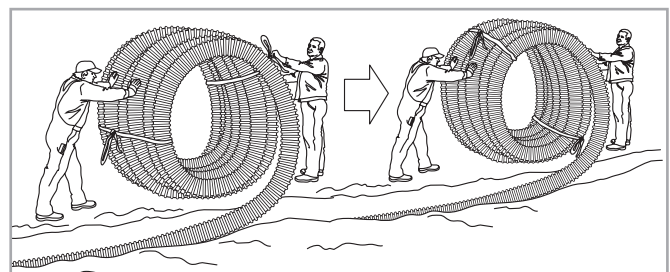
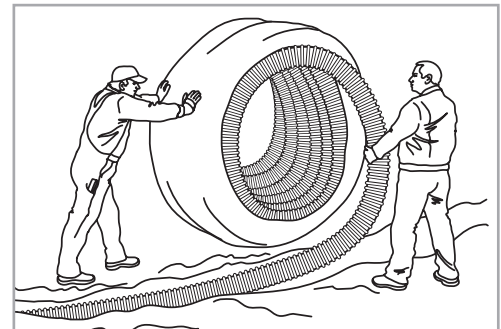


Fig. 1

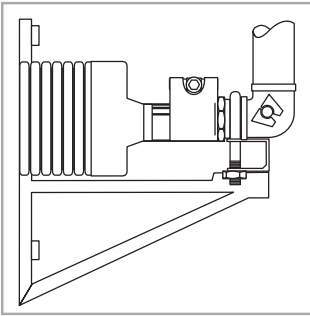
Fig. 2



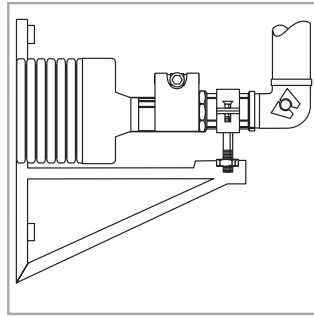
The pipe ends could whiplash when the textile tapes are opened (see Fig. 1) Therefore make sure the coils are always secured with two to three tapes. (see Fig. 2).



## Anchoring

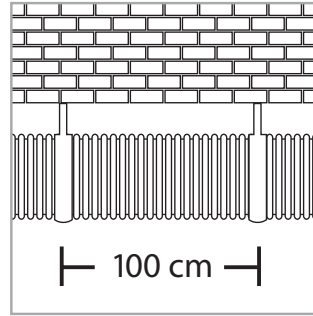


**Fixing to pipe elbow with a pipe clamp**



**Fixing to a fixed point joint with a pipe clamp**

The expansion behaviour of PE-X material leads to slight changes in the length of the medium pipe therefore a tension-free connection must be provided by a pipe bend or a fixed point joint.



**Wall and ceiling installation**

The Uponor pipe system can be fixed to any wall or ceiling using simple pipe clamps at intervals of 100 cm to prevent the pipe from sagging.

## Installation in cold temperatures

Installation is not recommended to be carried out in temperatures below  $-15^{\circ}\text{C}$ . In cold weather, installation is easier if the pipes are already warm, for example from having been stored in a warm space prior to the installation. On a construction site, heating can also be carried out using a hot air blower. Heating the pipes over an open fire is prohibited.

## Bending radii in mm

Product	25	32	40	50	63	75	90	110	125
Uponor Thermo Single	250	300	350	450	550	800	1100	1200	1400
Uponor Thermo Twin	500	600	800	1000	1200				
Uponor Aqua Single	350	400	450	550	650	900	1200	1300	
Uponor Aqua Twin	650	700	900	1000					
Uponor Quattro	800	800							
Uponor Supra	200	250	300	400	500	600	700	1200	
Uponor Thermo Mini	200	250							



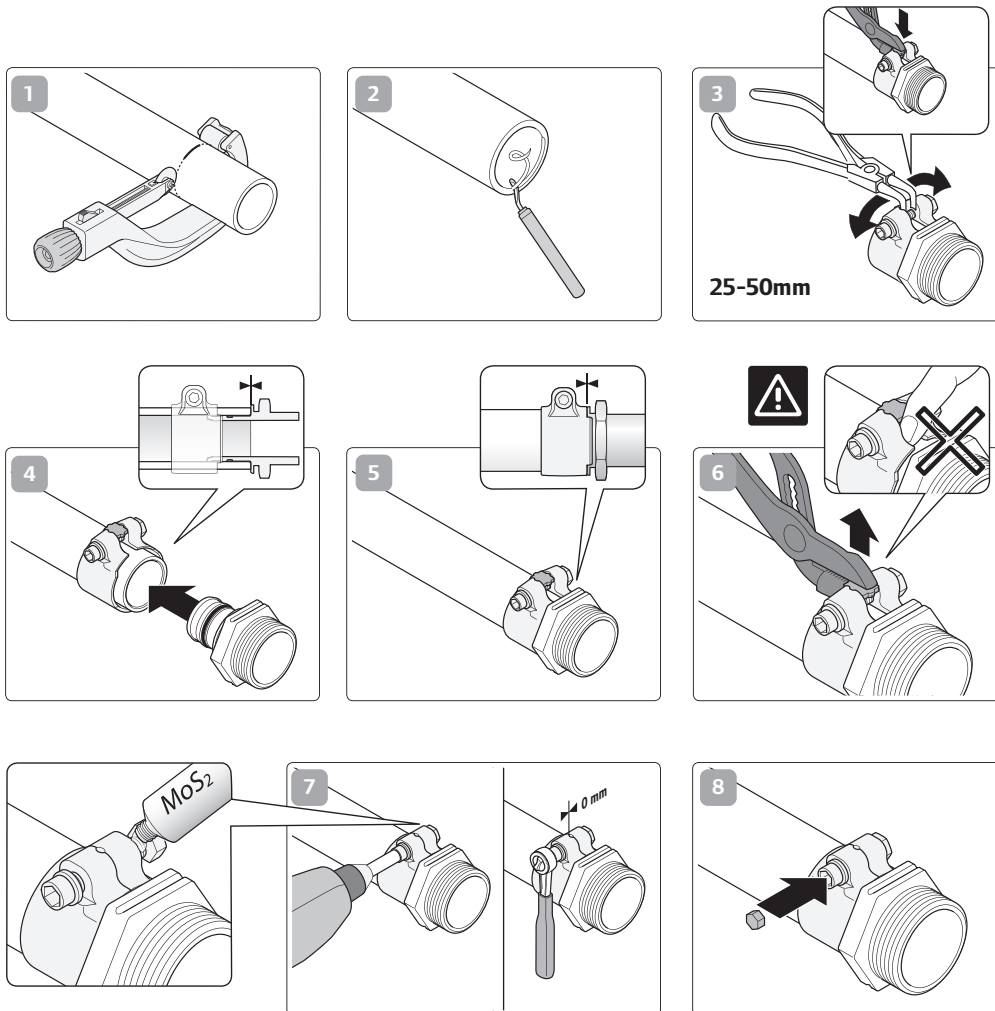


# Mounting Instructions

## Uponor Wipex fittings

Wipex is a complete set of fittings that fits Uponor PEX pipes used in hot tap water and heating systems and certain industrial applications.

Wipex fittings are used for pipes with an external diameter of 25-110 mm and pressure class of 6 or 10 bar. Required combinations of fittings are created using Wipex parts. Joints are sealed using the o-rings, supplied with the fittings.



Wipex fitting	Allen key size	ISO 4762 DIN 912
25	5	M6x35
32	5	M6x40
40	6	M8x45
50	8	M10x55
63	10	M12x70
75	10	M12x75
90	14	M16x90
110	14	M16x90

### Wipex base parts (tee, elbow, reducer, flange)

Check that the o-ring housing is clean. Only use the o-rings supplied with the base parts. Place the o-ring in the intended groove. Fasten all parts manually, if at all possible. Tighten the parts using a spanner or a pipe-wrench with small jaws all the way down (metal against metal). When other items are mounted on the Wipex base parts or pipe couplings, the threaded coupling must be tightened using flax (hemp).

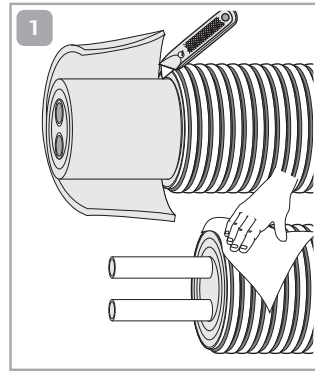
## Uponor rubber end caps

The rubber end caps are always used at the pipe ends. They protect the insulation against moisture and provide partitions between components.

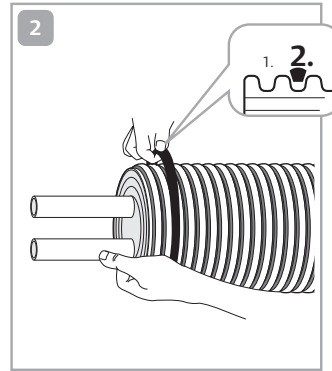
### Installing the rubber end caps

Put the end caps in place before the couplings.

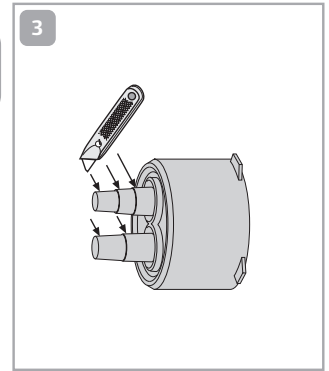
**Please note!** Follow also the instructions for the Uponor insulation sets.



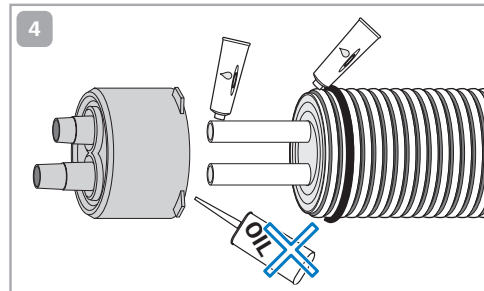
Cut away jacket pipe and peel off insulation layers so that enough flow pipe is visible to join the coupling and the end cap. Be careful not to damage the flow pipe. Clean the surfaces carefully.



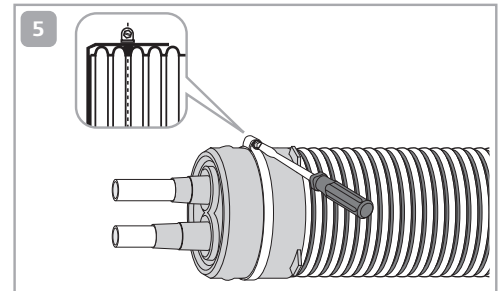
Install the rubber seal in the second groove.



Open outlets on the rubber end cap according to the flow pipe size.



Install the end cap over the end of the pipe using lubricant. A non oil-based lubricant can assist.



Position the jubilee clip over the seal and tighten.

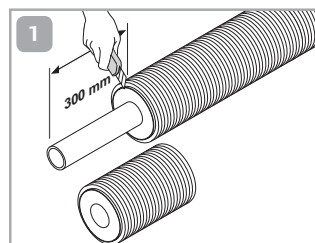
## Uponor insulation sets

### Example: T-branches

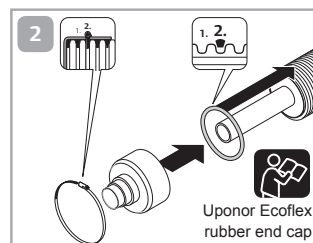
Uponor insulation sets are designed to protect underground joint areas from heat loss, external loading forces and water ingress. The T insulation set is designed for use with both twin and single pipe branches and is compatible with three jacket pipe dimensions (140/175/200). Pipes with a 68mm jacket can also be fitted to the insulation sets using reducer rings (supplied separately).

Each set is supplied with two PUR foam half-shells, spacer pieces, sealant, joining bolts with washers and full installation instructions.

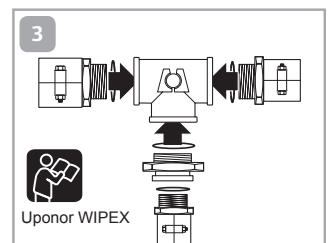
**Please note!** Conduct the pressure test before closing the T-insulation set.



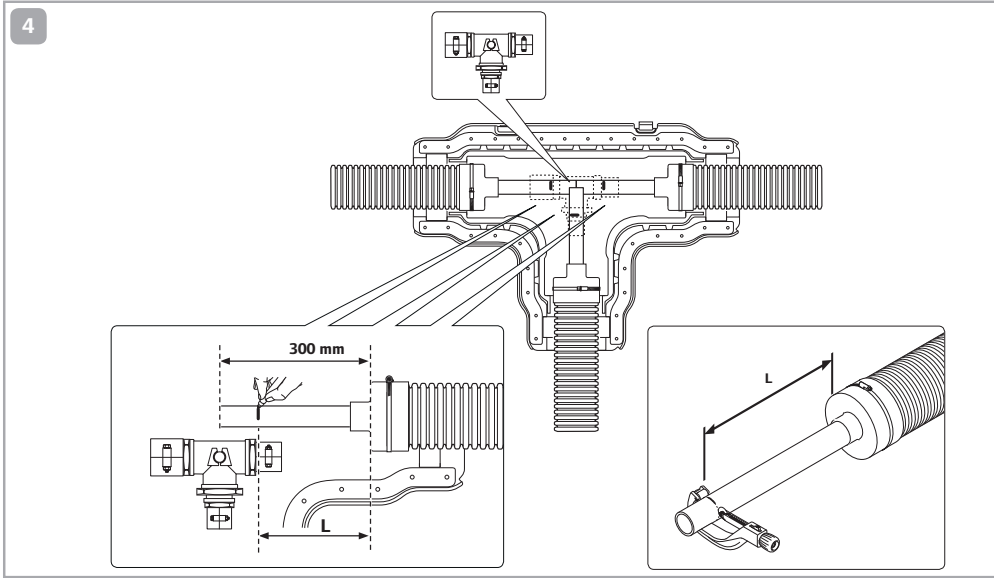
Cut back outer jacket.



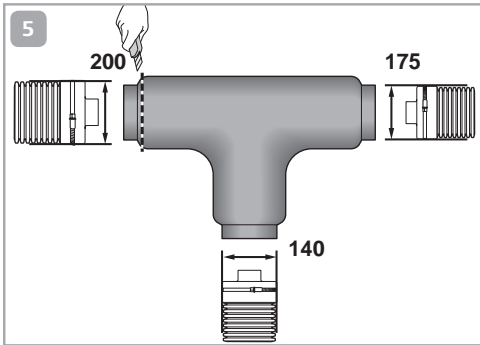
Fit rubber end cap.



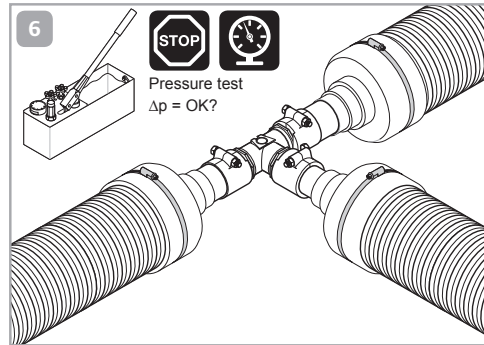
Assemble Wipex fittings.



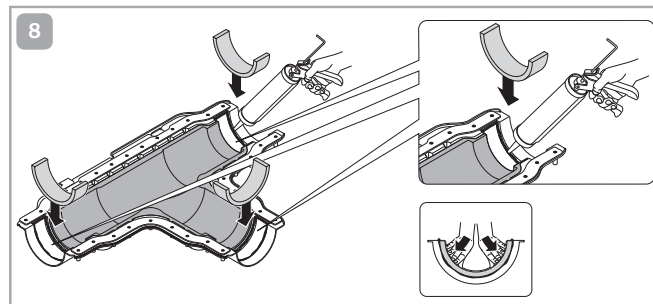
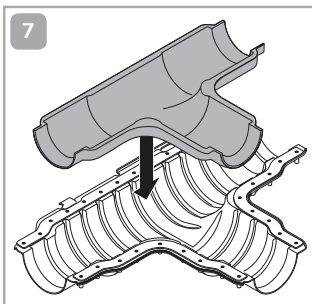
Trim back exposed pipe ends to suit the assembly of Wipex fittings.



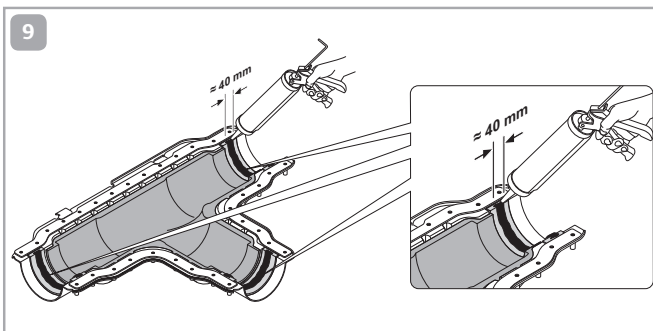
If using 200mm jacket pipe, trim back foam half-shell.



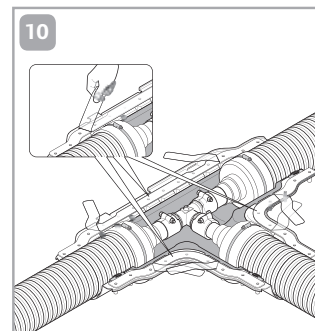
Connect up and pressure test.



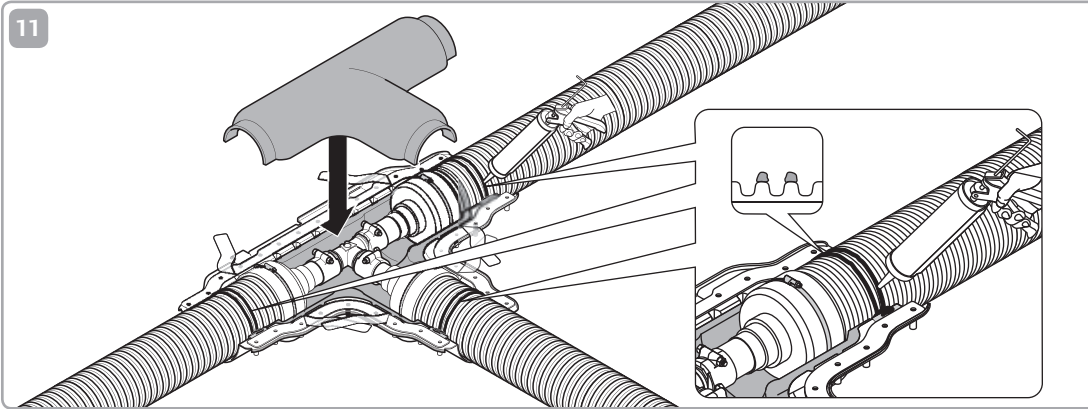
Place foam half-shell in casing. Fit spacer pieces to suit jacket pipe size using sealant.



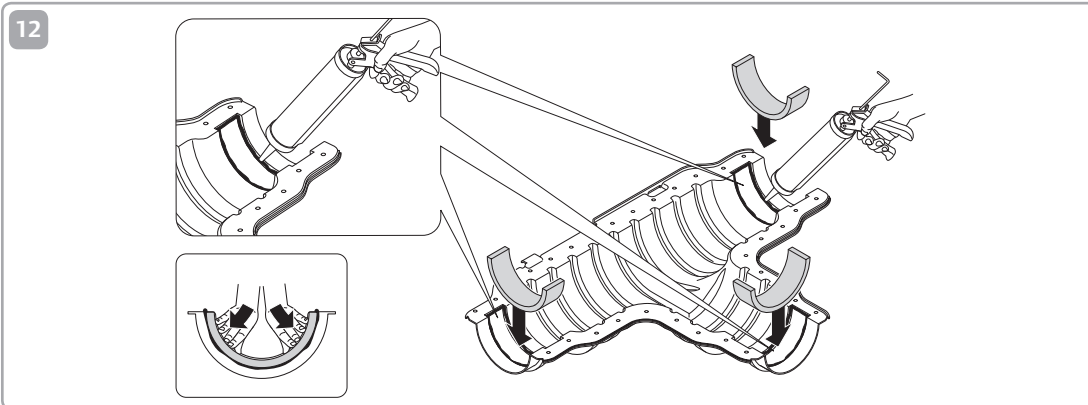
Apply sealant to spacer pieces.



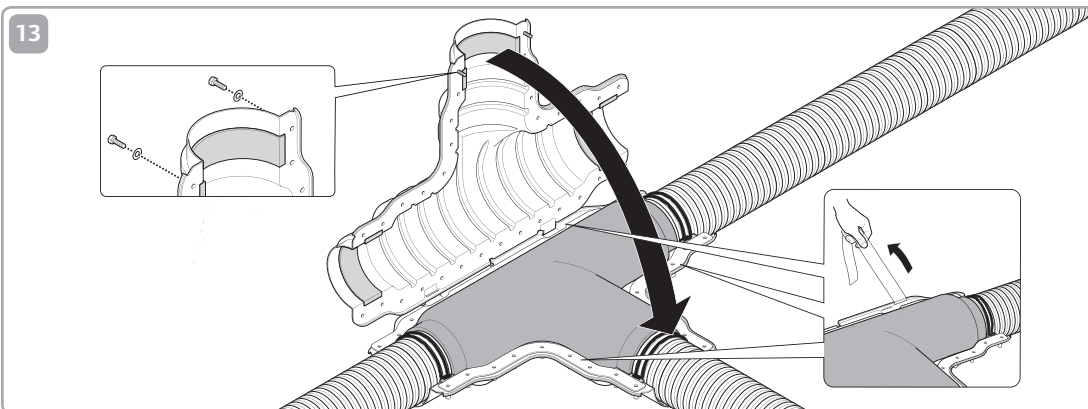
Partially release adhesive strips.



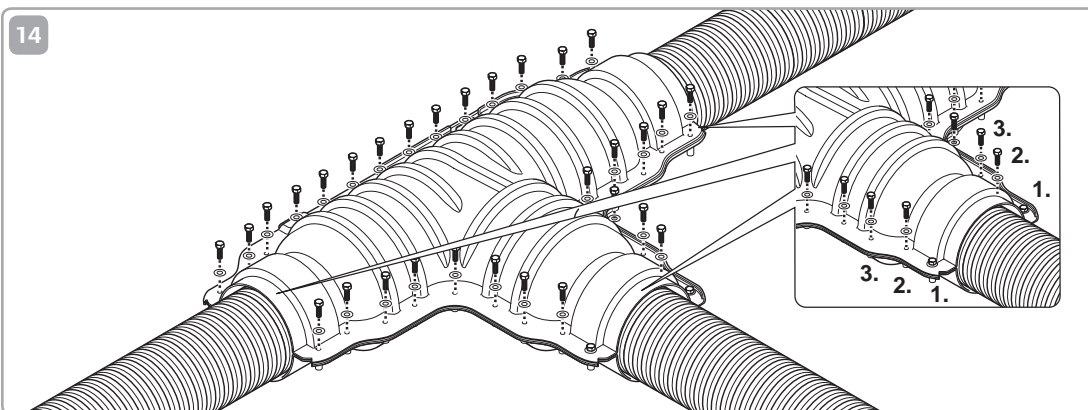
11 Position upper foam half-shell over joint area. Apply sealant to two corrugations where pipe meets spacer piece.



12 Prepare top half of insulation set casing.



13 Fully release adhesive strips and position top half of casing over joint area.



14 Complete assembly of insulation set using bolts provided.



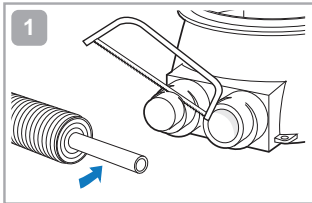
# Uponor Chamber

The Uponor branching chamber can be used for all pipe dimensions (140 – 200 mm). The chamber is available in both T and X models. End caps are always used in chambers.

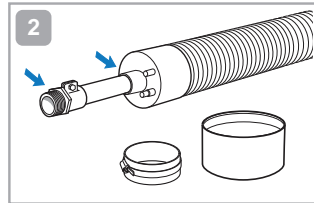
## Preparing the trench

Level the bottom of the trench with sand and compress the sand. If required, install an anchoring slab beneath the levelling layer. The normal depth of the chamber cover is 50 cm. 30 cm depth is permitted if no direct load is placed on top of the chamber.

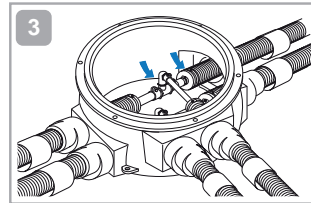
## Installing the chamber



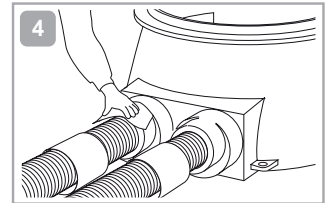
Cut open branches of the chamber according to the required pipe size. Peel off enough of the jacket pipe and insulation to make the joint, 10-20 cm depending on the pipe size.



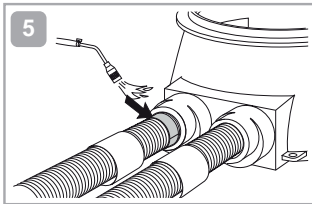
Put the end caps and their seals in place at the ends of the pipes. Mount the connectors to the ends of the flow pipes. Slide the shrink sleeves onto the pipes.



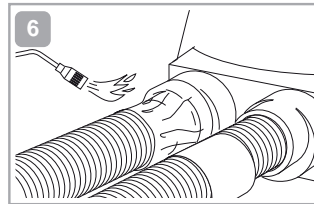
Push the pipes into the chamber. Fasten the rubber end caps on the jacket pipe using jubilee clips. Join the pipes and tighten the couplings.



Roughen up the surface of the jacket and the chamber joint with sand paper around the shrink sleeve. Wipe the joint area clean.

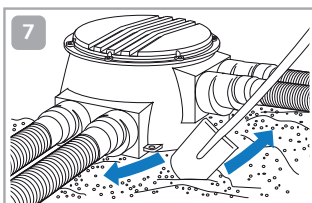


Preheat the area that is left under the shrink sleeve using a soft gas flame. Remove the protective paper from the sleeve and place the sleeve around the joint.

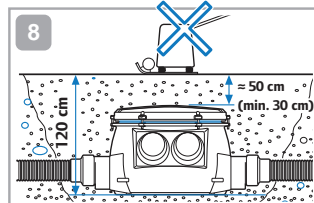


Shrink it with a soft gas flame according to the instructions on the shrink sleeve. First shrink the end near the chamber, then shrink towards the pipe element. Keep the flame in constant movement.

## Filling the trench



Close the chamber lid, but tighten the bolts only after the pipeline has been pressure tested. Begin filling the trench by pushing sand underneath the joints.



Start the filling using a shovel, be careful not to damage the shrink sleeves. Check that the chamber stays upright. Compress the fill in layers of approximately 20-30cm. Mechanical compression directly above the chamber is forbidden.

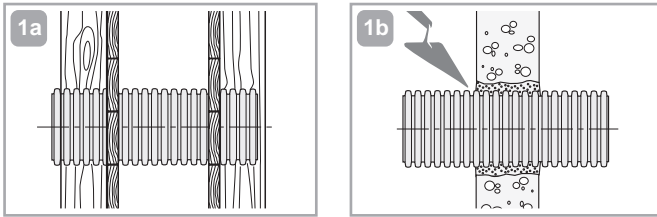
### Special cases:

**Traffic load:** A concrete slab can be used above the chamber to distribute the load. Without a protective slab, a chamber installed in a 50 cm cover depth can withstand an occasional short term load of 3,000 kg (= 6,000 kg/m<sup>2</sup>; for example, a tractor driving over it). Long-term loading is permissible until 500 kg (= 1,000 kg/m<sup>2</sup>; for example, a parked car).

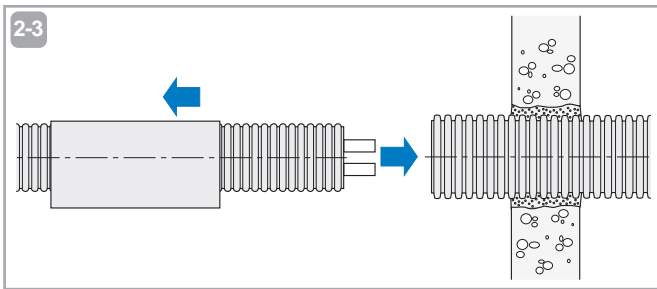
If ground water can rise up to the chamber, the use of an anchoring slab is recommended.

# Uponor wall sleeves and seals

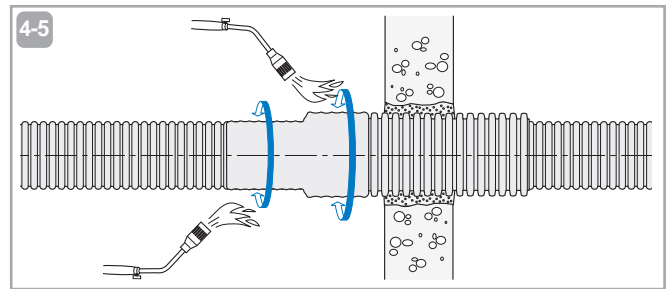
## Installing the wall sleeve NPW (non-pressure waterproof)



Place the feed-through sleeve in the structure where the pipe element will be placed and cast into place at a later stage. Please note that at least 10cm of the sleeve should be left outside the cast.

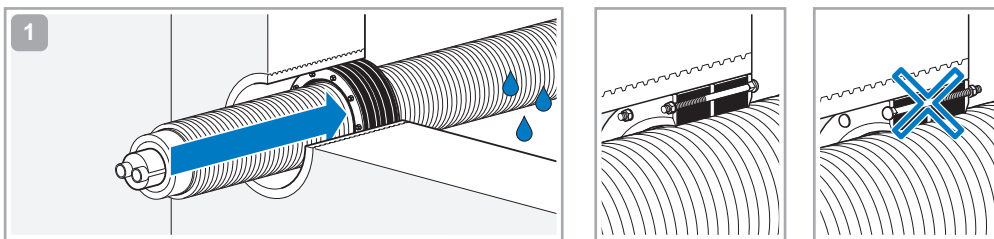


Install the shrink sleeve on top of the pipe element. Push the pipe element through the feed-through sleeve.

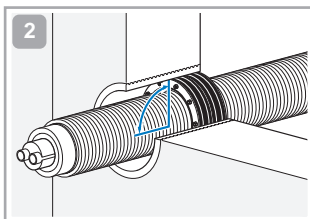


Place the shrink sleeve centrally in the joint between the sleeve pipe and the pipe element and remove any paper that may be left inside the shrink sleeve. Heat the shrink sleeve with a gas burner using a yellow flame. When the surface of the shrink sleeve is smooth and adhesive is extruding from the ends of the shrink sleeve, the shrink sleeve has received enough warmth. Installation is ready when the shrink sleeve has cooled down to the ambient temperature.

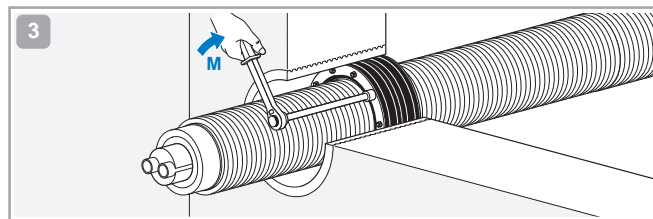
## Installation of Uponor PWP wall seal into the core hole or Uponor fibre cement pipe PWP



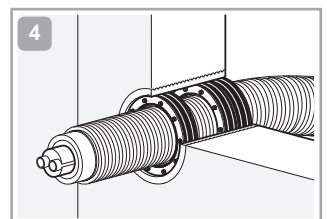
Insert the PWP wall seal as far as the water side (outside) - nuts face the cellar side



Install Uponor PWP wall seal pipe at right angles to Uponor pipe



During final assembly, successively tighten up each nut with torque-wrench clockwise until the maximum torque  $M_{max}$  is reached. Tighten the nuts several times. Repeat the procedure after two hours.

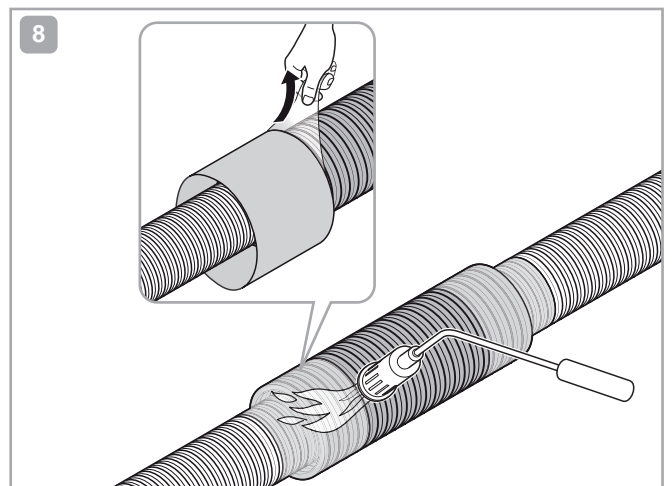
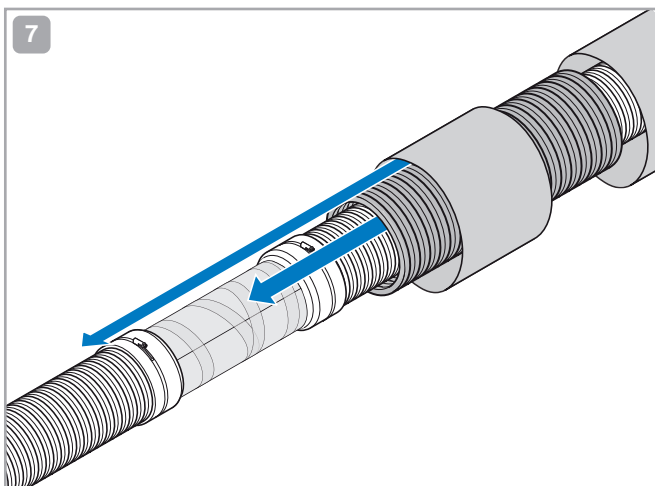
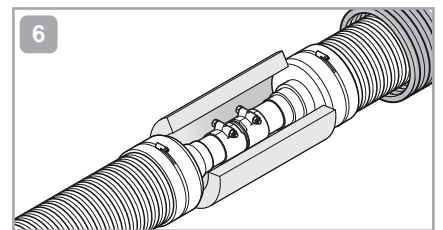
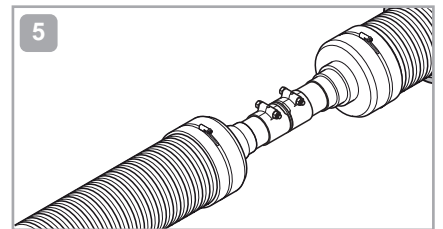
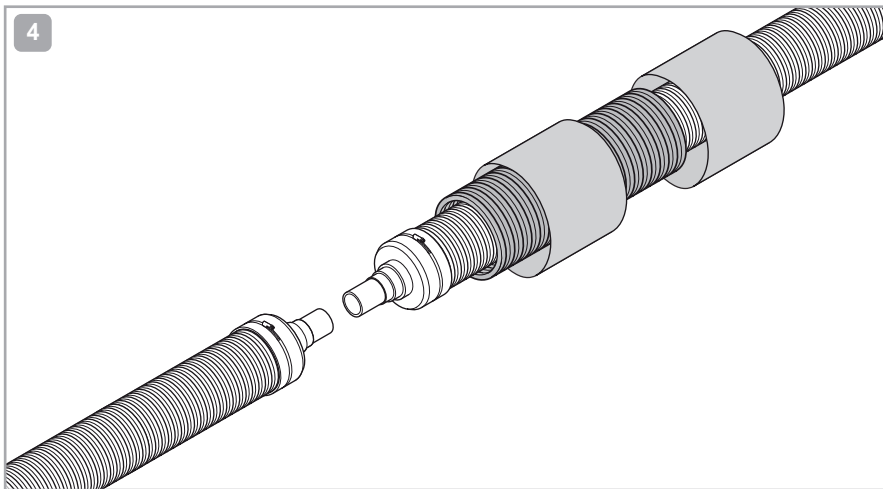
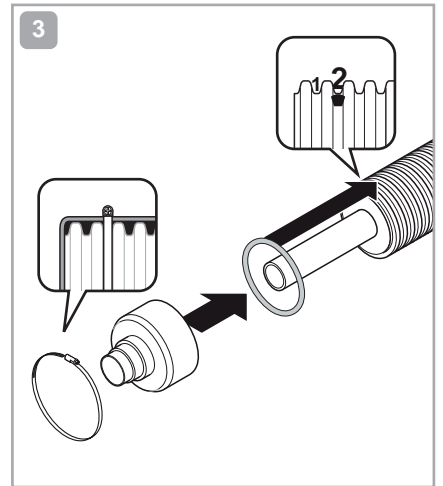
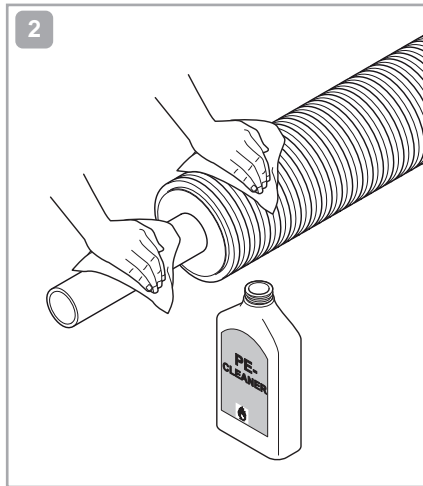
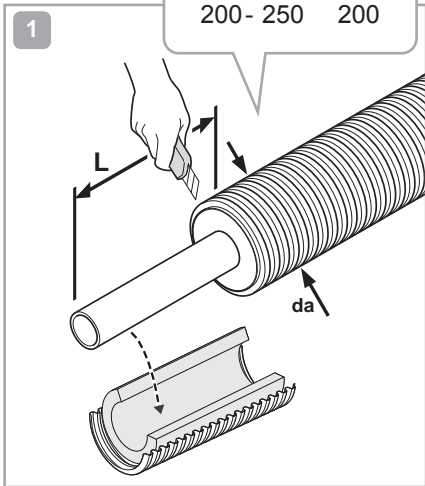


Use Uponor PWP supplementary set to reduce tension

# Uponor jacket joint set

Used for sealing the jacket when connecting pipes together or when connecting to pre-insulated steel fittings.  
Contains two heat shrink sleeves.

da	L
mm	mm
68 - 175	150
200 - 250	200



# Pressure test, leak test in accordance with DIN 1988, Part 2

## Legal information

Pressure tests are services performed under a service contract and form part of the contractual performances of the contractor even if they are not mentioned in the description of performances to be rendered.

According to applicable and valid standards, pressure tests must be carried out before the system is placed in operation. In order to establish that the connection is leakproof, the test must be carried out before the connection is insulated and sealed.

## Execution of pressure test

The finished but not yet covered pipelines are filled with filtered water so that they are free of air. The pressure test is to be carried out as a preliminary and as a main test.

## Preliminary test

For the preliminary test, a test pressure corresponding to permissible operating overpressure plus 5 bar is applied every 10 minutes twice for a period of 30 minutes. Then after a further test period of 30 minutes, the test pressure must not drop by no more than 0.6 bar (0.1 every 5 minutes) and there must be no leakages.

## Main test

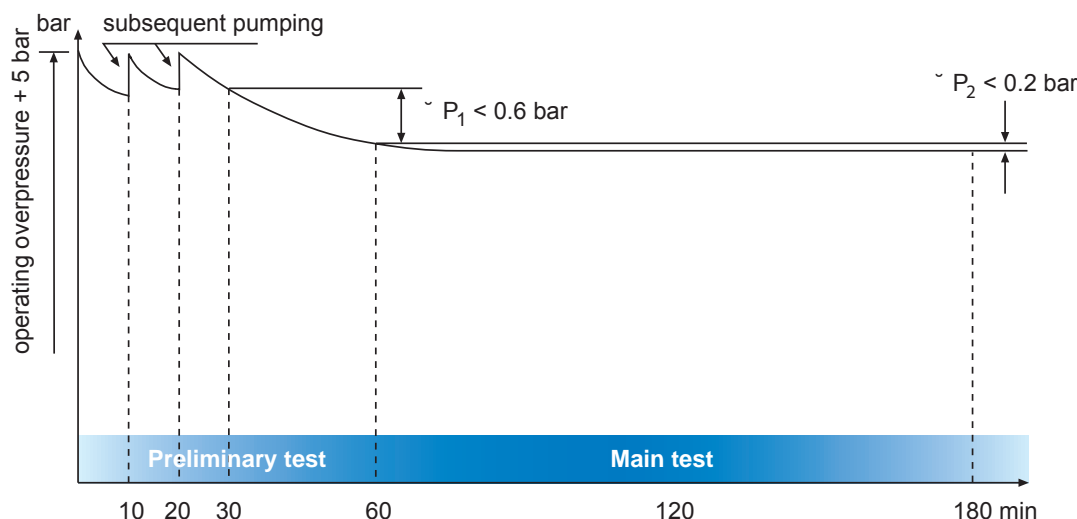
The main test must be carried out immediately following the preliminary test. The test lasts for 2 hours. The test pressure read off after the preliminary test must not fall more than 0.2 bar after 2 hours and there must be no leakages anywhere in the tested unit.

## Plastic pipes

The material properties of plastic pipes lead to an elongation of the pipe during the pressure test which can influence the test results. Temperature differences between the pipe and the test medium caused by high thermal expansion coefficients of plastic pipes might also influence test results whereby a change in temperature of 10 K corresponds roughly to a change in pressure of 0.5 to 1 bar. Efforts should therefore be made to ensure that during the pressure test, the temperature of the test medium remains as constant as possible. During the pressure test, a visual inspection of all the connections should also be carried out as experience has shown that small leakages are not always noticed by observing the pressure gauge. The pipelines must be thoroughly purged after the pressure test.

**Note:** Local requirements for pressure testing can differ from this example.

## Pressure test diagram





# Pressure test protocol

MASTER COPY

Construction project: \_\_\_\_\_

Ordering party: \_\_\_\_\_

Installation company: \_\_\_\_\_

Temperatures: Water temperature: \_\_\_\_\_ °C Ambient temperature: \_\_\_\_\_ °C

Lines filled with filtered water are free of air

**Preliminary test** (in certain cases, this counts as the main test)  
**Test duration:** 60 minutes **Test pressure:** operating overpressure + 5 bar

Pressure after 30 minutes (test start): \_\_\_\_\_ bar

Pressure after 60 minutes (final pressure): \_\_\_\_\_ bar (pressure drop max. 0.6 bar)

**Final result of preliminary test** \_\_\_\_\_

Leakages observed

**Main test** **Test duration:** 120 minutes **max.permissible pressure drop:** 0.2 bar

Pressure at test start: \_\_\_\_\_ bar (from final pressure in preliminary test)

Pressure after 120 minutes (final pressure): \_\_\_\_\_ bar (pressure drop max. 0.2 bar)

**Final result of main test:** \_\_\_\_\_

Leakages observed

Start of test \_\_\_\_\_

End of test \_\_\_\_\_

Place \_\_\_\_\_

Date \_\_\_\_\_

Ordering party (representative) \_\_\_\_\_

Installation company (representative) \_\_\_\_\_

# Technical Specifications

## Properties of the Uponor PE-Xa medium pipes (up to 95°C)



### Aqua

The DVGW-approved medium pipes in the Uponor Aqua product series are suitable for transporting warm potable water up to 95°C at a pressure of max. 10 bar. The PE-Xa medium pipe is produced in line with DIN16892/16893 with a diameter wall thickness ratio of SDR 7.4 .



Mechanical properties	Standards	Temperature	Standard value	Unit
Density			938	kg/m <sup>3</sup>
Tensile strength	DIN 53455	20 °C	19 – 26	N/mm <sup>2</sup>
	DIN 53455	80 °C	9 – 13	N/mm <sup>2</sup>
Elasticity module	DIN 53457	20 °C	600 – 900	N/mm <sup>2</sup>
	DIN 53457	80 °C	300 – 350	N/mm <sup>2</sup>
Elongation at break	DIN 53455	20 °C	350 – 550	%
	DIN 53455	100 °C	500 – 700	%
Impact strength	DIN 53453	–140 °C	no break	kJ/m <sup>2</sup>
	DIN 53453	20 °C	no break	kJ/m <sup>2</sup>
	DIN 53453	100 °C	no break	kJ/m <sup>2</sup>
Moisture absorption	DIN 53472	22 °C	0.01	mg/4d
Friction coefficient with steel			0.08 – 0.1	
Oxygen-Permeability		20 °C	0.8 x 10-13	g m/m <sup>2</sup> s bar
		55 °C	3.0 x 10-13	g m/m <sup>2</sup> s bar



### Thermo

Uponor Thermo medium pipes are coated with an EVAL oxygen diffusion barrier as per DIN 4726 and are thus particularly suited for transporting warm water up to 95°C and a max. pressure of 6 bar. The diameter-wall thickness ratio is SDR 11.

Thermal properties	Standards	Temperature	Standard value	Unit
Application temperature			–50 to +95	°C
Linear coefficient of expansion		20 °C	1.4 x 10-4	m/mK
		100 °C	2.05 x 10-4	m/mK
Softening point			+133	°C
Specific heat			2.3	kJ/kgK
Thermal conductivity	DIN 4725		0.35	W/mK

## PE-100 medium pipe (applications up to 20°C)



### Supra

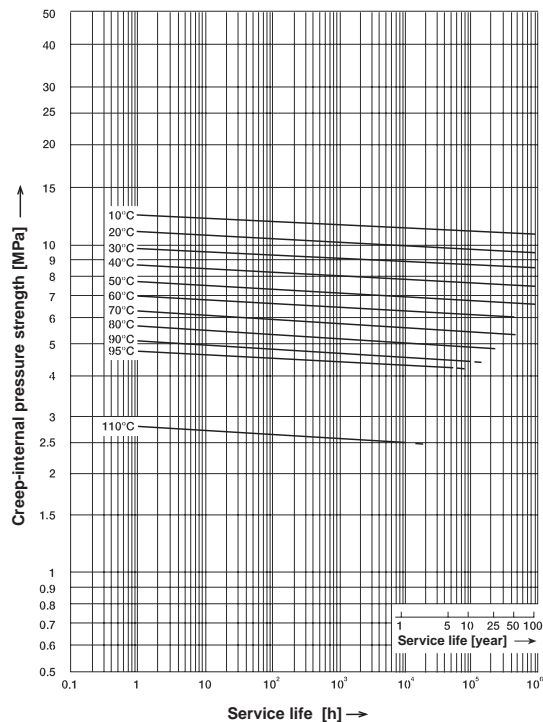
The medium pipe in our Uponor Supra pipeline is produced in HDPE (PE 100)\*. With a diameter-wall thickness ratio SDR 11 and pressure load of max. 16 bar at 20°C, it is designed specially for transporting cold potable water and for use in cooling water networks. Our HDPE medium pipe is DVGW-approved for transporting potable water.



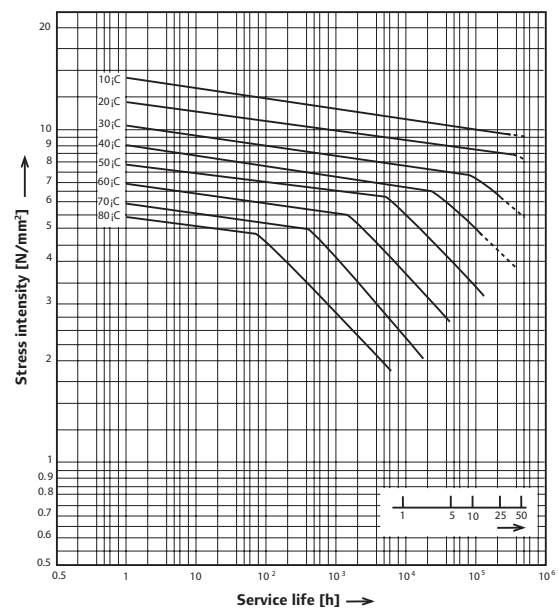
\* To European standard EN12201

Property	Standard	PE 100 (std.values)	Unit
Density at 23 °C	DIN 53479 ISO 1183 ISO/R 1183	approx. 0.96	g/cm <sup>2</sup>
Break strength	DIN 53495	38	N/mm <sup>2</sup>
Elongation at break	DIN 53495	> 600	%
Tensile strength at yield	DIN 53495	25	N/mm <sup>2</sup>
Elasticity module (tensile test)	ISO 178	approx. 1.200	N/mm <sup>2</sup>
Hardness	ISO 2039	46	N/mm <sup>2</sup>
Vicat-softening point	DIN/ISO 306		°C
VST-A/50		127	
VST-B/50		77	
Thermal conductivity (at 20 °C)	DIN 52612	0.38	W/mK
Application temperature (16 bar)		-10 to +20	°C
Thermal linear expansion coefficient	DIN 53752	1.8 x 10 <sup>-4</sup>	1/°C
Fire behaviour	DIN 4102 Part 1	B2	-

### Service life: PE-Xa medium pipe

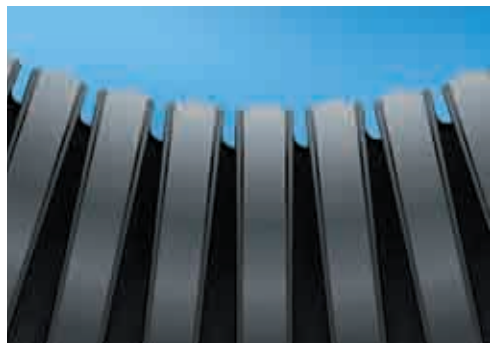


### Service life: HDPE medium pipe



## Material properties of the jacket pipe

The stable, impact-resistant PE-HD jacket pipe protects the insulating layer and medium pipe from external influences. The special design of the pipe geometry ensures a high flexibility on the one hand, high capacity to withstand static loads on the other.



Property	Value	Unit	Method
Material	PE-HD	-	-
UV-stabilised	yes	-	-
Fire behaviour	B2	-	DIN 4102
Density	957 – 959	kg/m <sup>3</sup>	ISO 1183
Modulus of elasticity	~ 1000	MPa	ISO 527-2

## Material properties of the insulation

The age-resistant insulation consists of crosslinked polyethylene and has, due to its closed cell structure, only minimal water absorption. The multi-layer design combines maximum flexibility and optimum heat insulation.



Property	Value	Unit	Method
Density	approx. 28	kg/m <sup>3</sup>	DIN 53420
Tensile strength	28	N/cm <sup>2</sup>	DIN 53571
Operating temperature limits-			
- Minimum	-40	°C	
- Maximum	+95	°C	
Water absorption	< 1,0	volume-%	DIN 53428
Fire behaviour	B2	-	DIN 4102
Compressive strength 50% deformation	73	kPa	DIN 53577
Water vapour transmission/ 10 mm thickness	1,55	g/m <sup>2</sup> d	DIN 53429
Ozone depletion potential	0		

## Long-term properties

### Classification of service conditions according to EN 15632-3 of pre-insulated PE-Xa pipes

The pre-insulated PE-Xa heating pipes and related system components from Uponor are designed according to EN 15632-3 (District heating pipes – Pre-insulated flexible pipe systems – Part 3: Non bonded plastic service pipes; requirements and test methods).

#### Operating temperatures and service life

The Uponor pre-insulated PE-Xa pipe systems are, according to this European Standard, designed for a service life of at least 30 years when operated at the following temperature profile:

29 years at 80°C + 1 year at 90°C + 100 h at 95°C.

Other temperature/time profiles can be applied in accordance with EN ISO 13760 (Miner's Rule). Further information is given in prEN 15632-2:2008. Annex A.

The maximum operating temperature shall not exceed 95°C.

#### Operating pressure

Uponor pre-insulated PE-Xa pipe systems are, in accordance to EN 15632-3, designed for continuous operating pressures of 6 bar (SDR 11) and 10 bar (SDR 7,4).



# Appendix

## Uponor PE-Xa pipes - weight and volume

### Heating pipes (Thermo) PN6

Pipe dim OD x s [mm]	ID [mm]	Weight [kg/m]	Volume [l/m]
25 x 2.3	20.4	0.183	0.31
32 x 2.9	26.2	0.268	0.50
40 x 3.7	32.6	0.430	0.85
50 x 4.6	40.8	0.665	1.32
63 x 5.8	51.4	1.048	2.08
75 x 6.8	61.2	1.461	2.96
90 x 8.2	73.6	2.113	4.25
110 x 10	90.0	3.141	6.29
125 x 11.4	102.2	4.050	8.20

### Tap water pipes (Aqua) PN10

Pipe dim OD x s [mm]	ID [mm]	Weight [kg/m]	Volume [l/m]
18 x 2.5	13.0	0.116	0.13
25 x 3.5	18.0	0.236	0.245
32 x 4.4	23.3	0.380	0.42
40 x 5.5	29.0	0.592	0.66
50 x 6.9	36.2	0.923	1.03
63 x 8.6	45.8	1.459	1.65
75 x 10.3	54.4	2.077	2.31
90 x 12.3	65.2	2.965	3.26
110 x 15.1	79.8	4.442	4.85

### Comparative table of PN6 / SDR 11 pipes

The table shows the corresponding dimensions of PEX and steel pipes.

PEX OD	OD/ID	Steel pipes DN	OD/ID
25	25/20.4	20	26.9/22.9
32	32/26.2	25	33.7/28.1
40	40/32.6	32	42.4/37.2
50	50/40.8	40	48.3/43.1
63	63/51.4	50	60.3/54.5
75	75/61.2	65	76.1/70.3
90	90/73.6	80	88.9/82.5
110	110/90.0	100	114.3/107.1
125	125/102.2	125	139.7/132.5

### Comparative table of PN10 /SDR 7.4 pipes

The table shows the corresponding dimensions of PEX and copper pipes.

PEX OD	OD/ID	Copper pipes DN	OD/ID
25	25/18	22	22/20
32	32/23.2	28	28/25.6
40	40/28.6	35	35/32.0
50	50/36.2	42	42/39.0
63	63/45.7	54	54/51.0
75	75/54.4	63	63/59.0
90	90/65.2	76,1	76.1/72.1
110	110/79.8	88,9	88.9/84.9

# Heat Loss Charts

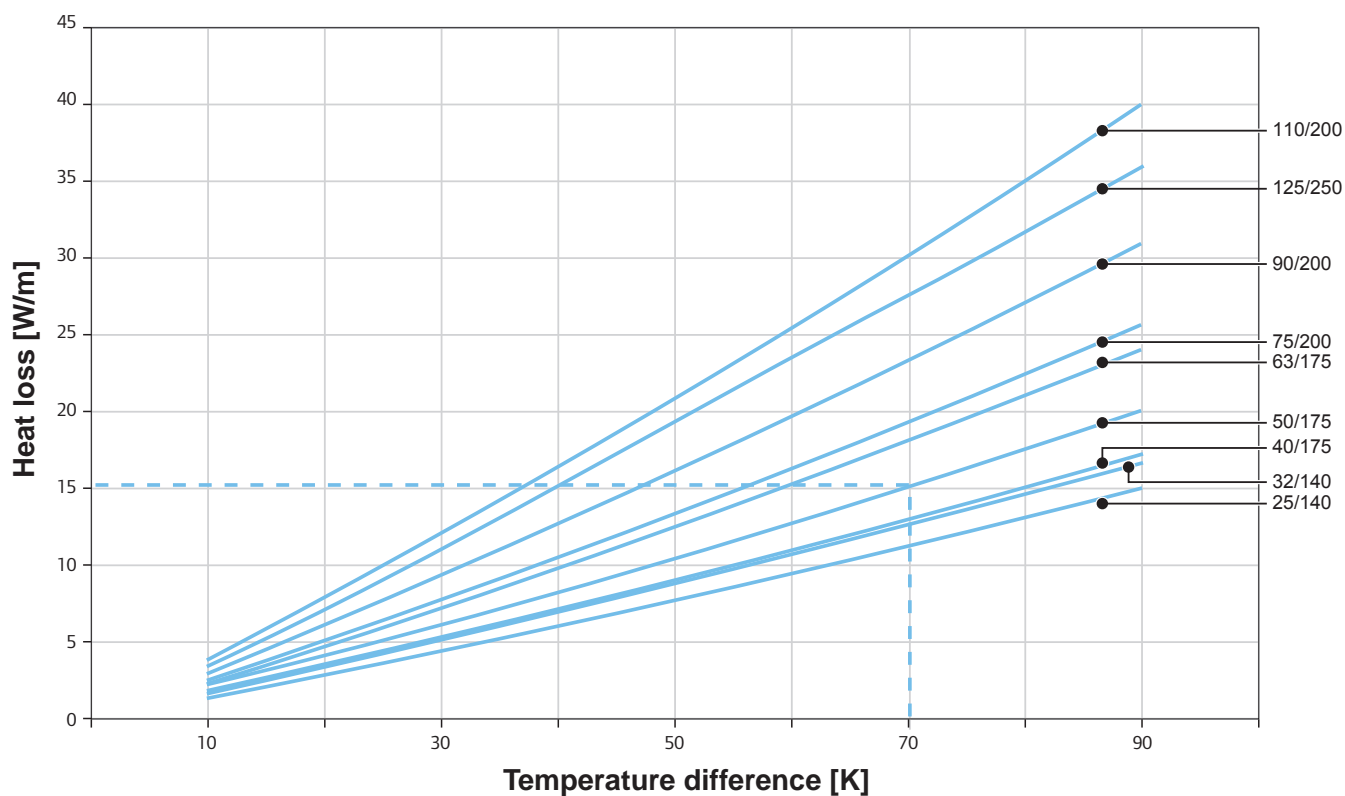
## Uponor Thermo Single

Thermal conductivity ground: 1.0 W/mK  
Ground coverage: 0.8 m



### Note!

Heat loss data in the diagram are calculated with a safety factor of 1,05, according to the requirements of the German "VDI-AG Gütesicherung". Depending on production related tolerance.



### Example for Uponor Thermo Single 50/175

$T_M$  = Medium temperature

$T_E$  = Ground temperature

$\Delta T$  = Temperature difference (K)

$$\Delta T = T_M - T_E$$

$$T_M = 75 \text{ }^\circ\text{C}$$

$$T_E = 5 \text{ }^\circ\text{C}$$

$$\Delta T = 75 - 5 = 70 \text{ K}$$

**Heat loss: 15.1 W/m**



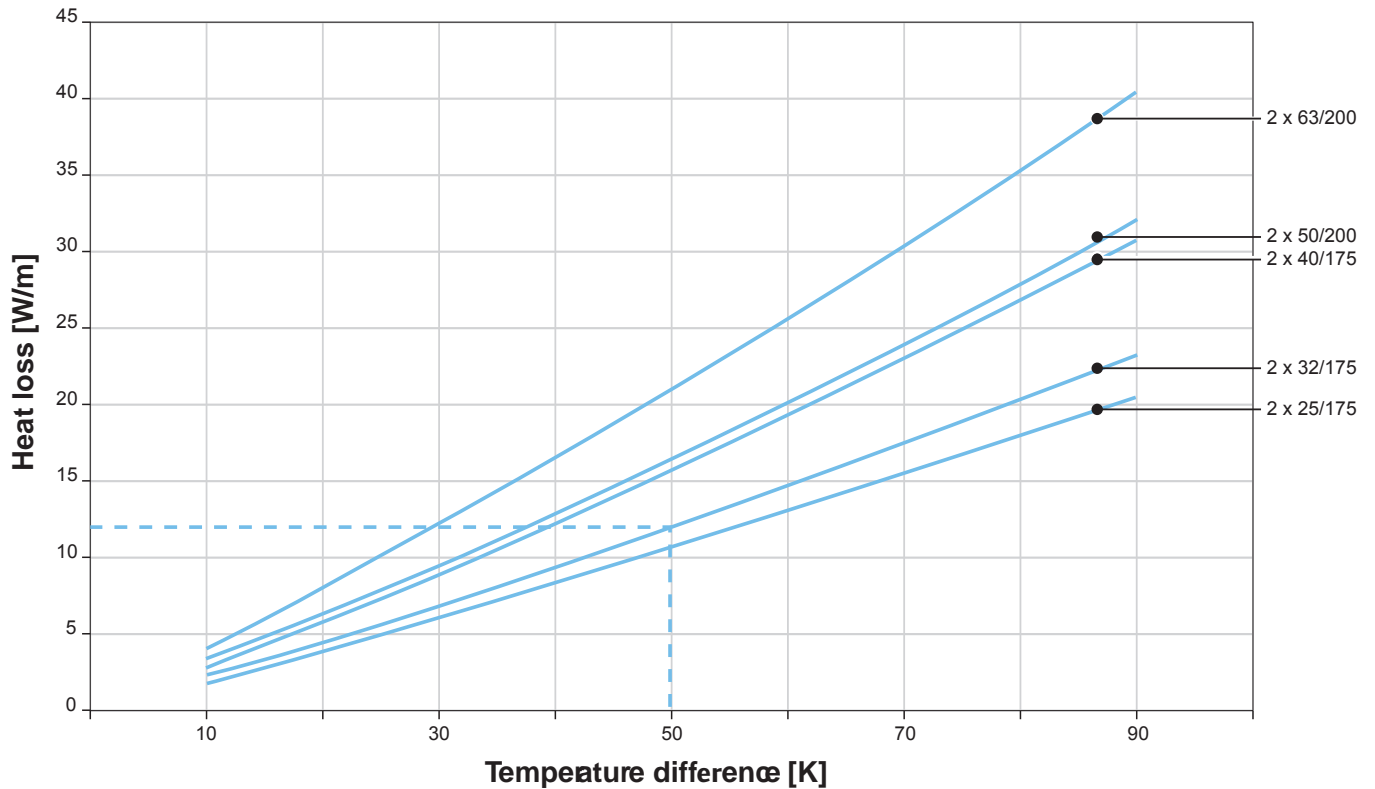
# Uponor Thermo Twin

Thermal conductivity ground: 1.0 W/mK  
 Ground coverage: 0.8 m



**Note!**

Heat loss data in the diagram are calculated with a safety factor of 1,05, according to the requirements of the German "VDI-AG Gütesicherung". Depending on production related tolerance.



**Example for Uponor Thermo Twin 2 x 32/175**

$T_V$  = Flow temperature  
 $T_R$  = Return temperature  
 $T_E$  = Ground temperature  
 $\Delta T$  = Temperature difference (K)  
 $\Delta T = (T_V + T_R)/2 - T_E$   
 $T_V = 70\text{ °C}$   
 $T_R = 40\text{ °C}$   
 $T_E = 5\text{ °C}$   
 $\Delta T = (70 + 40)/2 - 5 = 50\text{ K}$   
**Heat loss: 12 W/m**



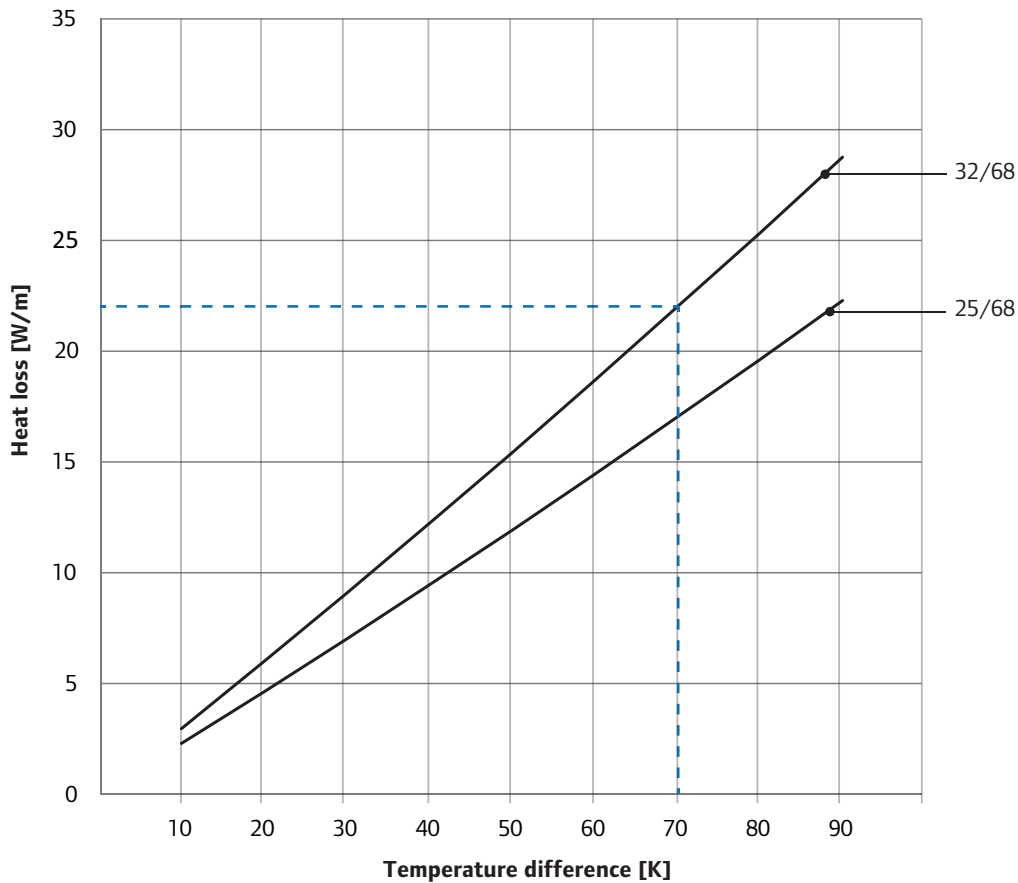
# Uponor Ecoflex Thermo Mini

Thermal conductivity ground: 1.0 W/mK  
 Ground cover: 0.8 m



**NOTE!**

Heat loss data in the diagram are calculated with a safety factor of 1.05, according to the requirements of the German "VDI-AG Gütesicherung". Depending on production related tolerances.



**Example for Uponor Thermo Mini 32/68**

$\theta_M$  = Temperature of medium  
 $\theta_E$  = Temperature of the ground  
 $\Delta\theta$  = Temperature difference (K)  
 $\Delta\theta = \theta_M - \theta_E$   
 $\theta_M = 75\text{ }^\circ\text{C}$   
 $\theta_E = 5\text{ }^\circ\text{C}$   
 $\Delta\theta = 75 - 5 = 70\text{ K}$   
**Heat loss: 22.5 W/m**

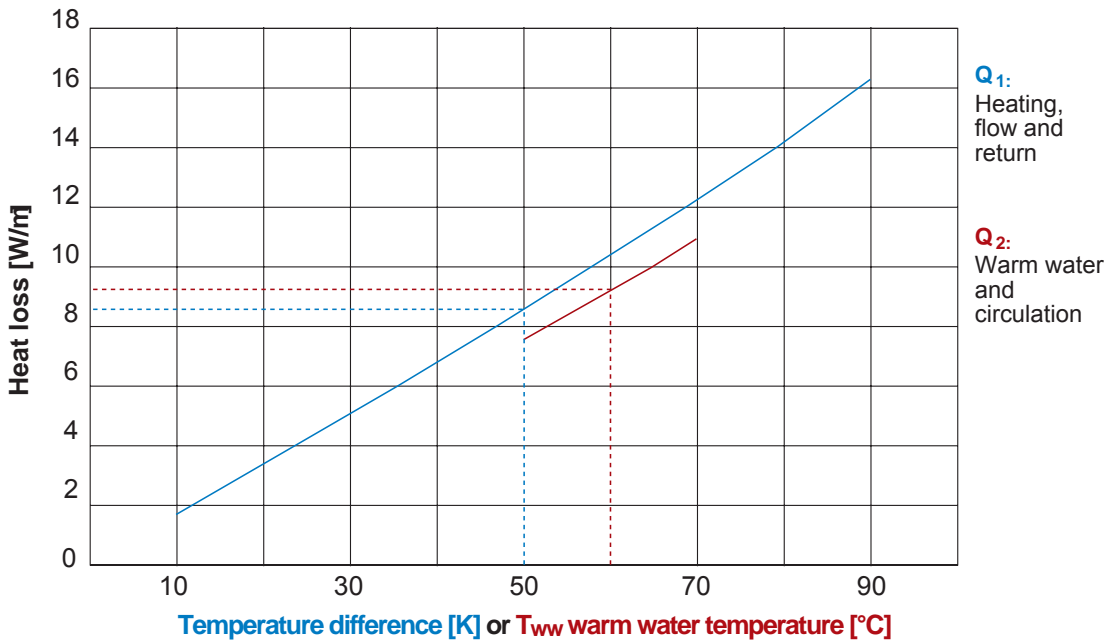
**NOTE!**

The diagram shows the heat loss of one pipe. The heat loss of flow and return has to be calculated separately. To get the total heat loss add the flow and return heat losses.



# Uponor Quattro

Thermal conductivity ground: 1.0 W/mK  
 Ground coverage: 0.8 m



## Example for Uponor Quattro

$T_V$  = flow temperature  
 $T_R$  = return temperature  
 $T_E$  = ground temperature  
 $\Delta T$  = temperature difference (K)  
 $T_{ww}$  = temperature warm water and circulation line  
 $\Delta T = (T_V + T_R)/2 - T_E$   
 $T_V = 70\text{ °C}$   
 $T_R = 40\text{ °C}$   
 $T_E = 5\text{ °C}$   
 $\Delta T = (70 + 40)/2 - 5 = 50\text{ K}$   
 $T_{ww} = 60\text{ °C}$

It follows therefore that:

$Q_1$  (at  $\Delta T = 50\text{ K}$ ) = 8.5 W/m  
 $Q_2$  (at  $T_{ww} = 60\text{ °C}$ ) = 9.2 W/m

Specific heat loss per running metre:

$Q = Q_1 + Q_2 = (8.5 + 9.2)\text{ W/m} = 17.7\text{ W/m}$



Heat loss checked by  
 FIW München:  
 Art.-No.: 1018149

# DIN Certco certification

The annual certification according to VDI 2055 verifies the heat loss figures. The heat loss graphs are prepared on this basis. Certification is based on defined layout conditions, which means values are a good reflection of real life.



# Pipe and Fitting Selector Tool

Stage 1			Stage 2			Stage 3			
Pick your application pipe and length...			Pick your End cap, one for each end...			Pick your coupler. . .			
	Order Code	Description		Order Code	Description		Order Code	Description	
	<b>1018109</b>	25/140		<b>1018315</b>	25+32/140		<b>1018328</b>	25x1" 6B	
	<b>1018110</b>	32/140		<b>1018315</b>	25+32/140		<b>1018329</b>	32x1" 6B	
	<b>1018111</b>	40/175		<b>1018313</b>	32+40+50/175		<b>1018330</b>	40x1¼" 6B	
	<b>1018112</b>	50/175		<b>1018313</b>	32+40+50/175		<b>1018331</b>	50x1¼" 6B	
	<b>1018113</b>	63/175		<b>1018312</b>	63+75/175		<b>1018332</b>	63x2" 6B	
	<b>1018114</b>	75/200		<b>1018310</b>	75+90+110/200		<b>1018333</b>	75x2" 6B	
	<b>1018115</b>	90/200		<b>1018310</b>	75+90+110/200		<b>1018334</b>	90x3" 6B	
	<b>1018116</b>	110/200		<b>1018310</b>	75+90+110/200		<b>1018335</b>	110x3" 6B	
	<b>1083868</b>	125/250		<b>1083869</b>	125/250		<b>1078368</b>	125x4" 6B	
	<b>1018134</b>	2x25/175		<b>1018309</b>	2x 25+32+40/175		<b>1018328</b>	25x1" 6B	
	<b>1018135</b>	2x32/175		<b>1018309</b>	2x 25+32+40/175		<b>1018329</b>	32x1" 6B	
	<b>1018136</b>	2x40/175		<b>1018309</b>	2x 25+32+40/175		<b>1018330</b>	40x1¼" 6B	
	<b>1018137</b>	2x50/200		<b>1018307</b>	2x 40+50+63/200		<b>1018331</b>	50x1¼" 6B	
	<b>1018138</b>	2x63/200		<b>1018307</b>	2x 40+50+63/200		<b>1018332</b>	63x2" 6B	
	<b>1018132</b>	25/68		<b>1018316</b>	25+32/68		<b>1018328</b>	25x1" 6B	
	<b>1018133</b>	32/68		<b>1018316</b>	25+32/68		<b>1018329</b>	32x1" 6B	
	<b>1018117</b>	25/140		<b>1018315</b>	25+32/140		<b>1018336</b>	25x1" 10B	
	<b>1018118</b>	32/140		<b>1018315</b>	25+32/140		<b>1018338</b>	32x1" 10B	
	<b>1018119</b>	40/175		<b>1018313</b>	32+40+50/175		<b>1018339</b>	40x1¼" 10B	
	<b>1018120</b>	50/175		<b>1018313</b>	32+40+50/175		<b>1018340</b>	50x1¼" 10B	
	<b>1018121</b>	63/175		<b>1018312</b>	63+75/175		<b>1018341</b>	63x2" 10B	
	<b>1018139</b>	25+25/175		<b>1018309</b>	2x 25+32+40/175		<b>1018336</b>	25x1" 10B	
	<b>1018140</b>	32+25/175		<b>1018309</b>	2x 25+32+40/175		<b>1018338</b>	32x1" 10B	
				<b>1018309</b>	2x 25+32+40/175		<b>1018336</b>	25x1" 10B	
	<b>1018141</b>	40+25/175		<b>1018309</b>	2x 25+32+40/175		<b>1018339</b>	40x1¼" 10B	
				<b>1018308</b>	2x 25+32+50/175		<b>1018336</b>	25x1" 10B	
	Thermo Aqua			<b>1018306</b>	175 Quattro		<b>1018328</b>	25x1" 6B	
	<b>1018147</b>	2x25/25+25/175			<b>1018306</b>		175 Quattro	<b>1018336</b>	25x1" 10B
					<b>1018306</b>		175 Quattro	<b>1018329</b>	32x1" 6B
	<b>1018148</b>	2x32/25+25/175			<b>1018306</b>		175 Quattro	<b>1018336</b>	25x1" 10B
	<b>1018124</b>	25/68		<b>1018316</b>	25+32/68		<b>1018400</b>	25x¾"	
	<b>1018125</b>	32/68		<b>1018316</b>	25+32/68		<b>1018401</b>	32x1"	
	<b>1018126</b>	40/140		<b>1018314</b>	40+50+63/140		<b>1018402</b>	40x1¼"	
	<b>1018127</b>	50/140		<b>1018314</b>	40+50+63/140		<b>1018403</b>	50x1½"	
	<b>1018128</b>	63/140		<b>1018314</b>	40+50+63/140		<b>1018404</b>	63x2"	
	<b>1018129</b>	75/175		<b>1018312</b>	63+75/175		<b>1018405</b>	75x2½"	
	<b>1018130</b>	90/175		<b>1018311</b>	90+110/175		<b>1018406</b>	90x3"	
	<b>1018131</b>	110/200		<b>1018310</b>	75+90+110/200		<b>1018407</b>	110x4"	

# The Uponor Delivery Programme for Flexible & Pre-insulated pipes

## Uponor Thermo Single

pre-insulated single pipe PE-X, max. 6 bar / 95°C, Heating

Order Code	Medium pipe da / di / s [mm]	DN	Jacket pipe Da [mm]	Weight [kg/m]	Delivery length max. [m]	Bending radius [m]
1018109	25 / 20.4 / 2.3	20	140	1.18	200	0.25
1018110	32 / 26.2 / 2.9	25	140	1.31	200	0.30
1018111	40 / 32.6 / 3.7	32	175	2.03	200	0.35
1018112	50 / 40.8 / 4.6	40	175	2.26	200	0.45
1018113	63 / 51.4 / 5.8	50	175	2.56	200	0.55
1018114	75 / 61.4 / 6.8	65	200	3.74	100	0.80
1018115	90 / 73.6 / 8.2	80	200	4.20	100	1.10
1018116	110 / 90.0 / 10.0	100	200	5.24	100	1.20
1083868	125 / 102.2 / 11.4	100	250	7.30	80	1.40

On request, available with heating tape HWAT-R. Delivery time on request.



## Uponor Thermo Twin

pre-insulated double pipe PE-X, max. 6 bar / 95°C, Heating

Order Code	Medium pipe da / di / s [mm]	DN	Jacket pipe Da [mm]	Weight [kg/m]	Delivery length max. [m]	Bending radius [m]
1018134	25 / 20.4 / 2.3 (2x)	20	175	1.92	200	0.50
1018135	32 / 26.2 / 2.9 (2x)	25	175	1.99	200	0.60
1018136	40 / 32.6 / 3.7 (2x)	32	175	2.33	200	0.80
1018137	50 / 40.8 / 4.6 (2x)	40	200	3.59	100	1.00
1018138	63 / 51.4 / 5.8 (2x)	50	200	4.55	100	1.20



## Uponor Thermo Mini

pre-insulated single pipe PE-X, max. 6 bar / 95°C, Heating

Order Code	Medium pipe da / di / s [mm]	DN	Jacket pipe Da [mm]	Weight [kg/m]	Delivery length max. [m]	Bending radius [m]
1018132	25 / 20.4 / 2.3	20	68	0.50	200	0.20
1018133	32 / 26.2 / 2.9	25	68	0.55	200	0.25



## Uponor Aqua Single

pre-insulated single pipe PE-X, max. 10 bar / 95°C, warm water

Order Code	Medium pipe da / di / s [mm]	DN	Jacket pipe Da [mm]	Weight [kg/m]	Delivery length max. [m]	Bending radius [m]
1018117	25 / 18.0 / 3.5	20	140	1.24	200	0.35
1018118	32 / 23.2 / 4.4	25	140	1.42	200	0.40
1018119	40 / 29.0 / 5.5	32	175	2.20	200	0.45
1018120	50 / 36.2 / 6.9	40	175	2.54	200	0.55
1018121	63 / 45.8 / 8.7	50	175	3.00	200	0.65
1018122	75 / 54.4 / 10.3	65	200	4.3	100	0.9
1018123	90 / 65.4 / 12.3	80	200	5.3	100	1.2
1036036	110 / 79.8 / 15.1	100	200	6.5	100	1.3

On request, available with heating tape HWAT-R. Delivery time on request.



Deliveries are made in accordance with our "General Terms and Conditions of Sale". Subject to technical changes without notice.



## Uponor Aqua Twin

pre-insulated double pipe PE-X, max. 10 bar / 95°C, warm water

Order Code [mm]	Medium pipe da / di / s	DN [mm]	Jacket pipe Da [kg/m]	Weight [m]	Delivery length max. [m]	Bending radius
1018139	1) 25 / 18.0 / 3.5 2) 25 / 18.0 / 3.5	20 20	175	2.05	200	0.65
1018140	1) 32 / 23.2 / 4.4 2) 25 / 18.0 / 3.5	25 20	175	2.20	200	0.70
1018141	1) 40 / 29.0 / 5.5 2) 25 / 18.0 / 3.5	32 20	175	2.45	200	0.90
1018142	1) 50 / 36.2 / 6.9 2) 25 / 18.0 / 3.5	40 20	175	2.73	200	1.00



## Uponor Quattro

pre-insulated quad-pipe PE-X, max. 6 bar / 95°C, Heating and/or max. 10 bar / 95°C / warm water

Order Code [mm]	Medium pipe da / di / s	DN [mm]	Jacket pipe Da [kg/m]	Weight [m]	Delivery length max. [m]	Bending radius
1018147	(2x) 25 / 20.4 / 2.3 (2x) 25 / 18.0 / 3.5	20 20	175	2.41	200	0.80
1018148	(2x) 32 / 26.2 / 2.9 (2x) 25 / 18.0 / 3.5	25 20	175	2.64	200	0.80
1018149	(2x) 32 / 26.2 / 2.9 32 / 23.2 / 4.4 25 / 18.0 / 3.5	25 25 20	175	2.78	200	0.80



## Uponor Supra

pre-insulated single pipe PE-HD, max. 16 bar / 20°C, cold water

Order Code [mm]	Medium pipe da / di / s	DN [mm]	Jacket pipe Da [kg/m]	Weight [m]	Delivery length max. [m]	Bending radius
1018124	25 / 20.4 / 2.3	20	68	0.52	200	0.20
1018125	32 / 26.2 / 2.9	25	68	0.62	200	0.25
1018126	40 / 32.6 / 3.7	32	140	1.47	200	0.30
1018127	50 / 40.8 / 4.6	40	140	1.67	200	0.40
1018128	63 / 51.4 / 5.8	50	140	1.97	200	0.50
1018129	75 / 61.4 / 6.8	65	175	2.72	100	0.60
1018130	90 / 73.6 / 8.2	80	175	3.14	100	0.70
1018131	110 / 90.0 / 10.0	100	200	5.24	100	1.20



## Uponor Supra Plus

fitted with self-regulating, freeze protection cable, rated at 10 w/m.

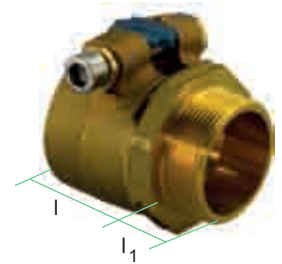
Order Code	Medium pipe da / di / s [mm]	n	Jacket pipe Da [mm]	Weight [kg/m]	Delivery lengths [m]	Bending radius [m]	Insulation thickness [mm]
1048902	25 / 20.4 / 2.3	1	68	0.52	150	0.20	15
1048903	32 / 26.2 / 2.9	1	68	0.62	150	0.25	12
1048904	40 / 32.6 / 3.7	3	140	1.44	150	0.30	39
1048905	50 / 40.8 / 4.6	3	140	1.67	150	0.40	34
1048906	63 / 51.4 / 5.8	2	140	1.97	150	0.50	27
1048907	75 / 61.4 / 6.8	3	175	2.89	100	0.60	38
1048908	90 / 73.6 / 8.2	2	175	3.31	100	0.70	28
1048909	110 / 90.0 / 10.0	3	200	5.24	100	1.20	30



### Uponor Wipex male connector 6 bar

6 bar / 95°C for Uponor pipe systems Thermo Single, Thermo Twin, Thermo Mini, Quattro

Order Code	Pipe size da / di / s [mm]	Connection Male thread [inch]	Weight [kg/piece]	l [mm]	l1 [mm]
1018328	25 / 20.4 / 2.3	1"	0.20	26	13
1018329	32 / 26.2 / 2.9	1"	0.30	38	13
1018330	40 / 32.6 / 3.7	1 1/4"	0.50	44	14
1018331	50 / 40.8 / 4.6	1 1/4"	0.70	51	14
1018332	63 / 51.4 / 5.8	2"	1.20	67	16
1018333	75 / 61.4 / 6.8	2"	1.50	71	17
1018334	90 / 73.6 / 8.2	3"	2.40	80	17
1018335	110 / 90.0 / 10.0	3"	3.50	92	17
1078368*	125 / 102.2 / 11.4	4"	5.24	94	43

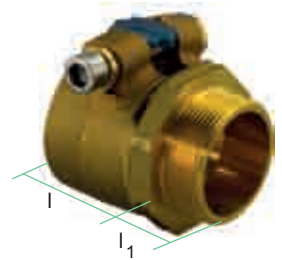


\*Requires hemp or thread sealant when connecting to 4" base parts

### Uponor Wipex male connector 10 bar

for Uponor pipe systems Aqua Single, Aqua Twin, Quattro (DVGW-approved)

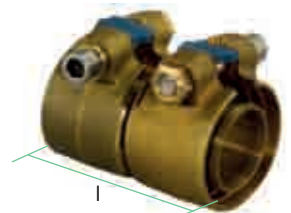
Order Code	Pipe size da / di / s [mm]	Connection Male thread [inch]	Weight [kg/piece]	l [mm]	l1 [mm]
1018336	25 / 18.0 / 3.5	1"	0.20	26	13
1018338	32 / 23.2 / 4.4	1"	0.30	38	13
1018339	40 / 29.0 / 5.5	1 1/4"	0.50	44	14
1018340	50 / 36.4 / 6.8	1 1/4"	0.70	51	14
1018341	63 / 45.8 / 8.7	2"	1.20	67	16
1018342	75 / 54.4 / 10.3	2"	1.55	71	17
1018343	90 / 65.4 / 12.3	3"	2.40	80	17
1023170	110 / 79.8 / 15.1	3"	3.50	92	17



### Uponor Wipex Jointing Equal 6 bar

for Uponor pipe systems Thermo Single, Thermo Twin, Thermo Mini, Quattro

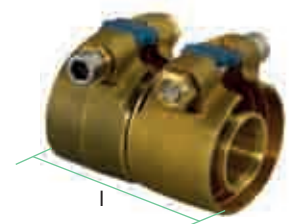
Order Code	Pipe size	For Pipe dim [mm]	Weight [kg]	l [mm]
1042972	25 PN6	25 x 2,3	0,168	54
1042973	32 PN6	32 x 2,9	0,358	64
1042980	40 PN6	40 x 3,7	0,554	72
1042984	50 PN6	50 x 4,6	0,984	86
1042981	63 PN6	63 x 5,8	1,575	106
1042985	75 PN6	75 x 6,8	2,405	124
1042986	90 PN6	90 x 8,2	3,622	143
1042987	110 PN6	110 x 10	5,127	167
1078365	125 PN6	125 x 11.4	8.15	170



### Uponor Wipex Jointing Equal 10 bar

for Uponor pipe systems Aqua Single, Aqua Twin, Quattro

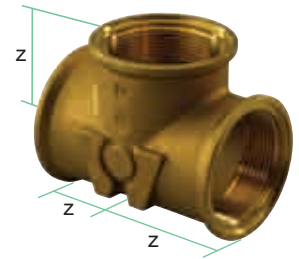
Order Code	Pipe size	For Pipe dim [mm]	Weight [kg]	l [mm]
1042970	25 PN10	25 x 3,5	0,179	54
1042974	32 PN10	32 x 4,4	0,345	64
1042979	40 PN10	40 x 5,5	0,551	72
1042983	50 PN10	50 x 6,9	0,974	86
1042982	63 PN10	63 x 8,7	1,582	106



### Uponor Wipex T-piece

for Uponor pipe systems Aqua Single, Aqua Twin, Thermo Single, Thermo Twin, Thermo Mini, Quattro

Order Code	Dimensions O-Ring di x s [mm]	Connection Female thread [inch]	Weight [kg/piece]	z [mm]
1018345	35.0 x 3.0	1"	0.31	35
1018346	43.5 x 3.0	1 1/4"	0.48	42
1018347	61.91 x 3.53	2"	1.01	55
1018348	90.0 x 4.0	3"	2.64	75
1078367	See note 1	4"	3.96	91



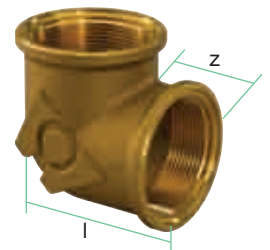
incl. O-Rings

Note 1: When connecting to 125 x 4" male connector (item 1078368), hemp or similar must be used to seal the threads.

### Uponor Wipex elbow

for Uponor pipe systems Aqua Single, Aqua Twin, Thermo Single, Thermo Twin, Thermo Mini, Quattro

Order Code	Dimensions O-Ring di x s [mm]	Connection Female thread [inch]	Weight [kg/piece]	l [mm]	z [mm]
1018350	35.0 x 3.0	1"	0.27	58	35
1018351	43.5 x 3.0	1 1/4"	0.45	68	42
1018352	61.91 x 3.53	2"	0.94	91	55
1018353	90.0 x 4.0	3"	2.20	126	75
1078366	See note 1	4"	3.28	157	92



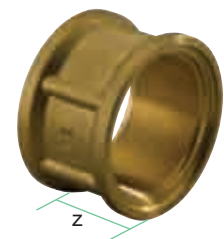
incl. O-Rings

Note 1: When connecting to 125 x 4" male connector (item 1078368), hemp or similar must be used to seal the threads.

### Uponor Wipex joint

for Uponor pipe systems Aqua Single, Aqua Twin, Thermo Single, Thermo Twin, Thermo Mini, Quattro

Order Code	Dimensions O-Ring da x s [mm]	Connection female thread [inch]	Weight [kg/piece]	z [mm]
1018355	35.0 x 3.0	1"	0,18	30
1018356	43.5 x 3.0	1 1/4"	0,20	37
1018357	61.91 x 3.53	2"	0,39	45
1018358	90.0 x 4.0	3"	0,70	55

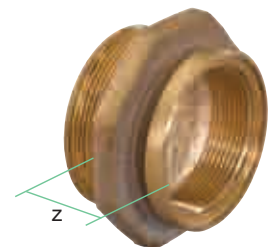


incl. O-Rings

### Uponor Wipex reducer

for Uponor pipe systems Aqua Single, Aqua Twin, Thermo Single, Thermo Twin, Thermo Mini, Quattro

Order Code	Dimensions O-Ring di x s [mm]	R 1 male thread [inch]	R 2 female thread [inch]	Weight [kg/piece]	z [mm]
1018368	35.0 x 3.0	1 1/4"	1"	0.22	20
1018369	43.5 x 3.0	1 1/2"	1 1/4"	0.25	21
1018371	35.0 x 3.0	2"	1"	0.41	21
1018372	43.5 x 3.0	2"	1 1/4"	0.46	25
1018374	35.0 x 3.0	3"	1"	0.92	23
1018375	43.5 x 3.0	3"	1 1/4"	1.03	27
1018376	61.91 x 3.53	3"	2"	0.99	31
1078369	90.0 x 4.0	4"	3"	1.43	12

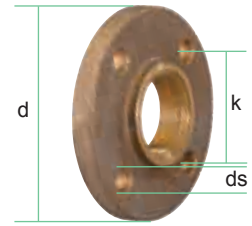


incl. O-Rings

## Uponor Wipex flange

for Uponor pipe systems Aqua Single, Aqua Twin, Thermo Single, Thermo Twin, Thermo Mini, Quattro

Order Code	DN	Bolt holes Number	Dimensions O-Ring di x s [mm]	Connection female thread [inch]	Weight [kg/piece]	k [mm]	ds [mm]	d [mm]
1018359	25	4	35.0 x 3.0	1"	1.33	85	14	115
1018360	32	4	43.5 x 3.0	1 1/4"	1.96	100	18	140
1018362	50	4	61.91 x 3.53	2"	2.96	125	18	165
1018364	80	8	90.0 x 4.0	3"	4.36	160	18	200
1078370	100	8	See note 1	4"	4.50	180	18	220



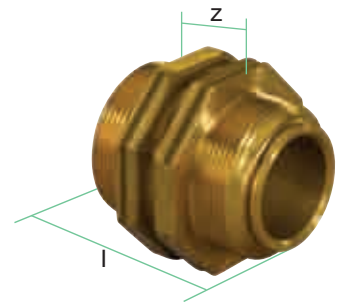
incl. O-Rings

Note 1: When connecting to 125 x 4" male connector (item 1078368), hemp or similar must be used to seal the threads.

## Uponor Wipex swivel union

For connecting wipex bodies together when installed in a chamber or H insulation set.

Order Code	R 1 male thread [inch]	R 2 male thread [inch]	Weight [kg/piece]	l [mm]	z [mm]
1045455	1"	1"	0,291	51	19,0
1045456	1 1/4"	1"	0,384	51	17,0
1045457	1 1/4"	1 1/4"	0,493	59	21,3
1045458	2"	1 1/4"	0,993	68	27,0
1045459	2"	2"	1,134	74	29,0
1045460	3"	2"	1,780	82	33,0
1045461	3"	3"	2,690	90	35,4

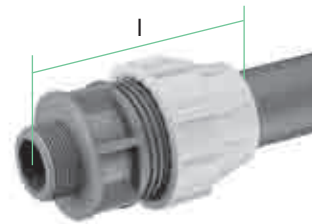


## Uponor plastic male connector

for main service take-off on Uponor Supra pipes

Order Code	For medium pipe dimensions da/s [mm]	Male thread [inch]	Weight [kg]	l [mm]
1018400	25 x 2.3	3/4"	0.073	95
1018401	32 x 2.9	1"	0.115	106
1018402	40 x 3.7	1 1/4"	0.192	116
1018403	50 x 4.6	1 1/2"	0.282	135
1014804	63 x 5.8	2"	0.480	167
1018405	75 x 6.8	2 1/2"	0.728	191
1018406	90 x 8.2	3"	1.133	230
1018407	110 x 10.0	4"	1.919	267

Material: Polypropylene high-grade copolymer



## Uponor rubber end-cap

incl. clamping ring and sealing ring

Order Code	For medium pipe da [mm]	For jacket pipe Da [mm]	Weight [kg/piece]	Use with product	l [mm]	l1 [mm]
1018316	25+32	68	0.15	Thermo Mini, Supra	80	140
1018315	25+28+32	140	0.29	Thermo Single/Aqua Single	90	184
1018313	32+40+50	175	0.39	Thermo Single/Aqua Single	90	184
1018314	40+50+63	140	0.30	Supra	90	184
1018312	63+75	175	0.41	Thermo Single/Aqua Single/Supra	90	184
1018310	75+90+110	200	0.45	Thermo Single/Supra	90	184
1018311	90+110	175	0.43	Supra	90	184
1018309	2x25+32+40	175	0.41	Thermo Twin/Aqua Twin	90	184
1018308	2x25+32+50	175	0.41	Thermo Twin/Aqua Twin	90	184
1018307	2x40+50+63	200	0.49	Thermo Twin	90	184
1018306	2x25+32 25+28+32 22+25+32	175	0.45	Quattro	90	184
1083869	125	250	0.75	Thermo Single	90	184

Material: EPDM, clamping ring: stainless steel





### Uponor T-insulation set

Old Code	Order Code	Jacket pipe diameter [mm]	Length l [mm]	Width b [mm]	Weight [kg/set]
1021990	1060982	140/175/200	1125	788	13.53

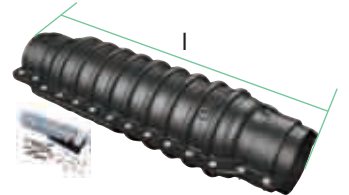
Comprises insulating half-shells (ABS lined with PUR foam), stainless steel bolts and solvent-free sealant.



### Uponor straight insulation set

Old Code	Order Code	Jacket pipe diameter [mm]	Length l [mm]	Width b [mm]	Weight [kg/set]
1021992	1060984	140/175/200	1200	270	9.66

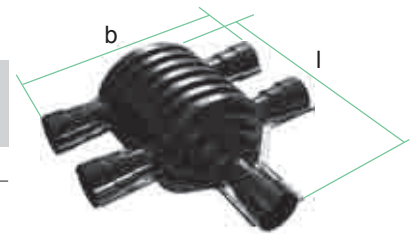
Comprises insulating half-shells (ABS lined with PUR foam), stainless steel bolts and solvent-free sealant.



### Uponor double tee (H) insulation set

Old Code	Order Code	Jacket pipe diameter [mm]	Length l [mm]	Width b [mm]	Weight [kg/set]
-	1007355	140/175/200	1290	1260	19.00

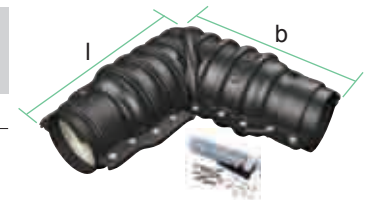
Comprises insulating half-shells (ABS lined with PEX foam), stainless steel bolts, plastic rivets and solvent-free sealant.



### Uponor elbow insulation set

Old Code	Order Code	Jacket pipe diameter [mm]	Length l [mm]	Width b [mm]	Weight [kg/set]
1021991	1060985	200 / 175 / 140	805	805	10.55

Comprises insulating half-shells (ABS lined with PUR foam), stainless steel bolts and solvent-free sealant.



### Uponor reducer rings

used with 25mm and 32mm Thermo Mini and Supra pipes when connecting into insulation sets.

Order Code	Diameter
1060991	200/68



### Uponor jacket joint set

for sealing the jacket when connecting pipes together or when connecting to pre-insulated steel fittings (p61). Contains two heat shrink sleeves.

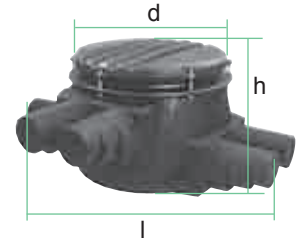
Order Code	Jacket pipe Diameter [mm]	Diameter [mm]	l [mm]	Weight [kg/set]
1084574	200	250	500	2.78
1083872	250	315	720	4.67



## Uponor chamber

Order Code	Diameter outer d [mm]	Number connections x jacket pipe diameter [mm]	Height h [mm]	Length l [mm]	Weight [kg/piece]
1018326	980	6 x 140 / 175 / 200	685	1660	50
1018327	980	8 x 140 / 175 / 200	685	1660	52

Material: chamber PE + PE-foam, cover: PE, sealing ring: SBR, screws: stainless steel

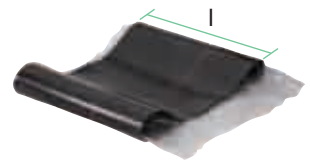


## Uponor heat-shrinkable sleeve

for sealing jacket pipe in the Uponor chamber outlet

Order Code	Jacket pipe Diameter [mm]	Length l [m]	Weight [kg/piece]
1018380	175	0.25	0.25
1018381	200	0.30	0.30
1084575	250	0.30	0.72

Material: PEX



## Uponor sealing tape chamber

Order Code	l [m]
1018382	10

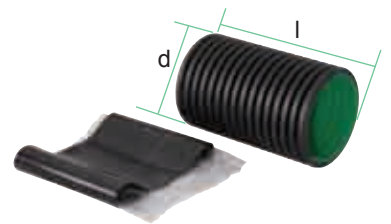


## Uponor wall sleeve NPW (non-pressure waterproof)

with heat-shrinkable sleeve, non pressure waterproof

Order Code	Jacket pipe diameter [mm]	Diameter wall sleeve d [mm]	Length l [mm]	Weight [kg/piece]
1018266	68	90	375	0.80
1018269	140	175	375	1.0
1018268	200/175	250	375	2.10
1083871	250	315	465	2.8

Material: wall sleeve PE-HD, heat-shrinkable sleeve: PEX

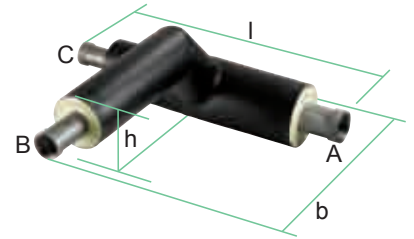


### Uponor pre-insulated single tee

Pre-insulated fitting used for branch connections to/from 125mm Thermo Single pipes.

Order Code	A	B	C	Length l [mm]	Height h [mm]	b [mm]	Weight [kg/piece]
1084580	4" / 250	3" / 200	4" / 250	1000	490	625	20.5
1084581	3" / 200	3" / 200	4" / 250	1000	490	625	20.5
1084582	4" / 250	3" / 200	3" / 200	1000	490	625	20.5
1084583	3" / 200	4" / 250	3" / 200	1000	545	725	20.5
1084584	3" / 200	4" / 250	4" / 250	1000	545	725	20.5
1084585	4" / 250	4" / 250	3" / 200	1000	545	725	20.5

Material: stainless steel pipes, ends welded with female thread adapters; insulation foam - PUR; outer jacket - PE  
 Note: 4"/250 denotes 4" thread connection/250mm outer jacket.

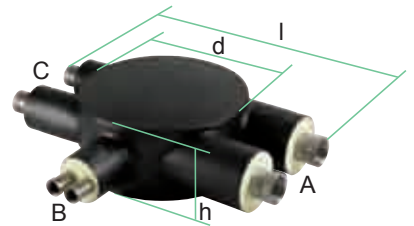


### Uponor pre-insulated twin tee

Pre-insulated fitting used for branch connections to/from 125mm Thermo Single pipes.

Order Code	A	B	C	Length l [mm]	Height h [mm]	Dia. d [mm]	Weight [kg/piece]
1084586	4" / 250	2 x 2" / 200	4" / 250	1190	320	710	46.5
1084587	3" / 200	2 x 2" / 200	4" / 250	1190	320	710	46.5
1084588	4" / 250	2 x 2" / 200	3" / 200	1190	320	710	46.5
1084589	4" / 250	3" / 200	2 x 2" / 200	1190	320	800	46.5
1084590	2 x 2" / 200	3" / 200	4" / 250	1190	320	800	46.5

Material: stainless steel pipes, ends welded with female thread adapters; insulation foam - PUR; outer jacket - PE  
 Note: 4"/250 denotes 4" thread connection/250mm outer jacket.  
 2"/200 denotes twin 2" connections/200mm outer jacket.

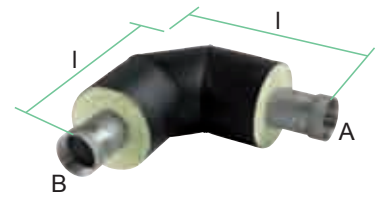


### Uponor pre-insulated elbow

Pre-insulated elbow for use with 125mm Thermo Single pipes.

Order Code	A	B	Length l [mm]	Weight [kg/piece]
1084579	4" / 250	4" / 250		625 8.8

Material: stainless steel pipes, ends welded with female thread adapters; insulation foam - PUR; outer jacket - PE  
 Note: 4"/250 denotes 4" thread connection/250mm outer jacket.



### Uponor wall seal PWP (pressure waterproof)

pressure waterproof. For direct use in a water-proof concrete core hole or in a walled-in fibre cement pipe

Order Code	Jacket pipe diameter [mm]	Core hole diameter [mm]	length l [mm]	Weight [kg/piece]
1007358	68	125	110	1.21
1007360	140	200	110	2.42
1007361	175	250	110	3.70
1007362	200	300	110	4.90

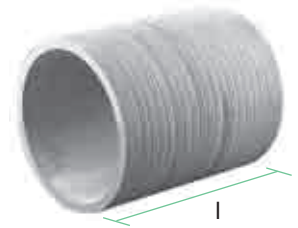


Material: rubber ring: EPDM, screws: yellow chromated, metal core: yellow chromated

### Uponor fibre cement pipe PWP (pressure waterproof)

for wall seal, pressure waterproof

Order Code	Liner pipe diameter DN	For jacket pipe diameter [mm]	Length l [mm]	Weight [kg/piece]
1007368	125	68	400	8.00
1007370	200	140	400	15.20
1007371	250	175	400	18.80
1007372	300	200	400	22.00



Material: Fibre cement

### Uponor supplementary set PWP (pressure waterproof)

for wall seals, PWP, to reduce any tension of the jacket pipe when it is not perpendicular to the wall

Order Code	Jacket pipe diameter [mm]	Core hole diameter [mm]	Length l [mm]	Weight [kg/piece]
1007363	68	125	65	0.72
1007365	140	200	65	1.43
1007366	175	250	65	2.30
1007367	200	300	65	3.30



Material: rubber ring: EPDM, screws: yellow chromated

### Uponor supra plus connection set

set includes Supra Plus Control Unit, 2 rubber end caps, 5m sensor cable, fixing screws, cable connections and full instructions. Control unit requires 230V supply.

Order Code	For medium pipe diameter [mm]	Jacket pipe diameter [mm]	Weight [kg/set]
1048697	25+32	68	1
1048699	40+50+63	140	1.08
1048700	75	175	1.53
1048701	90	175	1.64
1048702	110	200	1.92



### Uponor end cover

for use in dry areas in buildings where the pipe exits the floor. Non waterproof. Set comprises two plastic half-shells and foam inserts for single, twin and quattro pipes.

Order Code	Jacket pipe diameter [mm]	Weight [kg/piece]
1045310	140	0.1
1045311	175	0.14
1045312	200	0.18



### Uponor trench warning tape

to mark position of buried pipes. Red, tear-proof plastic tape imprinted with "Uponor" and symbols for trench identification.

Order Code	l [m]	w [mm]	Weight [kg/piece]
1018385	250	40	2



### Uponor shrinkable tape

shrinkable tape used for sealing damaged outer jacket.

Order Code	l [m]	w [mm]	Weight [kg/piece]
1018378	30	255	0.49



### Uponor re-rounding pliers

tool to assist the mounting of fittings by re-rounding the pipe end.

Order Code	Size	Weight [kg/piece]
1084142	125	2.7





## Notes

## Notes

## Notes

Uponor Limited (“Uponor”) guarantees [to the original purchaser/customer] that pipes and fittings sold by it are free of defects in materials or manufacture under normal conditions of use for a period of 25 years and in case of electrical and mechanical products for 2 years from the date of installation. This guarantee only applies to the products stored, installed, tested and operated in accordance with the fitting instructions issued by Uponor and valid at the time the products were installed.

Where a claim is made during the guarantee period and products are proven to be defective in materials and/or manufacture at the time of delivery, Uponor will supply replacement products free of charge. This is the exclusive remedy under this guarantee.

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# Uponor

**Uponor Limited**

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