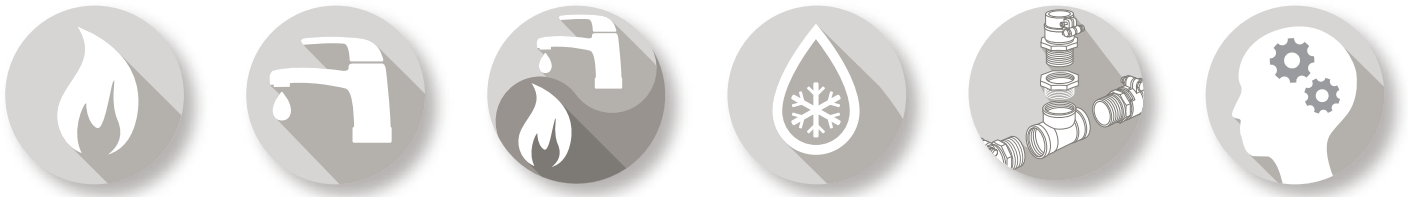




TECHNICAL INFORMATION



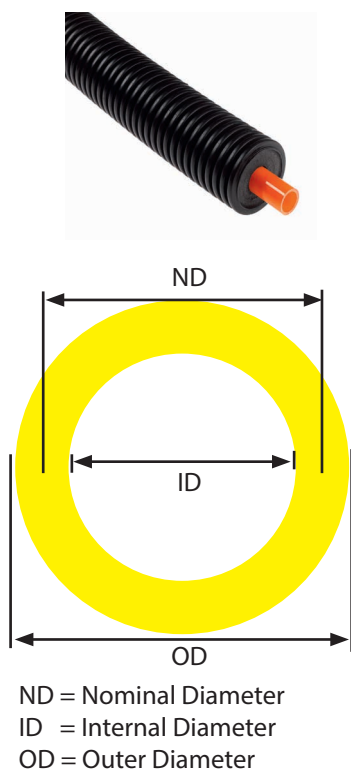
Terre-Pex Insulated Pipes are the ideal solution for delivery of hot and chilled where the energy preservation is key. Terre-Pex insulated piping provides the highest bending flexibility in the industry and thus minimizes overhead in project related pipe system considerations.

We differentiate Terre-Pex insulated pipes with either single or double carrier pipes for convenient supply and return piping based on project needs.

Terre-Pex insulated pex-A pipe can be delivered in any length required up to full coils of 328 feet. ComfortPro Systems provides a cut-to-length quick ship service for your project's needs. With a wide selection of pipe diameters in stock CPS can provide the right solution for your application requirements.

ComfortPro Systems also offers a full selection of pipe matching brass fittings 1" to 4" (110mm)

SINGLE Pipes



Single Heating Pipes

Art. No.	Jacket pipe OD in	Medium pipe OD in	s in	ID in	Bending radius in	water content gal/100ft	Heat capacity Btu/hr	R-value Btu/hr /ft / °F
H9032	3.5	1.26	0.11	1.03	9.8	4.34	205	7.064
H14040	5.5	1.57	0.15	1.28	13.8	6.72	307	6.868
H14050	5.5	1.97	0.18	1.61	15.7	10.53	478	6.868
H16063	6.3	2.48	0.23	2.02	21.7	16.71	751	6.434
H16075	6.3	2.95	0.27	2.42	29.5	23.85	1126	5.229
H20090	7.9	3.54	0.32	2.90	43.3	34.27	1638	5.227
H200110	7.9	4.33	0.39	3.54	47.2	51.24	2388	3.889

Description	Part #	Qty
32mm Single Insulated Pex 90mm Outer Jacket	H9032	1
1-1/4" 40mm Single Insulated Pex 140mm Outer Jacket	H14040	1
1-1/2" 50mm Single Insulated Pex 140mm Outer Jacket	H14050	1
2" 63mm Single Insulated Pex 160mm Outer Jacket	H16063	1
2-1/2" 75mm Single Insulated Pex 160mm Outer Jacket	H16075	1
3" 90mm Single Insulated Pex 200mm Outer Jacket	H20090	1
4" 110mm Single Insulated Pex 200mm Outer Jacket	H200110	1

DOUBLE Pipes



Double Heating Pipes

Art. No.	Jacket pipe OD in	Medium pipe OD in	s in	ID in	Bending radius in	water content gal/100ft	Heat capacity Btu/hr	R-value Btu/hr /ft / °F
HD1401	5.5	0.98	0.09	0.8	13.8	5.26	1.02	7.109
HD14032	5.5	1.26	0.11	1.03	15.7	8.68	205	5.661
HD16040	6.3	1.57	0.15	1.28	23.6	13.45	307	5.468
HD16050	6.3	1.97	0.18	1.61	23.6	21.06	478	3.918
HD20063	7.9	2.48	0.23	2.02	47.2	33.42	751	3.595

Description	Part #	Qty
28mm Double Insulated Pex 140mm Outer Jacket	HD1401	1
32mm Double Insulated Pex 140mm Outer Jacket	HD14032	1
1-1/4" 40mm Double Insulated Pex 160mm Outer Jacket	HD16040	1
1-1/2" 50mm Double Insulated Pex 160mm Outer Jacket	HD16050	1
2" 63mm Double Insulated Pex 200mm Outer Jacket	HD20063	1

SINGLE Pipes

Pipe Type	Heat Loss [Btu/(h ft)] for indicated Δt , per ft length of pre-insulated Single pipe									
	18	36	54	72	90	108	126	144	162	180
H9032	2.55	5.10	7.64	10.19	12.74	15.29	17.84	20.38	22.93	25.48
H14040	2.14	4.28	6.43	8.57	10.71	12.85	15.00	17.14	19.28	21.42
H14050	2.62	5.24	7.86	10.48	13.10	15.73	18.35	20.97	23.59	26.21
H16063	2.80	5.60	8.39	11.19	13.99	16.79	19.58	22.38	25.18	27.98
H16075	3.44	6.89	10.33	13.77	17.21	20.66	24.10	27.54	30.98	34.43
H20090	3.41	6.82	10.23	13.65	17.06	20.47	23.88	27.29	30.70	34.11
H200110	4.63	9.26	13.88	18.51	23.14	27.77	32.40	37.03	41.65	46.28

DOUBLE Pipes

Pipe Type	Heat Loss [Btu/(h ft)] for indicated Δt , per ft length of pre-insulated Double pipe									
	18	36	54	72	90	108	126	144	162	180
HD14032	3.18	6.36	9.54	12.72	15.90	19.08	22.26	25.44	28.62	31.80
HD16040	3.29	6.58	9.88	13.17	16.46	19.75	23.04	26.33	29.63	32.92
HD16050	4.59	9.19	13.78	18.38	22.97	27.57	32.16	36.76	41.35	45.95
HD20063	5.01	10.01	15.02	20.03	25.03	30.04	35.05	40.06	45.06	50.07

HEAT LOSS

- λ Insulation material: 0.036 W/m.K @ 10°C
0.040 W/m.K @ 40°C
- λ PE-Xa pipe: 0.35 W/m.K
- λ Ground: 1 W/m.K
- Pipe-laying depth: 0.80 m

The heat loss of a pre-insulated piping system is determined by the driving temperature difference Δt between the operating temperature of the heating medium inside the carrier tube(s), and the ground temperature in the immediate neighbourhood of the buried pipe.

Depending on the selected pipe configuration, the Δt can be calculated as following:

$$\text{for Single Heating } \Delta t = t_{\text{flow}} - t_{\text{ground}}$$

$$\text{for Double Heating } \Delta t = [(t_{\text{flow}} + t_{\text{return}}) / 2] - t_{\text{ground}}$$

U-values enable easy heat loss determination, as a function of the driving temperature difference Δt .

By multiplying the U-value of the subject pre-insulated pipe system with the applicable Δt , you calculate the corresponding heat loss per meter pipe length [W/m].

The below tables allow direct reading of the heat loss for a range of standard temperature differences.

Attention: For a configuration with flow and return, each in their own pre-insulated Single heating pipe, the heat loss is to be calculated for both pre-insulated Single pipes, and added up to become the overall heat loss of the system. Whereas for a Double heating pipe, the indicated heat loss only has to be multiplied by the length of the pre-insulated Double pipe to calculate its overall heat loss.

Single Heating

U-value [W/(mK)]	Pipe Type	Heat Loss [W/m] for indicated Δt , per meter length of pre-insulated Single pipe								
	Art. No.	10°	20°	30°	40°	50°	60°	70°	80°	90°
0.227	H7525	2.27	4.54	6.81	9.08	11.35	13.62	15.89	18.16	20.43
0.171	H11025	1.71	3.42	5.13	6.84	8.55	10.26	11.97	13.68	15.39
0.245	H9032	2.45	4.90	7.35	9.80	12.25	14.70	17.15	19.60	22.05
0.206	H11032	2.06	4.12	6.18	8.24	10.30	12.36	14.42	16.48	18.54
0.252	H11040	2.52	5.04	7.56	10.08	12.60	15.12	17.64	20.16	22.68
0.206	H14040	2.06	4.12	6.18	8.24	10.30	12.36	14.42	16.48	18.54
0.252	H14050	2.52	5.04	7.56	10.08	12.60	15.12	17.64	20.16	22.68
0.216	H16050	2.16	4.32	6.48	8.64	10.80	12.96	15.12	17.28	19.44
0.328	H14063	3.28	6.56	9.84	13.12	16.40	19.68	22.96	26.24	29.52
0.269	H16063	2.69	5.38	8.07	10.76	13.45	16.14	18.83	21.52	24.21
0.331	H16075	3.31	6.62	9.93	13.24	16.55	19.86	23.17	26.48	29.79
0.265	H20075	2.65	5.30	7.95	10.60	13.25	15.90	18.55	21.20	23.85
0.436	H16090	4.36	8.72	13.08	17.44	21.80	26.16	30.52	34.88	39.24
0.328	H20090	3.28	6.56	9.84	13.12	16.40	19.68	22.96	26.24	29.52
0.269	H22590	2.69	5.38	8.07	10.76	13.45	16.14	18.83	21.52	24.21
0.445	H200110	4.45	8.90	13.35	17.80	22.25	26.70	31.15	35.60	40.05
0.342	H225110	3.42	6.84	10.26	13.68	17.10	20.52	23.94	27.36	30.78
0.414	H225125	4.14	8.28	12.42	16.56	20.70	24.84	28.98	33.12	37.26

Double Heating

U-value [W/(mK)]	Pipe Type	Heat Loss [W/m] for indicated Δt , per meter length of pre-insulated Double pipe								
	Art. No.	10°	20°	30°	40°	50°	60°	70°	80°	90°
0.243	HD14025	2.43	4.86	7.29	9.72	12.15	14.58	17.01	19.44	21.87
0.210	HD16025	2.10	4.20	6.30	8.40	10.50	12.60	14.70	16.80	18.90
0.306	HD14032	3.06	6.12	9.18	12.24	15.30	18.36	21.42	24.48	27.54
0.253	HD16032	2.53	5.06	7.59	10.12	12.65	15.18	17.71	20.24	22.77
0.316	HD16040	3.16	6.32	9.48	12.64	15.80	18.96	22.12	25.28	28.44
0.442	HD16050	4.42	8.84	13.26	17.68	22.10	26.52	30.94	35.36	39.78
0.320	HD20050	3.20	6.40	9.60	12.80	16.00	19.20	22.40	25.60	28.80
0.481	HD20063	4.81	9.62	14.43	19.24	24.05	28.86	33.67	38.48	43.29
0.420	HD22563	4.20	8.40	12.60	16.80	21.00	25.20	29.40	33.60	37.80

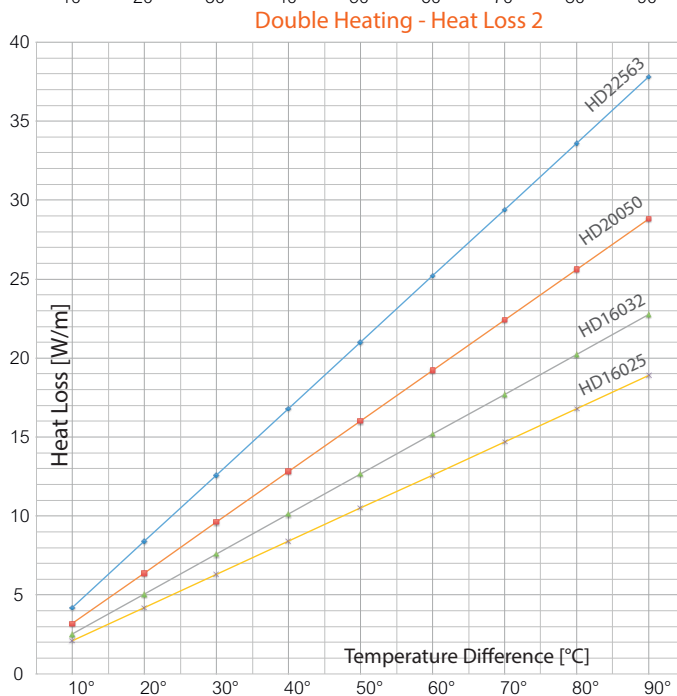
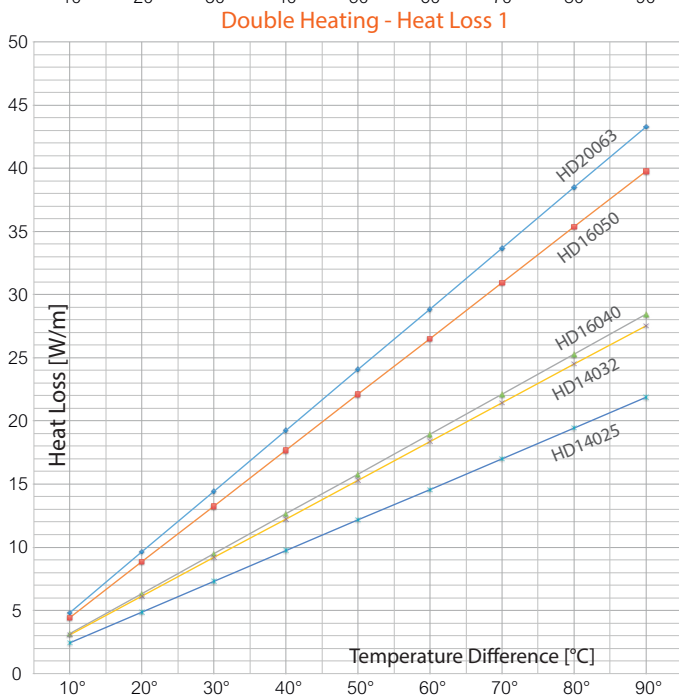
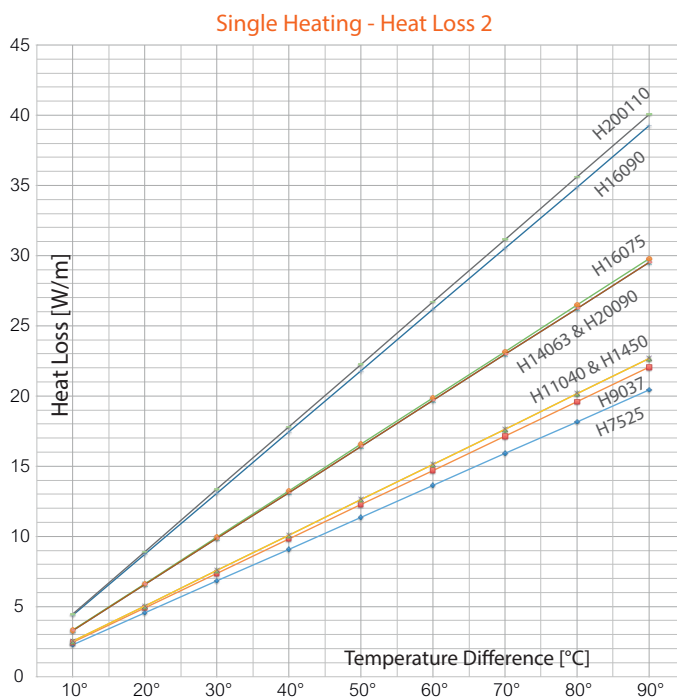
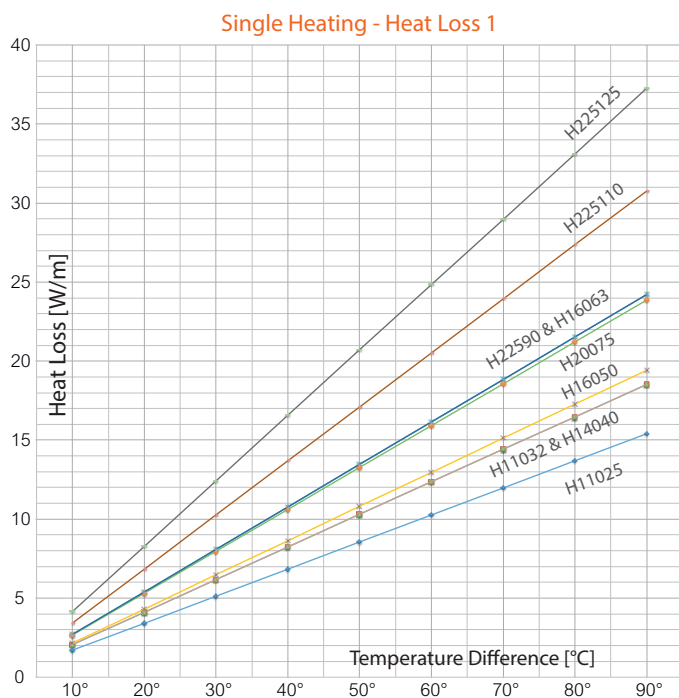
For pipe systems, heat loss is expressed in Watts per unit length of pipe. For our pre-insulated pipe systems, this is the heat flowing from the hotter inner medium-carrying PE-Xa pipes to the colder earth surrounding the outer protective HDPE jacket, and this at a rate determined by the temperature difference (Δt).

The thermal performance of a pre-insulated pipe system is, for equivalent materials and under comparable operating conditions, primarily a function of the insulation thickness:

Operating at a 110 kW capacity in a classic 80°C/60°C (flow/return) temperature regime, at 1 m placement depth, 100 m of our HD20050 pipe has an approximate heat loss of 1.92 kW and an average heating temperature drop of 0.18°C.

Under exactly the same circumstances, our HD16050 pipe has an approximate heat loss of 2.65 kW and an average heating temperature drop of 0.25°C.

Using the calculated driving temperature difference Δt as an entrance, the heat loss per meter of pre-insulated pipe can be read from the corresponding line in the graphs. Calculation method for the driving temperature difference Δt : see previous page



PRESSURE LOSS

Heating capacity [kW] for the respective temperature differences ΔT [K].

(ΔT = the temperature difference between flow and return. Example: flow @ 80 °C and return @ 60°C => therefore $\Delta T = 20$ K)

Pressure drop charts

Pressure Drop Methodology

Calculating pressure drop through a tube or circuit is dependent on a wide range of factors – viscosity, density, flow rate, and tube conditions. Pressure drop (loss) in the circuits is determined using the Darcy-Weisback equation. These equations are referenced in ASHRAE's 2005 Handbook - Fundamentals, section 2.0, equations 5, 18, 30, 32a, 32b, and 32c.

Glycol values referenced are based on DowFrost™ Technical Specification (form no. 180-01272-402AMS). Different glycol concentrations, types, and formats will result in different pressure drop calculations. The data points provided should only be used as a reference point.

Data

DowFrost™ 50% Solution (extrapolated data)

°F	Density (lbs/cu.ft.)		Dynamic Viscosity	
			Dynamic Viscosity (cps)*	(lb/ft-s)
40	65.670	14.280	0.0096	
60	65.210	12.394	0.0048	
80	64.750	10.509	0.0029	
100	64.290	8.623	0.0020	
120	63.830	6.737	0.0014	
140	63.370	4.851	0.0011	
160	62.910	2.966	0.0009	
180	62.450	1.080	0.0007	

Water

°F	Density (lbs/cu.ft.)		Dynamic Viscosity	
			Dynamic Viscosity (cps)	(lb-ft-s)
80	62.22	0.858	0.00058	
100	61.99	0.681	0.00046	
120	61.71	0.557	0.00037	
140	61.38	0.466	0.00031	
160	61.00	0.398	0.00027	
180	60.58	0.345	0.00023	

PRESSURE TEST ACCORDING TO DIN 1988-2

The pressure test procedure is mandatory before backfilling over any pipes

Prior to concealing, fill the finished pipework with water, taking care to avoid air locks. The pressure test must be conducted in two stages, starting with the preliminary test, followed by the main test.

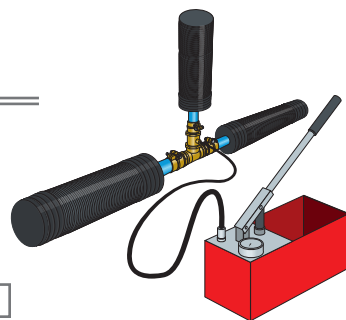
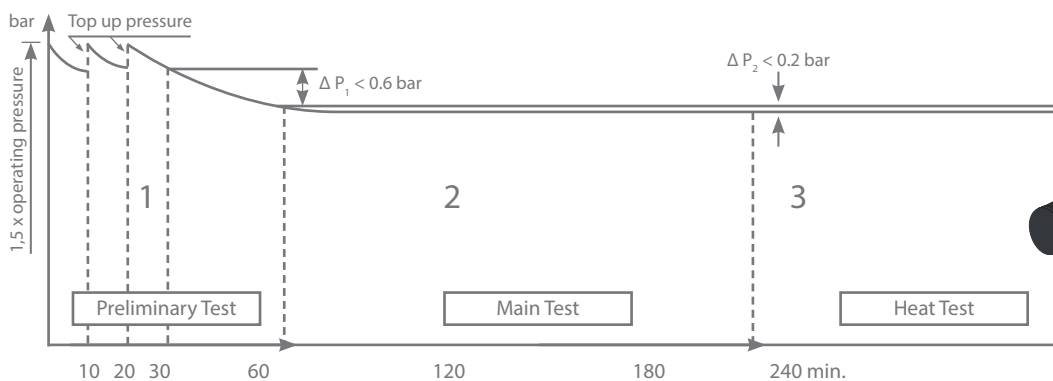
1. Preliminary test

The preliminary test involves applying a test pressure equal to 1.5 times the admissible operating pressure. This pressure must be regenerated twice within the space of 30 minutes at intervals of 10 minutes. Following a test period of another 30 minutes, the test pressure must not have fallen by more than 0.6 bar. Leakages must not occur at any points in the system being tested.

2. Main test

The main test has to be conducted immediately after the preliminary test. The test takes 2 hours. At the end of this period, the test pressure recorded after the preliminary test must not have fallen by more than 0.2 bar. Leakages must not occur at any point in the system being tested.

Leakage testing - DIN 1988-2



1 Preliminary test	Bar / psi	2 Main test	Bar / psi
1.1 Operating pressure x 1.5		Beginning (hh:mm)	:
1.2 After 10 min. (restore 1.1)		End (hh:mm)	:
1.3 After 20 min. (restore 1.1)		2.2 Test pressure	
1.4 After 30 min.		2.3 After 120 min.	
1.5 After 60 min. admissible pressure drop < 0.6 bar		2.4 Remarks admissible pressure drop < 0.2 bar	

ATTENTION: Always pressure test the completed pipe-work before concealing!

The conscientious execution and documentation of the standardised pressure test for the entire piping system is a warranty requirement! Failing to do so involves a genuine damage risk, and automatically voids the system warranty.

INSTALLATION

Notes

To facilitate the connection of branch pipes to the main pipes, superposition of the inner medium-carrying PE-Xa pipes is recommended (as shown in the drawing).

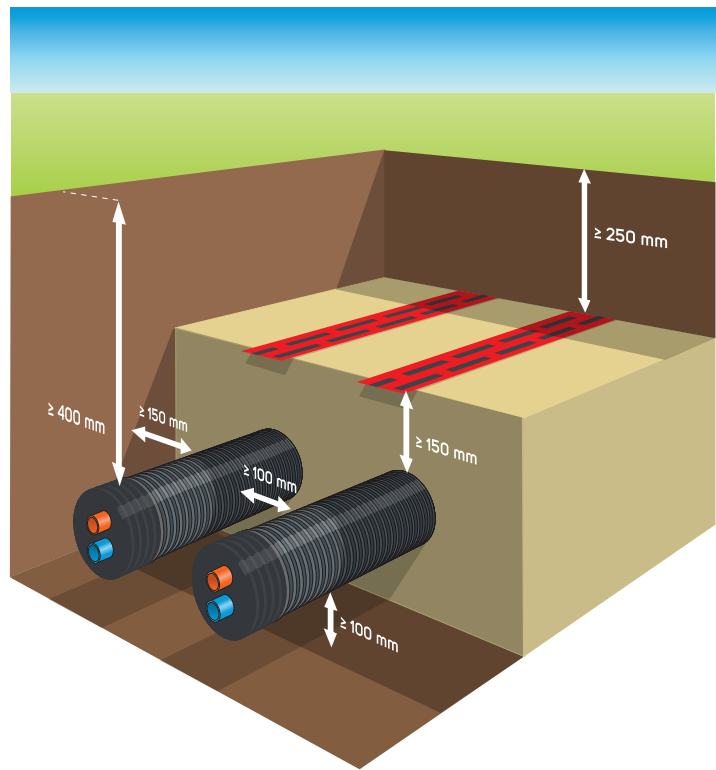
Always consider the local frost depth to determine the minimum placement depth of the pipes.

To avoid damaging the outer protective HDPE jacket, always lay the pipes in a sand bed. Backfill only after fully covering the pipes with sand, respecting the minimal layer dimensions as indicated in the drawing.

Warning tape or warning mesh positioned above the buried pipes should avoid damaging these pipes when carrying out ground works at a later stage.

To avoid potential contamination during transportation and handling, our pre-insulated pipes are always delivered with the medium-carrying pipes closed with plastic plugs.

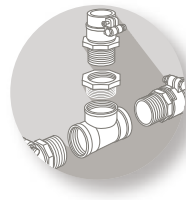
All pipe systems intended for potable (drinking) water and other sanitary domestic tasks, such as washing and showering applications, should always be thoroughly rinsed before commissioning, following the locally applicable hygienic regulations and accepted practices



For a state-of-the-art installation, the following guidelines should be respected. Failing to do so involves a genuine damage risk, and automatically voids the system warranty.

- The installation of adequately anchored Fix Points at the system's extremities (typical at wall penetrations) is mandatory. This to secure the connected plumbing against the potential impact of the system's dilatation forces (thermal expansion/retraction).
- All underground pipe connections should be executed with purpose designed PE-X couplings.
- To prevent ingress of (ground)water, the EN 15632-3 standard prescribes the usage of Shrink End Caps to seal the non-bonded system layers at underground connections.
- Prior to concealing, the methodical execution and documentation of the standardised Pressure Test of the entire system is required to determine the integrity of the underground plumbing.

ComfortPro[®]
Terre-Pex
Pre Insulated Pex-A Piping Systems



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