

PRE-INSULATED PE-XA PIPE SYSTEM



Hiline

e-FLEX

An efficient, flexible and reliable pre-insulated PE-Xa pipe system for heating applications

1 INTRODUCTION

2 SPECIFICATION

2.1 Bonded System

- 2.1.1 Standards
- 2.1.2 Service Pipe
- 2.1.3 Insulation
- 2.1.4 Casing

2.2 Available Dimensions

2.3 System Performance

- 2.3.1 Pressure Loss
- 2.3.2 Heat Loss
- 2.3.3 Service Life

3 DESIGN

3.1 Introduction

3.2 Network Types

- 3.2.1 Branched e-Flex
- 3.2.2 Looped e-Flex
- 3.2.3 Branched Hybrid

3.3 Pipe Sizing

- 3.3.1 Introduction
- 3.3.2 Pressure Loss Nomogram
- 3.3.3 Service Life

3.4 Heat Loss

3.5 Thermal Expansion

3.6 Trench Requirements

- 3.6.1 Introduction
- 3.6.2 Traffic Loadings
- 3.6.3 Trench Dimensions
- 3.6.4 Trenches in Special Conditions
 - 3.6.4.1 Trenches on a Slope
 - 3.6.4.2 Waterlogged Ground
- 3.6.5 Proximity to Other Services

3.7 System Connections

- 3.7.1 Horizontal Building Entry
- 3.7.2 Vertical Building Entry
- 3.7.3 Transitions to Rigid Pre-Insulated Systems

4 PRODUCT RANGE

4.1 Pre-insulated

- 4.1.1 Pre-insulated Pipes
- 4.1.2 Pre-insulated Fittings
 - 4.1.2.1 90-Degree / Building Entry Bend
 - 4.1.2.2 Flat Tee
 - 4.1.2.3 Cranked Tee
 - 4.1.2.4 Y-Piece
 - 4.1.2.5 Valves

4.2 Jointing

- 4.2.1 PEX-LOK Service Pipe Axial Compression Joints
 - 4.2.1.1 PEX-LOK Straight Couplings
 - 4.2.1.2 PEX-LOK 90-Degree Elbows
 - 4.2.1.3 PEX-LOK Tee Couplings
 - 4.2.1.4 PEX-LOK Transition Couplings
 - 4.2.1.5 PEX-LOK Tooling
- 4.2.2 Casing Joints and Insulation
 - 4.2.2.1 Straight Shell Sleeve
 - 4.2.2.2 90-Degree Shell Sleeve
 - 4.2.2.3 Tee Shell Sleeve
 - 4.2.2.4 Heat Shrink Casing Joint
 - 4.2.2.5 Insulation of Casing Joints

4.3 Terminations

- 4.3.1.1 Building Entry - Wall Opening
- 4.3.1.2 Building Entry - Core Drilled
- 4.3.2 End Cap
- 4.3.3 Wall Sealing Ring
- 4.3.4 Wall seal (compression type)
- 4.3.5 Building Entry Bend

4.4 Accessories

- 4.4.1 Buried Mains Warning Tape
- 4.4.1 Tools for PEX-LOK Axial Compression Joints

5 INSTALLATION

5.1.0 Logistics and Pipe Coil Handling

- 5.1.1 Transportation
- 5.1.2 Lifting
- 5.1.3 Storage
- 5.1.4 Cutting Straps, Uncoiling and Straightening
- 5.1.5 Bending Radius

5.2 Pipe Laying

- 5.2.1 Trench Dimensions

5.3 Pipe Jointing

- 5.3.1 Preparation of Pipe Ends
- 5.3.2 Service Pipe Jointing
- 5.3.3 Jointing with Shell Sleeves
 - 5.3.3.1 Components List
 - 5.3.3.2 Preparation for Jointing
 - 5.3.3.3 Fitting the Shell Sleeve Joint
- 5.3.4 Jointing with Heat-Shrink Casing Joints

5.4.0 Pipe Terminations

- 5.4.1 End Caps
- 5.4.2 Wall Entry Sleeves
 - 5.4.2.1 Wall Sealing Ring
 - 5.4.2.2 Wall Seal (compression type)
- 5.4.3 Building Termination
- 5.4.4 Connecting to Bonded Rigid Pre-insulated Pipe

6 COMMISSIONING

6.1 Pressure Testing

- 6.1.1 Test Procedure with Water

6.2 Drawings

6.3 Water Treatment

6.4 Pressure Test Report

APPENDIX

Introduction to CPV Ltd

District Heating Pipe Systems and Services

Other Pipe Systems

Hiline *e-Flex* is a flexible district heating pipe system from CPV Ltd that has been specifically designed for low-temperature heating applications.

Hiline *e-Flex* district heating pipe has a service pipe made of cross-linked polyethylene, PE-Xa. This material was selected because of its excellent thermal and mechanical properties. It is a corrosion-proof and chemically-resistant material. The product is free of harmful substances, making it exceptionally environment-friendly.

The PE-Xa pipe is equipped with an oxygen diffusion barrier ethylene vinyl alcohol copolymer film (EVOH).

The thermal insulation is CFC-free flexible polyurethane foam with excellent insulation values. The bending capability of Hiline *e-Flex* district heating pipe means that it is generally possible to pass over or under existing buried services and obstacles can be easily bypassed.

With Hiline *e-Flex* district heating pipe, users can choose the shortest pipe route without the restrictions imposed by the traditional method of rigid pre-insulated pipe network construction.

The flexible Hiline *e-Flex* district heating pipe is delivered to the site continuously in coils. Long delivery lengths enable pipes to be laid in the ground largely without joints. This means that the pipe trench can be considerably narrower, which in turn, ensures considerable savings on

work below ground, especially as with the Hiline *e-Flex* DUO pipe system.

When considering the relatively short time required for installation, Hiline *e-Flex* district heating pipe is not only an ideal technical solution, but it reduces installation costs due to a reduced requirement for on-site co-ordination as the pipes are laid simply and quickly.

The physical properties of the PE-Xa pipe, combined with the composite insulation, mean that thermal expansion can be ignored when using this product.

Installing pipe connections is very simple. The joints are fitted quickly and reliably with PEX-LOK compression joints. The wide range of accessories ensures that solutions can be chosen for every possible situation.

Hiline *e-Flex* district heating pipes are manufactured according to the current standard (EN 15632-1 /-2).

Range of applications	
Heating pipe	
Maximum temperature for continuous operation	Max: 80 °C
Maximum permitted operating temperature	Max: 95 °C (fluctuating)
Maximum permitted operating pressure	6 bar



2.1 BONDED SYSTEM

2.1.1 Standards

Specification:	Pre-insulated flexible pipe systems according to EN 15632-1/-2
Fire behaviour:	Building material according to DIN 4102 class B2 (normally inflammable)

2.1.2 Service Pipe

Material:	High-density polyethylene (PE-HD), peroxide cross-linked (PE-Xa), colour: natural
Bonding agent:	PE-modified, heat stabilised, colour: red
Oxygen barrier:	Ethylene vinyl alcohol copolymer (EVOH), heat stabilised, colour natural
Specification:	According to DIN 16892, DIN 16893 and EN 12318-2
Properties:	Unaffected by aggressive water; low pressure losses; very good chemical and mechanical resistance

PE-Xa service pipe	Reference temperature °C	Value	Test standard
Density	-	932 - 935 kg/m ³	ISO 1183
Thermal conductivity	-	0.38 W/mK	According to ASTM C 1113
Tensile strength	20	min. 18 N/mm ²	ISO 6259
Tensile strength	80	min. 8 N/mm ²	ISO 6259
Modulus of elasticity	20	600 N/mm ²	ISO 527
Modulus of elasticity	80	200 N/mm ²	ISO 527
Linear expansion coefficient	20	1.4 · 10 ⁻⁴ 1/K	-
Linear expansion coefficient	100	2.0 · 10 ⁻⁴ 1/K	-
Crystallite melting range	-	128 - 134 °C	-
Oxygen impermeability	40	≤ 0.10g / (m ³ x d)	DIN 4726 and DIN 4729
Chemical resistance	20 / 40 / 60	Better than PE-HD	DIN 8075 B.1

2.1.3 Thermal Insulation

PUR insulation	Reference temperature °C	Hiline Flex heating	Test standard
Density	-	> 50 kg/m ³	EN 253
Axial shear strength			EN 15632-2
Thermal conductivity flexible systems	50	≤ 0.0216 W/mK	EN 253 and ISO 8497
Thermal conductivity rigid systems	50	≤ 0.0260 W/mK	EN 253 and ISO 8497
Percentage of closed cells	-	≥ 90 %	EN 253
Water absorption	100	≤ 10 %	EN 15632-1

2.1.4 Protective Casing

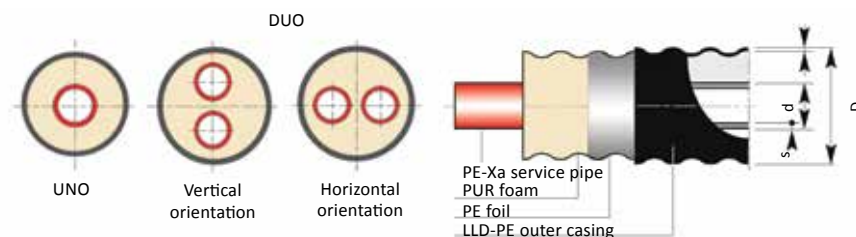
LLD-PE protective casing	Reference temperature °C	Value	Test standard
Density	-	918 - 922 kg/m ³	ISO 1183
Thermal conductivity	-	0.33 W/mK	DIN 52612
Crystallite melting range	-	122 °C	ISO 11357-3

UV stable, it is seamlessly extruded

2.2 AVAILABLE DIMENSIONS

Heating, 6 bar

Hiline e-Flex in coils:
Dimensions:
HF 25/76 - 140/202



Hiline e-Flex heating, 6 bar, UNO

Type	Service pipe	Nominal	Outer casing	Minimum	Volume	Weight	Max length	Part Number
	d x s	DN	D x s1	Bending radius	Service pipe			
	mm	mm	mm	m	l/m	kg/m	m	
25/ 76	25 x 2.3	20.4	78 x 1.9	0.70	0.32	0.90	807	HF.2576.PU-/BK
32/ 76	32 x 2.9	26.2	78 x 1.9	0.70	0.53	1.00	807	HF.3276.PU-/BK
40/ 91	40 x 3.7	32.6	93 x 2.1	0.80	0.83	1.39	590	HF.4091.PU-/BK
50/111	50 x 4.6	40.8	113 x 2.3	0.90	1.30	1.97	429	HF.50111.PU-/BK
63/126	63 x 5.8	51.4	128 x 2.7	1.00	2.07	2.60	305	HF.63126.PU-/BK
75/142	75 x 6.8	61.4	143 x 2.9	1.10	2.96	3.39	229	HF.75142.PU-/BK
90/162	90 x 8.2	73.6	163 x 3.2	1.20	4.25	4.56	149	HF.90162.PU-/BK
110/162	110 x 10.0	90.0	163 x 3.2	1.20	6.36	5.10	149	HF.110162.PU-/BK
110/182	110 x 10.0	90.0	183 x 3.3	1.40	6.36	5.68	86	HF.110182.PU-/BK
125/182	125 x 11.4	102.2	183 x 3.3	1.40	8.20	6.37	86	HF.125182.PU-/BK
140/202	140 x 12.7	114.6	202 x 3.3	1.60	10.31	7.60	80	HF.140202.PU-/BK
160/250	160 x 14.6	130.8	250 x 3.9	-	13.43	11.31	12*	HF.160250.PU-/BK

* supplied in 12m straight lengths

Hiline e-Flex heating, 6 bar, DUO

Type	Service pipe	Nominal	Outer casing	Minimum	Volume	Weight	Max length	Part Number
	d x s	DN	D x s1	Bending radius	Service pipe			
	mm		mm	m	l/m	kg/m	m	
25 + 25/ 91	2 x 25 x 2.3	20.4 + 20.4	93 x 2.1	0.80	2 x 0.32	1.34	590	HF.252591.PD-/BK
32 + 32/111	2 x 32 x 2.9	26.2 + 26.2	113 x 2.3	0.90	2 x 0.53	1.87	429	HF.3232111.PD-/BK
40 + 40/126	2 x 40 x 3.7	32.6 + 32.6	128 x 2.7	1.00	2 x 0.83	2.48	305	HF.4040126.PD-/BK
50 + 50/162	2 x 50 x 4.6	40.8 + 40.8	163 x 3.2	1.20	2 x 1.30	3.96	149	HF.5050162.PD-/BK
63 + 63/182	2 x 63 x 5.8	51.4 + 51.4	183 x 3.3	1.40	2 x 2.07	5.28	86	HF.6363182.PD-/BK
75 + 75/202	2 x 75 x 6.8	61.4 + 61.4	202 x 3.3	1.60	2 x 2.96	6.50	80	HF.7575202.PD-/BK

- Supplied cut to customer-specified lengths. The delivered coil length may vary (+/- 5%)
- The delivered coil dimensions will vary according to lengths ordered, but will be no larger than 2.8m in diameter and 0.8m to 1.2m wide

2.3.1 Pressure Loss

Hiline e-Flex's PE-Xa service pipe has a very low coefficient of friction ($e = 0.007$ mm at 60°C) and permanently-low pressure loss throughout the lifetime of the system. With such low frictional losses, pipe diameters can often be much smaller than those using alternative materials such as steel.

Please refer to the design information in section 3.3.2 for details of pressure loss in the Hiline e-Flex system.

2.3.2 Heat Loss

The system's high-performance PUR foam insulation offers minimal heat loss – some ≤ 0.0216 W/mK – in accordance with standards EN 253. Heat loss is often overlooked by specifiers and even a small difference in the chosen system's performance, can result in increased running costs throughout the life of a system – plus additional carbon emissions.

Please refer to the design information in section 3.4 for details of heat loss in the Hiline e-Flex system.

2.3.3 Service Life

Operational temperatures and pressures play a very large part in the length of a system's useful operational life. As such, great care must be taken when selecting the design parameters – details of which can be found in section 3.3.3 of this document.

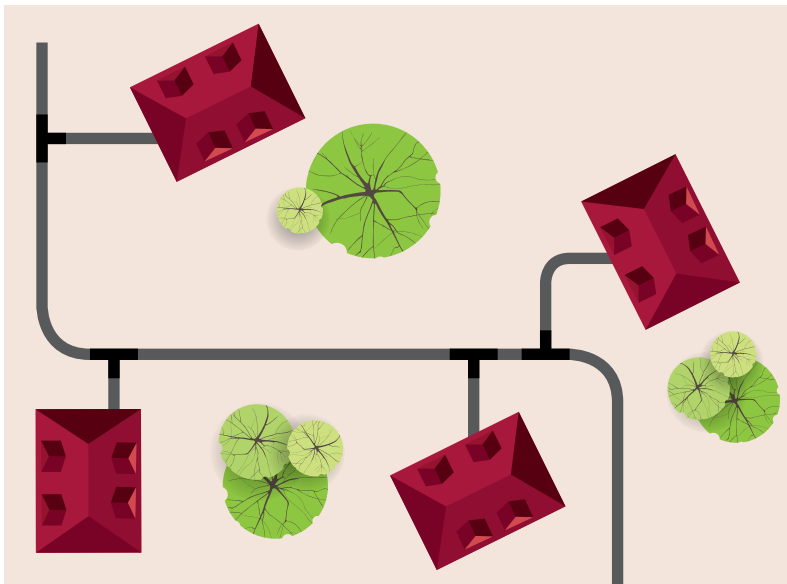


3.1 INTRODUCTION

When designing a district heating network, it is important to choose the optimal design parameters as these will have a significant effect on a system's ability to satisfy the demands of the heat loads that are connected. Furthermore, the system's life expectancy can vary considerably – depending on the chosen temperatures and pressures.

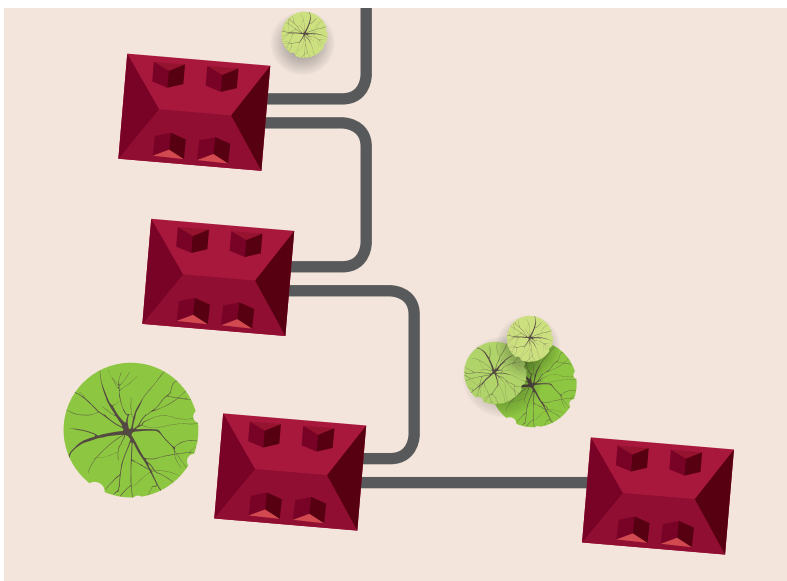
This section discusses the key considerations that need to be addressed for optimal performance to be achieved. Should you have any further questions, please contact the CPV technical sales department – the contact details for which can be found on the rear page of this document.

3.2 NETWORK TYPES



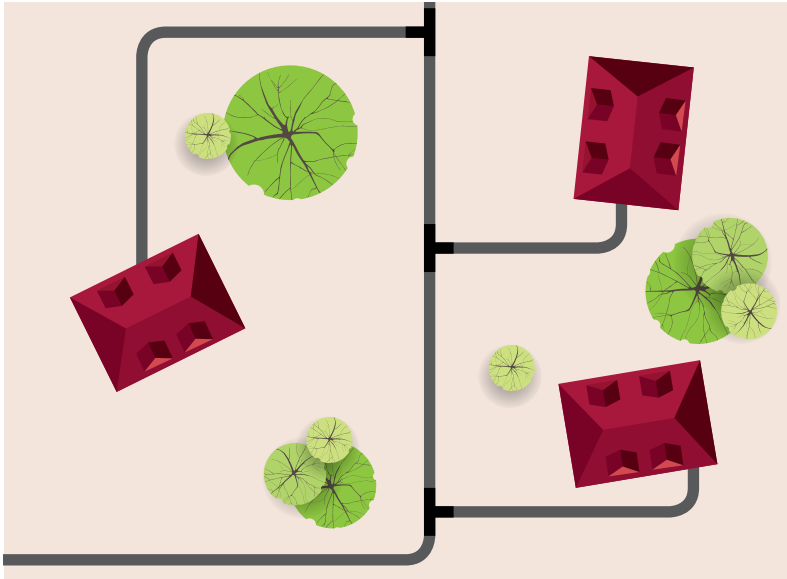
3.2.1 Branched e-Flex

This method is one of the more common methods of network configuration. Using entirely flexible pipe for all connections, the branch connection pipes can be installed before buildings are constructed.



3.2.2 Looped e-Flex

This method offers the advantage of there being no pipe connections below ground. This is better suited to smaller networks.



3.2.3 Branched Hybrid

This method combines the advantages and larger dimension availability of pre-insulated steel systems for the arterial mains distribution – with the flexibility and speed of installation that individual branch connections in flexible PE-Xa pre-insulated pipe offers.

3.3 PIPE SIZING

3.3.1 Introduction

With a much improved frictional coefficient, PE-Xa pipes offer great advantages over their steel counterparts. When sizing Hiline e-Flex pipes, it's recommended that a comparison is made between the energy losses in a system and the pump capacity. Heat demands vary throughout the year and as such, the full pumping load is only reached on a few days every year. By striking a balance on the energy loss and pumping capacity, pipe dimensions can be kept lower and savings made on both the capital cost of installation and its long-term operation.

To calculate a pipe's size, the Pressure Loss Nomogram in section 3.3.2 can be used to estimate pressure loss.

3.3.2 Pressure Loss Nomogram

Using the Pressure Loss Nomogram on the following page, select the temperature difference ΔT from the left-hand vertical axis. Two examples are shown, 30°C and 20°C.

Using the relevant vertical scale, select the connected heat load Q in kW. Then, move horizontally over the Nomogram to determine which of the pipe diameters will provide the optimal flow rate. These pipe dimensions are represented by the thick black lines – with their corresponding dimensions shown on the right-hand vertical axis. The vertical lines running from the horizontal axis show the Pressure Loss - Δp in Pa/m.

By using the thinner diagonal lines – following them up wards, the Mass Flow Rate in kg/h can be determined. As with the pressure drop values, this will vary according to the chosen pipe dimension.

Example Calculation

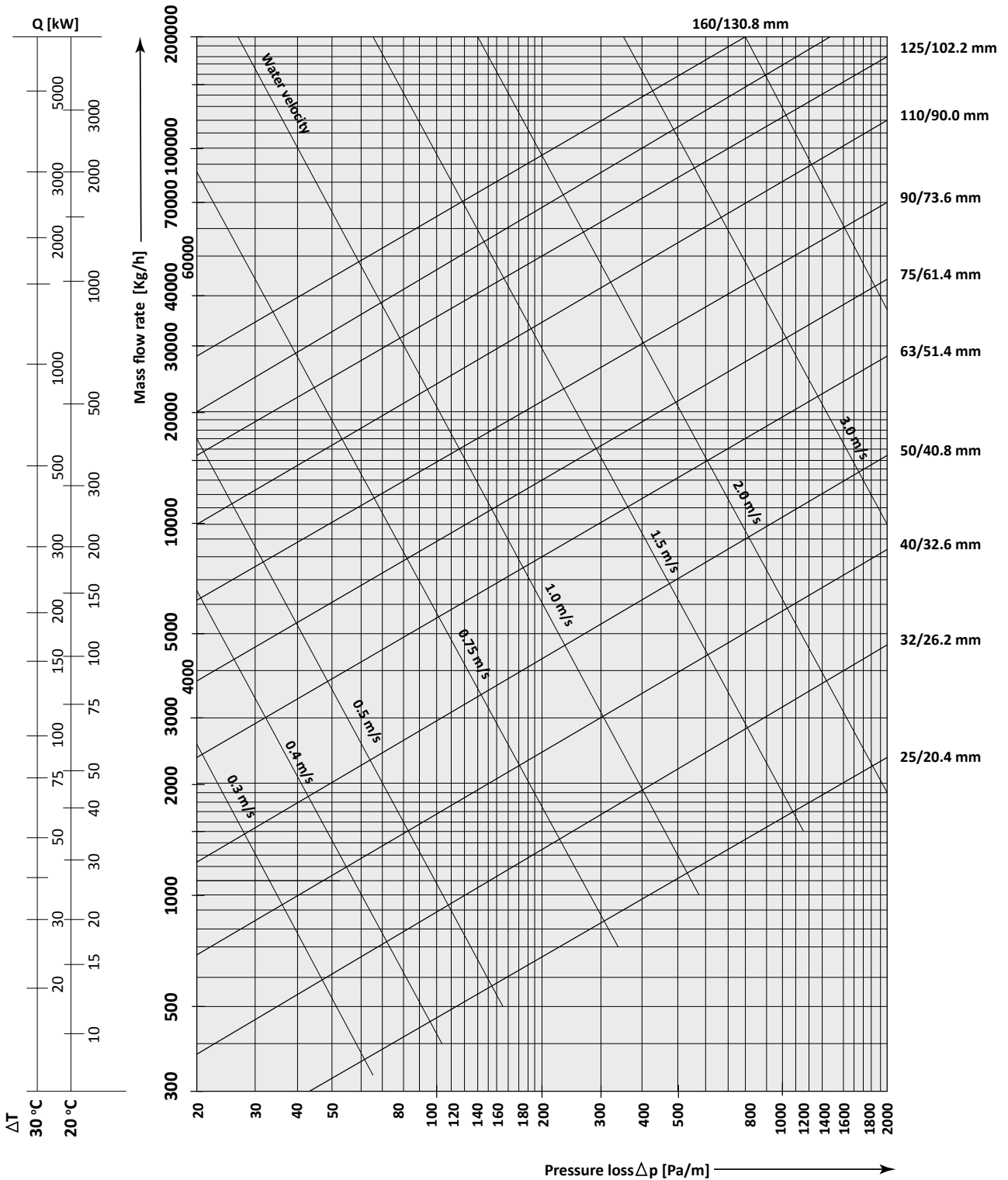
- Assumed flow temperature: 80°C
- System Temperature Drop ΔT : 30°C
- Connected Heat Load Q: 200kW

First two options for Hiline e-Flex pipe diameter:

- (1) 75/61.4mm Hiline e-Flex – with a pressure drop of 45 Pa/m
- (2) 63/51.4mm Hiline e-Flex – with a pressure drop of 100 Pa/m

Choose a pipe dimension from the available options according to the preferred pressure drop figure.

3.3.2 Pressure Loss Nomogram for PE-Xa SDR11 Pipes



3.3.3 Service Life Introduction

The chosen operational flow temperatures and pressures can have a great effect on the life expectancy calculations for a PE-Xa-based pre-insulated pipe system. The tables below illustrate the expected values at a range of different temperatures and pressures. Should you require specific calculations, please contact our Technical Sales department, the contact details for which can be found in the rear of this document.

Operating temperature °C	Heating Operating pressure (bar)				
	1 year	5 year	10 year	25 year	50 year
10	17.9	17.5	17.4	17.2	17.1
20	15.8	15.5	15.4	15.2	15.1
30	14.0	13.8	13.7	13.5	13.4
40	12.5	12.2	12.1	12.0	11.9
50	11.1	10.9	10.8	10.7	10.6
60	9.9	9.7	9.7	9.5	9.5
70	8.9	8.7	8.6	8.5	8.5
80	8.0	7.8	7.7	7.6	-
90	7.2	7.0	6.9	-	-
95	6.8	6.6	6.6	-	-

1 MPA= 10 bar

Long-term behaviour:

The values have a safety factor of 1.25 and are based on a series of measurements covering an average of 32,000 hours. They can be compared with Table 5 as per DIN 16893. All values have been tested and confirmed by the competent organizations in various countries. The max. operating temperature is 95 °C but accommodates a short-term over temperature (fault temperature) of 110 °C.

Lifetime calculation using Miner's Rule

Lifetime calculation for fluctuating operating temperatures will be calculated to EN ISO 13760. A typical fluctuating temperature distribution for the flow in a district heating system gives an average temperature/year of approx. 66 °C.

Example of application

The basis is a typical temperature collective over one year, with fluctuating operation. (EN 15632-2)
1 year= 365 days= 8,760 hours.

Operating Temperature	Example 1 Annual Operating time	Example 2 Annual Operating time	Example 3 Annual Operating time
°C	h	h	h
95	3.3	0	0
90	292	50	50
85	0	100	1,000
80	8,468	200	3,450
75	0	2,000	1,000
70	0	2,410	0
65	0	4,000	0
60	0	0	0
total	8,763.3	8,760	5,500

3.4 HEAT LOSS

Hiline e-Flex UNO

Conditions:

Cover above pipe	0.8m
Ground temperature	+10°C
Soil thermal conductivity	1.0 W/mK
PUR insulation thermal conductivity	0.021 W/mK
Service pipe thermal conductivity	0.38 W/mK
Distance between pipes	0.1 m

Heat loss calculation for 1 m network:

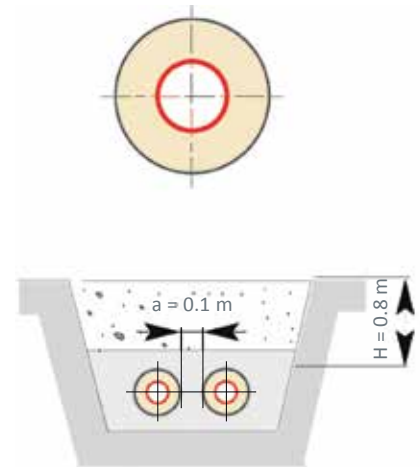
$$q = K(\bar{t} - t_g),$$

$$\bar{t} = \frac{t_f + t_r}{2} \text{ – Average operating temperature,}$$

K – Heat transfer coefficient,

t_f – Flow (supply) operating temperature

t_r – Return operating temperature.



Type of installation, HF UNO:
2-pipe, laid in the ground

Pipe dimension	K_f , W/mK	Heat Loss q , W/m				
		Average operating temperature \bar{t} , °C				
		40	50	60	70	80
Insulation Series S1						
25/76	0.114	3.42	4.56	5.70	6.85	7.99
32/76	0.144	4.32	5.77	7.21	8.65	10.09
40/91	0.151	4.52	6.03	7.54	9.05	10.55
50/111	0.154	4.64	6.19	7.73	9.28	10.83
63/126	0.176	5.28	7.05	8.81	10.57	12.33
75/142	0.190	5.71	7.61	9.51	11.47	13.32
90/162	0.205	6.15	8.20	10.25	12.30	14.35
110/162	0.295	8.84	11.79	14.74	17.69	20.64
125/182	0.301	9.04	12.60	15.08	18.09	21.11
140/202	0.308	9.24	12.32	15.40	18.48	21.56
Insulation Series S2						
25/91	0.099	2.97	3.95	4.94	5.93	6.92
32/91	0.121	3.62	4.83	6.04	7.24	8.45
40/111	0.123	3.69	4.93	6.16	7.39	8.62
50/126	0.135	4.06	5.41	6.77	8.12	9.48
63/142	0.153	4.58	6.11	7.64	9.17	10.70
75/162	0.160	4.82	6.42	8.03	9.64	11.24
90/182	0.174	5.22	6.96	8.70	10.44	12.18
110/182	0.234	7.04	9.39	11.73	14.08	16.43
125/202	0.245	7.34	9.79	12.24	14.69	17.14

3.4 HEAT LOSS

Hiline e-Flex DUO

Conditions:

Cover above pipe	0.8m
Ground temperature	+10°C
Soil thermal conductivity	1.0 W/mK
PUR insulation thermal conductivity	0.021 W/mK
Service pipe thermal conductivity	0.38 W/mK

Heat loss calculation for 1 m network with supply and return pipelines:

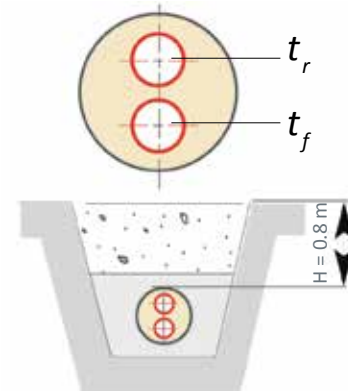
$$q = K(\bar{t} - t_g)$$

$$\bar{t} = \frac{t_f + t_r}{2} \quad \text{-- Average operating temperature,}$$

K – Heat transfer coefficient,

t_f – Flow (supply) operating temperature

t_r – Return operating temperature.



Type of installation, HF DUO:
1-pipe, laid in the ground

Pipe dimension	K, W/mK	Heat Loss q, W/m				
		Average operating temperature \bar{t} , °C				
		40	50	60	70	80
Insulation Series S1						
25+25/ 91	0.180	5.39	7.18	8.98	10.77	12.57
32+32/111	0.184	5.51	7.35	9.18	11.02	12.86
40+40/126	0.210	6.31	8.42	10.52	12.62	14.73
50+50/162	0.196	5.87	7.83	9.79	11.74	13.70
63+63/182	0.238	7.15	9.54	11.92	14.31	16.69
75+75/202	0.273	8.19	10.92	13.65	16.37	19.10
Insulation Series S2						
25+25/111	0.139	4.17	5.56	6.95	8.34	9.73
32+32/126	0.156	4.68	6.24	7.80	9.36	10.91
40+40/142	0.174	5.21	6.95	8.68	10.42	12.15
50+50/182	0.167	5.00	6.67	8.34	10.01	11.68
63+63/202	0.196	5.89	7.85	9.81	11.77	13.73

3.5 THERMAL EXPANSION

The Hiline e-Flex system does not require any expansion bellows or compensators when installed in trenches. This is due to the frictional forces between the pipe's corrugated LDPE outer casing and the compacted soil being greater than the expansion forces exerted by the plastic pipe.

3.6 TRENCH REQUIREMENTS

3.6.1 Introduction

The pipe trench's dimensions can affect the load bearing capabilities of the buried pipe system. Therefore, it is important that the dimensions laid out in section 3.6.3 are adhered to. Adequate space must also be provided at jointing areas to allow for free access for the installation process.

The minimum cover for buried pipes is 600mm down to a maximum of 2.6m.
Please contact us if your project's requirement necessitates a deviation from these limits.

3.6.2 Traffic Loadings

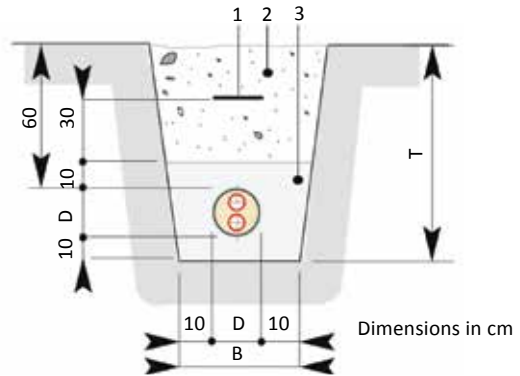
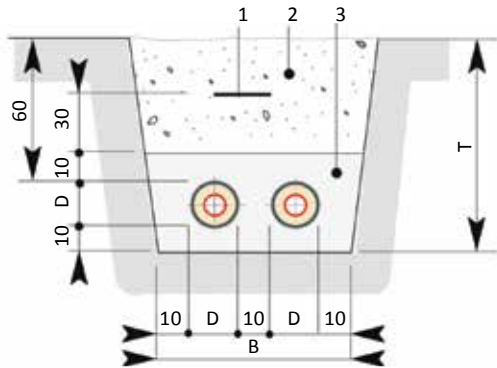
For buried systems under road structures, loading classifications SWL 30 or SWL 60 must be complied with – in accordance with DIN 1072. For loads greater than SWL 30 300kN total, a load-distributing super structure is required in compliance with the demands of RSt075 (or equivalent).

With no traffic load, the minimum trench depth T can be reduced by 200mm.



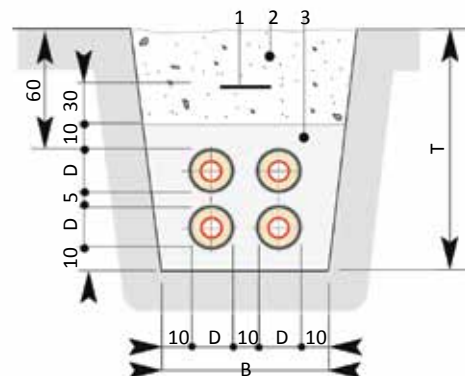
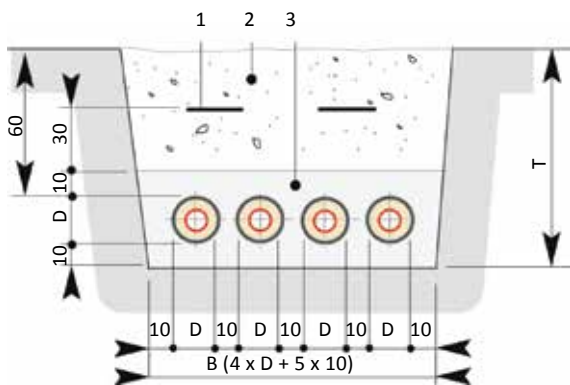
3.6.3 Trench Dimensions

- 1 Pipe warning tape; see sheet HF 4.4.3
- 2 Excavated material
- 3 Pipe bedding media
 - (a) Sand - Grade 0/4
 - (b) Pea shingle - 6-8mm (rounded)



Service pipe Ø D mm	Width B cm	Depth T cm	Minimum bending radius m
76	45	80	0.70
91	50	80	0.80
111	55	85	0.90
126	55	85	1.00
142	60	85	1.10
162	65	90	1.20
182	70	95	1.40
202	75	95	1.40

Service pipe Ø D mm	Width B cm	Depth T cm	Minimum bending radius m
91	30	80	0.80
111	30	85	0.90
126	35	85	1.00
142	35	85	1.10
162	35	90	1.20
182	38	95	1.40
202	41	95	1.60



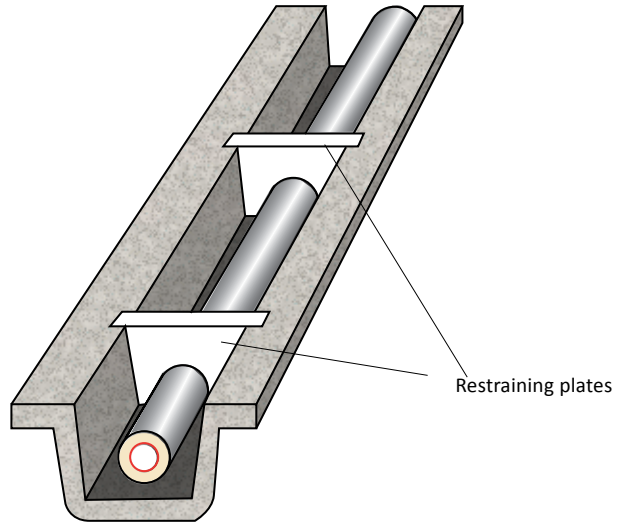
Installation depth:
 Max. installation depth: 2.6 m
 Our approval is required for installation
 at greater depths.

SLW 30 300 kN total load as per DIN 1072; if subject
 to higher traffic loads (e.g. SLW 60), a load-distributing
 superstructure as per RStO75 is required. With no traffic
 load, the minimum trench depth T can be reduced
 by 20 cm.

**3.6.4
Trenches in Special
Conditions**

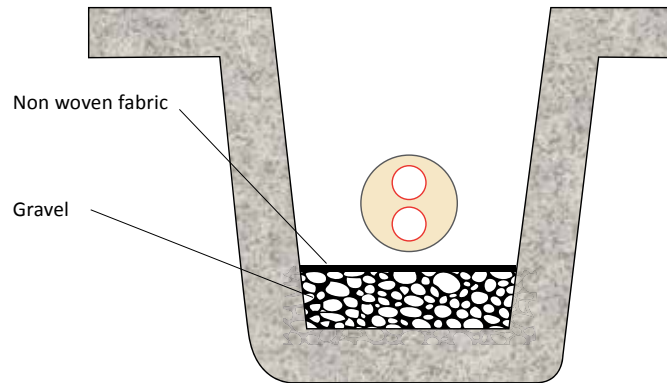
**3.6.4.1
Trenches on a Slope**

Where trenches are on an incline, backfill material must be prevented from being washed away by ground water. This can be done by the installation of concrete plates cast into position at regular intervals along the section of sloping trench.



**3.6.4.2
Waterlogged Ground**

Where the bottom of the trench may be unstable from waterlogged, boggy ground or marshland, it is important that measures are taken to provide a consistent support along the entire length of the pipe system. This can include the use of general construction methods such as non-woven fabric.



**3.6.5
Proximity to Other
Services**

Utility / Service	Parallel <5m or crossover	Parallel >5m
1kV Electricity Cables	0.3m	0.3m
10kV or 30kV Electricity Cables	0.6m	0.7m
Natural Gas or Water Supplies	0.2m	0.4m

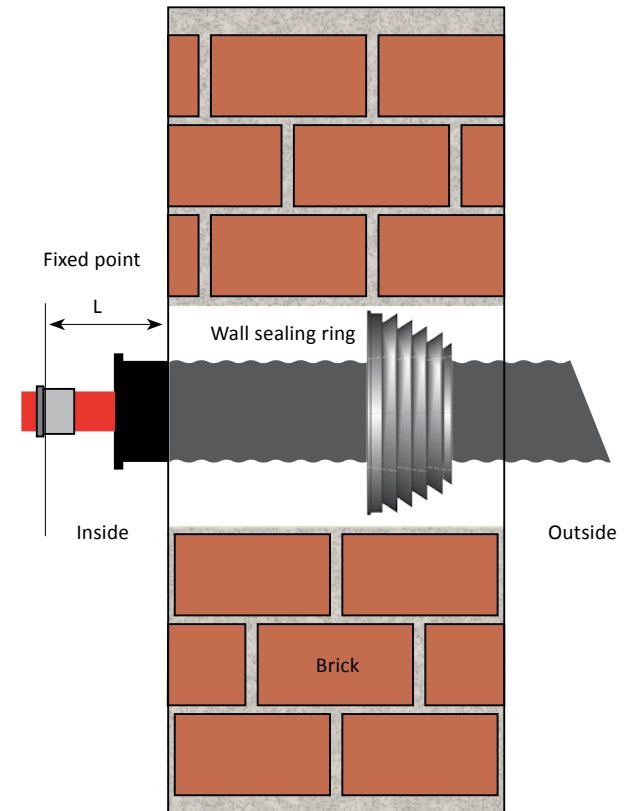
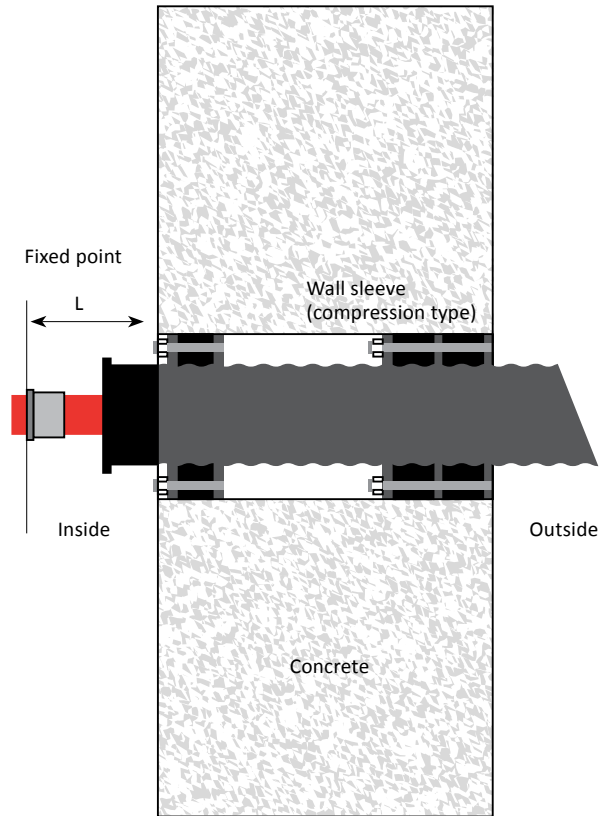
It is important to observe any relevant standards and regulations for the positioning of buried utilities. An example of this includes potable water supplies – where they must not be warmed by district heating mains. The table above offers some guide values for common services, but please ensure that local and national requirements are strictly adhered to.

3.7 SYSTEM CONNECTIONS

3.7.1 Horizontal Building Entry

When connecting to buildings, the linear thermal expansion must be kept within acceptable limits. The table below specifies the maximum distances that the pipes may protrude inside the inner wall – as detailed on the illustrations below. Please also refer to section 5.4.3 of this document for details on configuring pipe terminations.

Maximum fixed point forces occurring per pipe for:			
90 °C, 6 bar		60 °C, 6 bar	
Type	Fmax [N]	Type	Fmax [N]
25/ 76	925	25/ 76	755
32/ 76	1495	32/ 76	1225
40/ 91	2365	40/ 91	1940
50/111	3685	50/111	3015
63/126	5785	63/126	4740
75/142	8205	75/142	6720
90/162	11860	90/162	9720
110/182	17675	110/182	14480
125/182	22878	125/182	18745
140/202	28747	140/202	23553



3.7.2 Vertical Building Entry

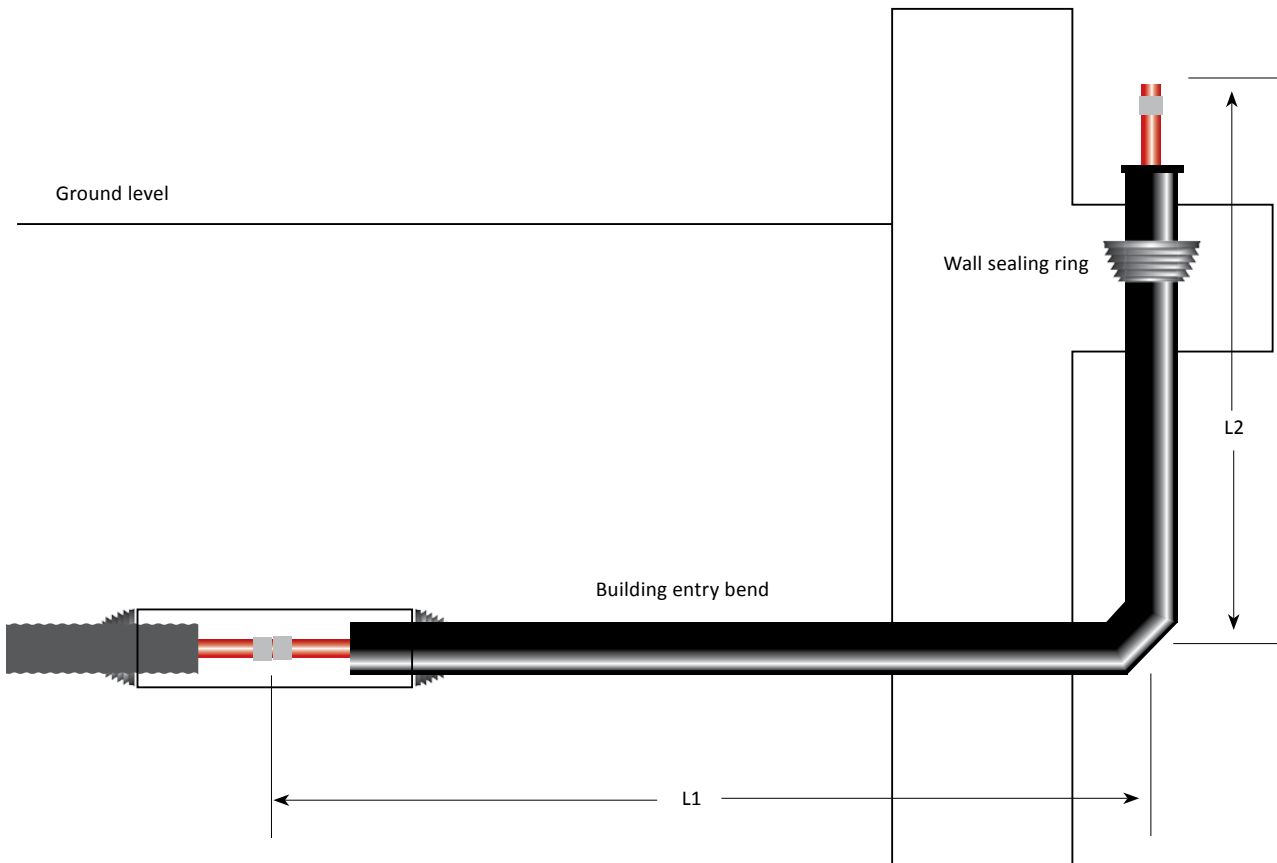
Pre-fabricated 90-degree bends can be used when the minimum bending radius is insufficient to facilitate a vertical termination within a building. The illustration below shows the dimensions of the pre-fabricated bend and configuration with Wall Sealing Ring (see section 4.3.3) and End Cap (see section 4.3.2).

Building Entry Dimensions

The table below details the dimensions L1 and L2 for the pre-fabricated building entry pipe shown above.

Hiline e-Flex Pipe Dimension	HF 25/76 to 125/182	HF 140/202*
L1 (mm)	1,600	1,114
L2(mm)	1,100	1,114

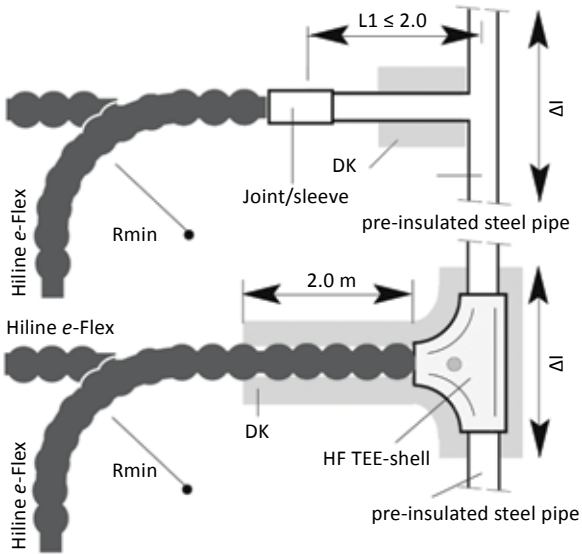
*Please note that this sizes uses pre-insulated steel bends with pre-fitted PEX-LOK axial compression fittings.



3.7.3 Transitions to Rigid Pre-insulated Systems

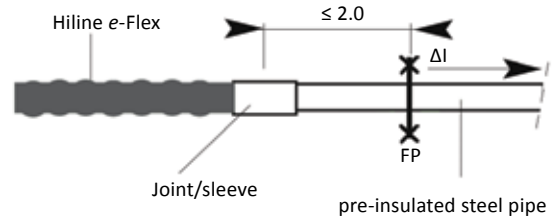
Installation instructions for transition from Hiline e-Flex to pre-insulated steel pipe

1. Junction with tee-piece



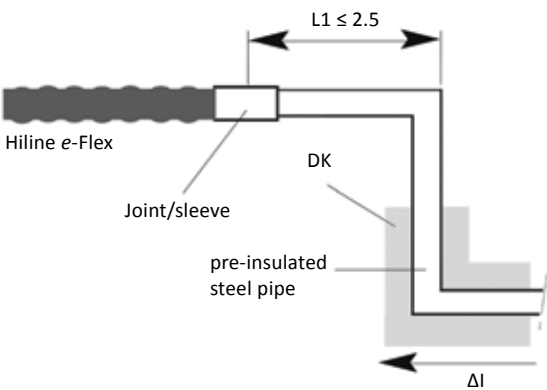
The transverse expansion Δl must not exceed the expansion that can be accommodated by junction pipe DS and the Hiline e-Flex pipe.

2. Transition with fixed point



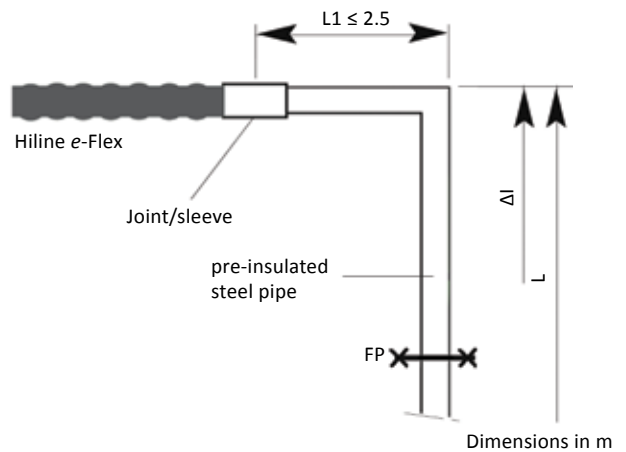
The thermal movement Δl of the pre-insulated steel pipe cannot be compensated by the Hiline e-Flex pipes. A fixed point must be installed.

3. Transition with Z-bend



Static design of the Z-bend according to expansion variable Δl .
 Δl = Thermal movement
 FP = Fixed point
 DK = Expansion pad

4. Transition with expansion bend

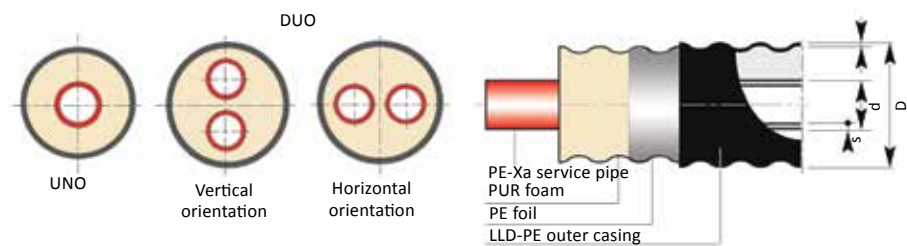


If pipe length L or Δl is more than permitted for $L1$, a fixed anchor point must be installed.

- Design of expansion components
- Positioning of expansion pads

4.1 PRE-INSULATED

4.1.1 Pre-insulated Pipes UNO/DUO range



Hiline e-Flex heating, 6 bar, UNO

Type	Service pipe d x s	Nominal DN	Outer casing D x s1	Minimum Bending radius	Volume Service pipe	Weight	Max length	Part Number
	mm	mm	mm	m	l/m	kg/m	m	
25/ 76	25 x 2.3	20.4	78 x 1.9	0.70	0.32	0.90	807	HF.2576.PU-/BK
32/ 76	32 x 2.9	26.2	78 x 1.9	0.70	0.53	1.00	807	HF.3276.PU-/BK
40/ 91	40 x 3.7	32.6	93 x 2.1	0.80	0.83	1.39	590	HF.4091.PU-/BK
50/111	50 x 4.6	40.8	113 x 2.3	0.90	1.30	1.97	429	HF.50111.PU-/BK
63/126	63 x 5.8	51.4	128 x 2.7	1.00	2.07	2.60	305	HF.63126.PU-/BK
75/142	75 x 6.8	61.4	143 x 2.9	1.10	2.96	3.39	229	HF.75142.PU-/BK
90/162	90 x 8.2	78.6	163 x 3.2	1.20	4.25	4.56	149	HF.90162.PU-/BK
110/162	110 x 10.0	90.0	163 x 3.2	1.20	6.36	5.10	149	HF.110162.PU-/BK
110/182	110 x 10.0	90.0	183 x 3.3	1.40	6.36	5.68	86	HF.110182.PU-/BK
125/182	125 x 11.4	102.2	183 x 3.3	1.40	8.20	6.37	86	HF.125182.PU-/BK
140/202	140 x 12.7	114.6	202 x 3.3	1.60	10.31	7.60	80	HF.140202.PU-/BK
160/250	160 x 14.6	130.8	250 x 3.9	-	13.43	11.31	12*	HF.160250.PU-/BK

* supplied in 12m straight lengths

Hiline e-Flex heating, 6 bar, DUO

Type	Service pipe d x s	Nominal DN	Outer casing D x s1	Minimum Bending radius	Volume Service pipe	Weight	Max length	Part Number
	mm	mm	mm	m	l/m	kg/m	m	
25 + 25/ 91	2 x 25 x 2.3	20.4 + 20.4	93 x 2.1	0.80	2 x 0.32	1.34	590	HF.252591.PD-/BK
32 + 32/111	2 x 32 x 2.9	26.2 + 26.2	113 x 2.3	0.90	2 x 0.53	1.87	429	HF.3232111.PD-/BK
40 + 40/126	2 x 40 x 3.7	32.6 + 32.6	128 x 2.7	1.00	2 x 0.83	2.48	305	HF.4040126.PD-/BK
50 + 50/162	2 x 50 x 4.6	40.8 + 40.8	163 x 3.2	1.20	2 x 1.30	3.96	305	HF.5050162.PD-/BK
63 + 63/182	2 x 63 x 5.8	51.4 + 51.4	183 x 3.3	1.40	2 x 2.07	5.28	86	HF.6363182.PD-/BK
75 + 75/202	2 x 75 x 6.8	61.4 + 61.4	202 x 3.3	1.60	2 x 2.96	6.50	80	HF.7575202.PD-/BK

- Supplied cut to customer-specified lengths. The delivered coil length may vary (+/- 5%)
- The delivered coil dimensions will vary according to lengths ordered, but will be no larger than 2.8m in diameter and 0.8m to 1.2m wide

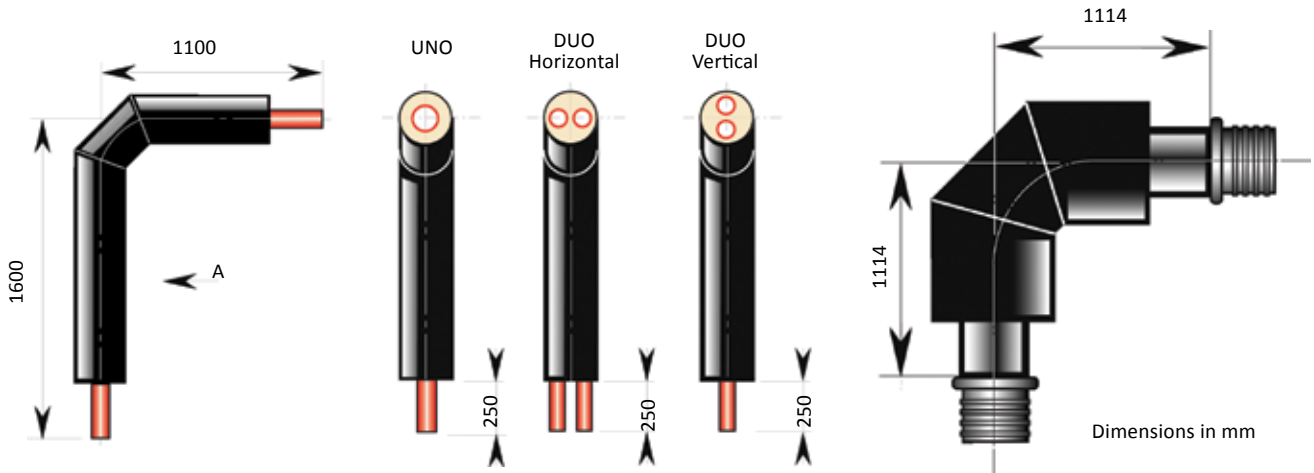
4.1.2 Pre-insulated Fittings

4.1.2.1 90-Degree / Building Entry Bend

Bend, 90°

Dimensions: HF 25/76 - 125/182

Bend, 90° Steel with welded-on PEX-LOK compression coupling
Dimensions: HF 140/202



Please Note: Hiline e-Flex pre-insulated bends in dimensions 140/202 are pre-insulated steel, fitted with PEX-LOK compression connections at each end – as detailed in section 4.2.1.4.

Hiline e-Flex UNO

Type	PEX service pipe d x s mm	Weight kg/unit	Part No
25/ 76	25 x 2.3	2.30	HF.2576.LPU
32/ 76	32 x 2.9	2.50	HF.3276.LPU
40/ 91	40 x 3.7	3.47	HF.4091.LPU
50/111	50 x 4.6	4.92	HF.50111.LPU
63/126	63 x 5.8	6.50	HF.63126.LPU
75/142	75 x 6.8	8.47	HF.75142.LPU
90/162	90 x 8.2	11.40	HF.90162.LPU
110/162	110 x 10.0	14.23	HF.110162.LPU
110/182	110 x 10.0	16.19	HF.110182.LPU
125/182	125 x 11.4	17.20	HF.125182.LPU
140/225	140 x 12.7	40.95	HF.140202.LPU

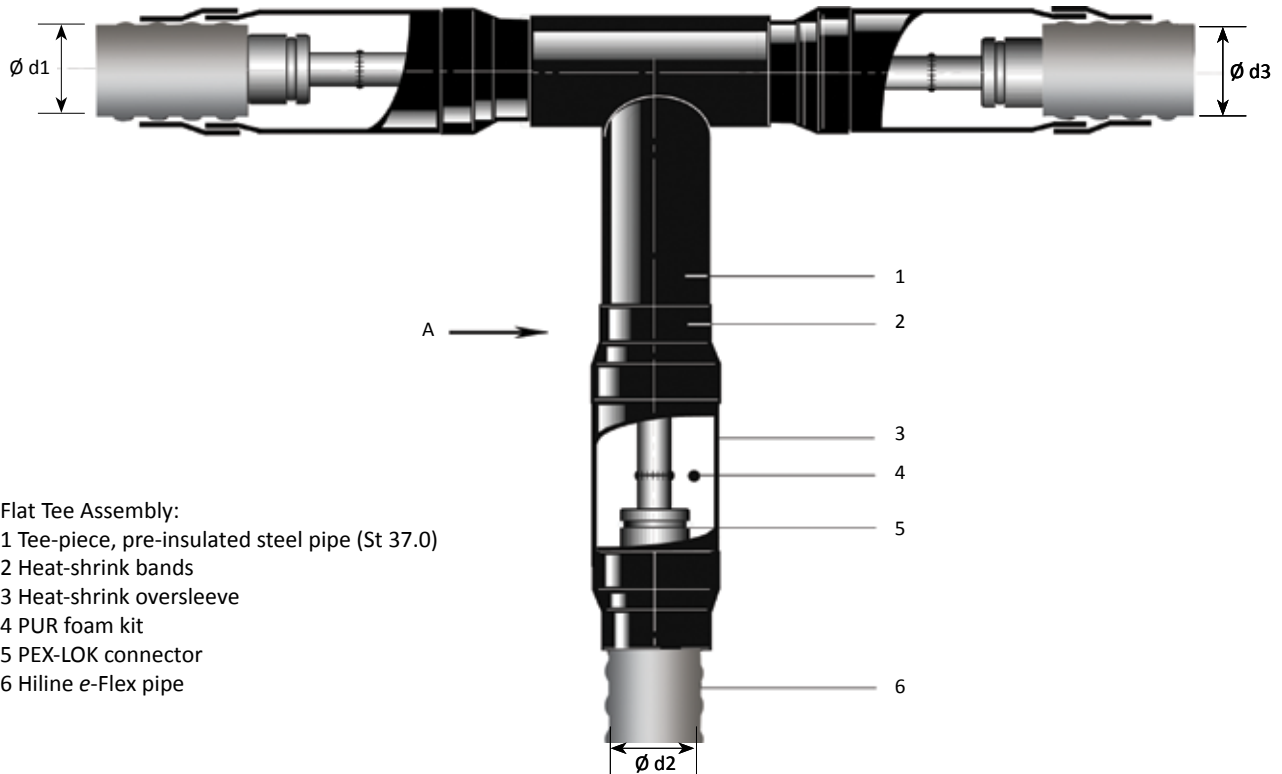
Hiline e-Flex DUO

Type	PEX service pipe d x s mm	Weight kg/unit	Part No
25 + 25/ 91	2 x 25 x 2.3	4.32	HF.252591.LPD*
32 + 32/111	2 x 32 x 2.9	4.67	HF.3232111.LPD*
40 + 40/126	2 x 40 x 3.7	7.42	HF.4040126.LPD*
50 + 50/162	2 x 50 x 4.6	9.90	HF.5050162.LPD*
63 + 63/182	2 x 63 x 5.8	13.96	HF.6363182.LPD*
75 + 75/202	2 x 75 x 6.8	17.50	HF.7575202.LPD*

*Please specify Horizontal 'H' or Vertical 'V' configuration in part number suffix.

4.1.2.2 Flat Tee

Dimension HF 140/225 - 160/250



- Flat Tee Assembly:
- 1 Tee-piece, pre-insulated steel pipe (St 37.0)
 - 2 Heat-shrink bands
 - 3 Heat-shrink oversleeve
 - 4 PUR foam kit
 - 5 PEX-LOK connector
 - 6 Hiline e-Flex pipe

View A



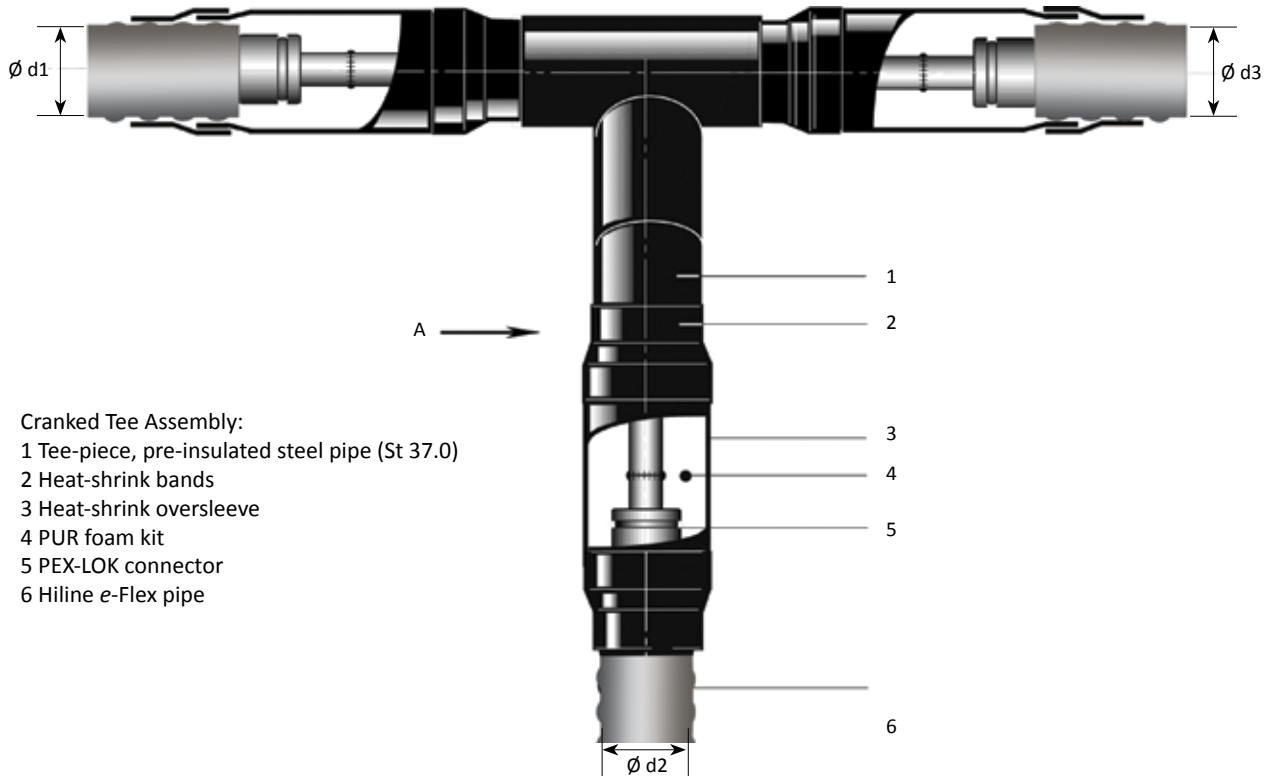
Hiline e-Flex Flat Tee-Joint – Part Numbers

Outer casing $\varnothing d1$ $\varnothing d3$	Branch, $\varnothing d2$										
	25/76	32/76	40/91	50/111	63/126	75/142	90/162	110/162	110/182	125/182	140/202
125/182 - 125/182	125.TF9	125.TF8	125.TF7	125.TF6	125.TF5	125.TF4	125.TF3	125.TF2	125.TF1	125.TF-	-
140/202 - 140/202	140.TF10	140.TF9	140.TF8	140.TF7	140.TF6	140.TF5	140.TF4	140.TF3	140.TF2	140.TF1	140.TF-

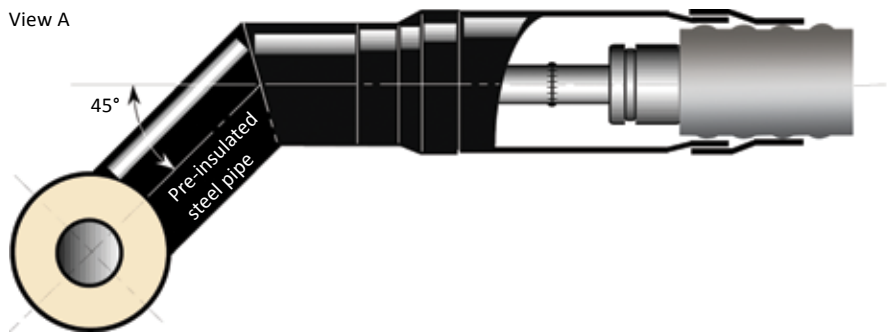
Part Numbers: to determine the part number, please take the value shown in the table above and prefix with HF. So a 140/202 main pipe with a 125/182 branch tee would be HF.140.TF2 We can supply tee-pieces with different branches on request

4.1.2.3 Cranked Tee

Dimension HF 125/182 - 140/202



- Cranked Tee Assembly:
- 1 Tee-piece, pre-insulated steel pipe (St 37.0)
 - 2 Heat-shrink bands
 - 3 Heat-shrink oversleeve
 - 4 PUR foam kit
 - 5 PEX-LOK connector
 - 6 Hiline e-Flex pipe

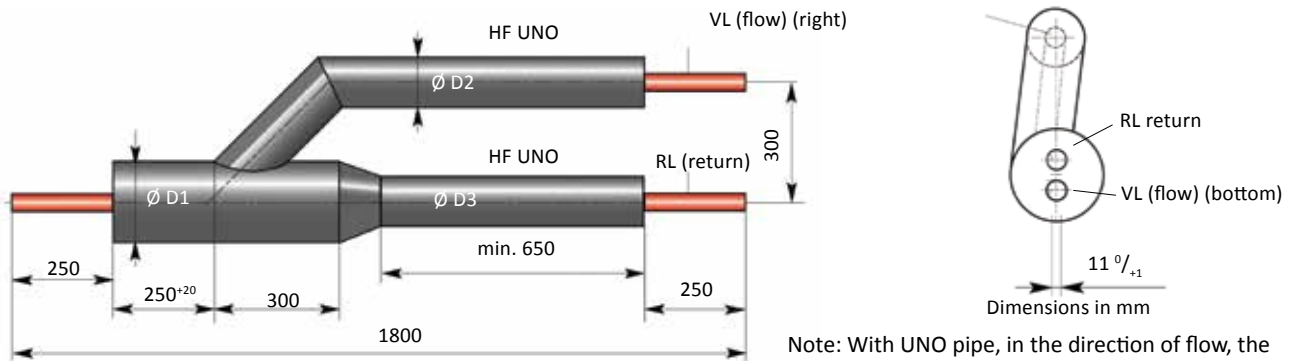


Hiline e-Flex Cranked Tee-Joint – Part Numbers

Outer casing $\varnothing d1 \varnothing d3$	Branch, $\varnothing d2$										
	25/76	32/76	40/91	50/111	63/126	75/142	90/162	110/162	110/182	125/182	140/202
125/182 - 125/182	125.TC9	125.TC8	125.TC7	125.TC6	125.TC5	125.TC4	125.TC3	125.TC2	125.TC1	125.TC-	-
140/202 - 140/202	140.TC10	140.TC9	140.TC8	140.TC7	140.TC6	140.TC5	140.TC4	140.TC3	140.TC2	140.TC1	140.TC-

Part Numbers: to determine the part number, please take the value shown in the table above and prefix with HF. So a 140/202 main pipe with a 125/182 branch tee would be HF.140.TC1 We can supply tee-pieces with different branches on request

4.1.2.4 Y-Piece

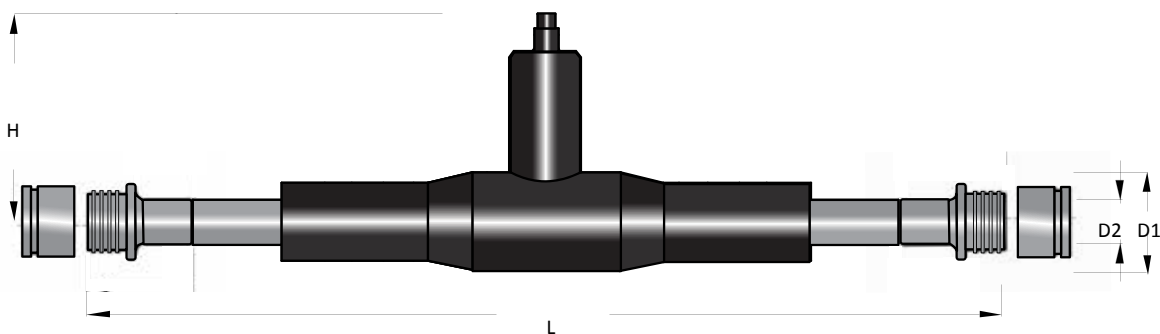


Hiline e-Flex DUO / 2 x Hiline e-Flex UNO

UNO pipes mm	Ø D2 and D3 mm	D DUO HF pipe mm	Ø D1 mm	Part No
2 x 25/ 76	75	25 + 25/ 91	90	HF.25257691.UDA-PP
2 x 32/ 76	75	32 + 32/111	110	HF.323276111.UDA-PP
2 x 40/ 91	90	40 + 40/126	125	HF.404091126.UDA-PP
2 x 50/ 111	110	50 + 50/162	160	HF.5050111162.UDA-PP
2 x 63/ 126	125	63 + 63/182	180	HF.6363126182.UDA-PP
2 x 75/142	140	75 + 75/202	200	HF.7575142202.UDA-PP

4.1.2.5 Pre-insulated Valves

These pre-insulated valves are from the Hiline Steel (Metric) range, with welded-on PEX-LOK axial compression fittings as detailed in section 4.2.1.4. These valves are supplied with extended handles and street boxes.



Hiline e-Flex Size Service Pipe OD/Casing OD (mm)	Dimensions (mm)				Part No
	Nominal Diameter(mm)			L*	
HF UNO	D2	D1	H	L*	
25/76	20	90	460	1,608	HF.25.BVU
32/76	25	90	460	1,624	HF.32.BVU
40/91	32	110	465	1,640	HF.40.BVU
50/111	40	110	475	1,670	HF.50.BVU
63/126	50	125	480	1,670	HF.63.BVU
75/142	65	140	505	1,688	HF.75.BVU
90/162	80	160	515	1,686	HF.90.BVU
110/162	100	200	525	1,676	HF.110.BVU
110/182	100	200	525	1,676	HF.110.BVU
125/225	125	225	545	1,716	HF.125.BVU
140/225	125	225	545	1,725	HF.140.BVU
160/250	150	250	565	1,725	HF.160.BVU
HF DUO					
25+25/91	20+20	125	460	1,608	HF.25.BVD
32+32/111	25+25	140	460	1,624	HF.32.BVD
40+40/126	32+32	160	465	1,640	HF.40.BVD
50+50/162	40+40	160	475	1,670	HF.50.BVD
63+63/182	50+50	200	480	1,670	HF.63.BVD
75+75/202	65+65	225	505	1,688	HF.75.BVD

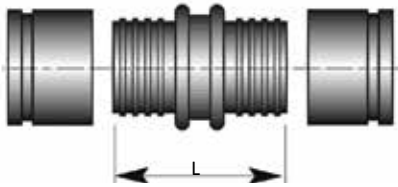
* This dimension includes the welded-on PEX-LOK axial compression connectors. Special reducing casing joint kits may be required to accommodate certain sizes. Please contact us for details.

4.2 JOINTING

4.2.1 Service Pipe PEX-LOK Axial Compression Joints

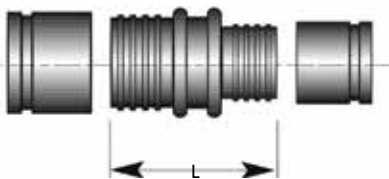
4.2.1.1 PEX-LOK Straight Couplings

Coupling



Heating, 6 bar			Part No
Material: brass			
PEX pipe	Coupling	L	
mm	mm	mm	
25 x 2.3	25 x 2.3	67.0	HF.25.C/J
32 x 2.9	32 x 2.9	88.0	HF.32.C/J
40 x 3.7	40 x 3.7	100.0	HF.40.C/J
50 x 4.6	50 x 4.6	114.0	HF.50.C/J
63 x 5.8	63 x 5.7	141.0	HF.63.C/J
75 x 6.8	75 x 6.8	137.5	HF.75.C/J
90 x 8.2	90 x 8.2	137.5	HF.90.C/J
110 x 10.0	110 x 10.0	137.5	HF.110.C/J
125 x 11.4	125 x 11.4	141.0	HF.125.C/J
140 x 12.7	140 x 12.7	140.0	HF.140.C/J

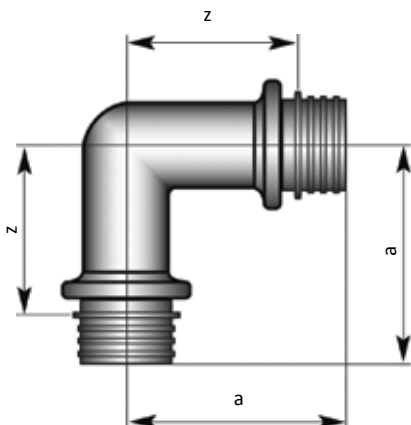
PEX-LOK Coupling, reduced



Heating, 6 bar			Part No
Material: brass/steel*			
PEX pipe	Coupling	L	
mm	mm	mm	
32 x 2.9	25 x 2.3	80.0	HF.3225.RED/J
40 x 3.7	32 x 2.9	100.0	HF.4032.RED/J
50 x 4.6	40 x 3.7	108.0	HF.5040.RED/J
63 x 5.8	50 x 4.6	129.0	HF.6350.RED/J
75 x 6.8	63 x 5.8	138.0	HF.7563.RED/J
90 x 8.2	75 x 6.8	142.0	HF.9075.RED/J
110 x 10.0	90 x 8.2	142.0	HF.11090.RED/J
125 x 11.4*	110 x 10.1	228.0	HF.125110.RED/J
140 x 12.7*	125 x 11.4	220.0	HF.140125.RED/J

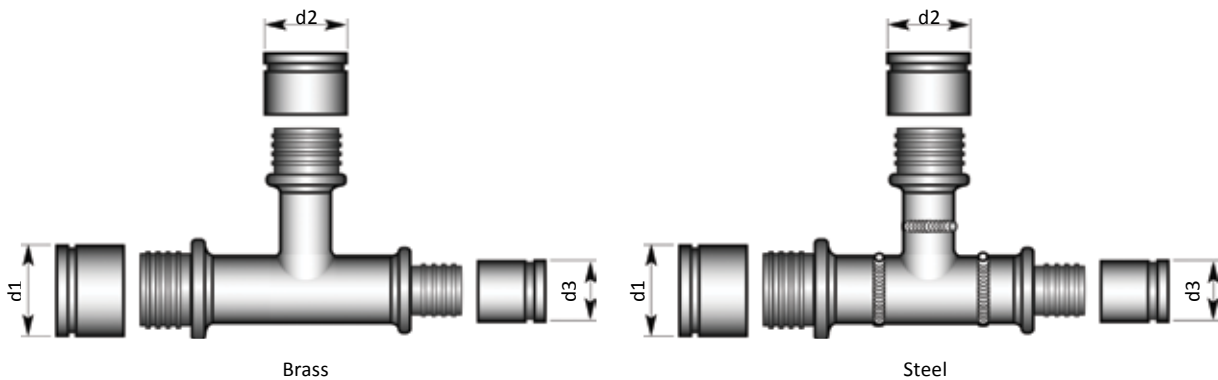
4.2.1.2 PEX-LOK 90-Degree Elbows

PEX-LOK Angle piece, 90°



Heating, 6 bar				Part No
Material: brass/*steel				
PEX pipe	PEX pipe	a	z	
mm	mm	mm	mm	
25 x 2.3	25 x 2.3	54	32	HF.25.E90/J
32 x 2.9	32 x 2.9	64	37	HF.32.E90/J
40 x 3.7	40 x 3.7	74	42	HF.40.E90/J
50 x 4.6	50 x 4.6	87	48	HF.50.E90/J
63 x 5.8	63 x 5.8	106	60	HF.63.E90/J
75 x 6.8	75 x 6.8	117	67	HF.75.E90/J
90 x 8.2	90 x 8.2	127	76	HF.90.E90/J
110 x 10.0	110 x 10.0	137	87	HF.110.E90/J
125 x 11.4*	125 x 11.4	298	260	HF.125.E90/J

4.2.1.3 PEX-LOK Tee Couplings



Heating, 6 bar		Branch, \varnothing d2							
\varnothing d1 \varnothing d3	mm								
mm	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 10.0	125 x 11.4
25 x 2.3 - 25 x 2.3	252525								
32 x 2.9 - 32 x 2.9	322532	323232							
32 x 2.9 - 25 x 2.3	322525								
40 x 3.7 - 40 x 3.7	402540	403240	404040						
40 x 3.7 - 32 x 2.9	402532	403232							
50 x 4.6 - 50 x 4.6	502550	503250	504050	505050					
50 x 4.6 - 40 x 3.7	502540	503240	504040						
63 x 5.8 - 63 x 5.8	632563	633263	634063	635063	636363				
63 x 5.8 - 50 x 4.6	632550	633250	634050	635050					
75 x 6.8 - 75 x 6.8	752575	753275	754075	755075	756375	757575			
75 x 6.8 - 63 x 5.8	752563	753263	754063	755063	756363				
90 x 8.2 - 90 x 8.2	902590	903290	904090	905090	906390	907590	909090		
90 x 8.2 - 75 x 6.8	902575	903275	904075	905075	906375	907575			
110 x 10.0 - 110 x 10.0	11025110	11032110	11040110	11050110	11063110	11075110	11090110	110110110	
110 x 10.0 - 90 x 8.2	1102590	1103290	1104090	1105090	1106390	1107590	1109090		
125 x 11.4 - 125 x 11.4	12525125	12532125	12540125	12550125	12563125	12575125	12590125	125110125	125125125

Part Numbers: to determine the part number, please take the value shown in the table above and prefix with HF. and suffix with a .TCS So a 125mm main pipe with a 75mm branch tee would be HF.12575125.TCS

- PEX-LOK tee-pieces made of steel can be supplied on request
- Other PEX-LOK tee-pieces can be supplied on request.
- Tees for dimension DN 150 is supplied in prefabricated and pre-insulated form (see 4.1.2.2 and 4.1.2.3).

Material:

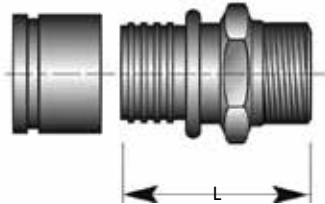
The material depends upon the chosen size:

- Brass CuZn39Pb3 (DN 20 - DN 50),
- Gunmetal Rg7 (DN 65 - DN 100)
- Steel St 37.0, welded (DN 125)

4.2.1.4 Transition Couplings

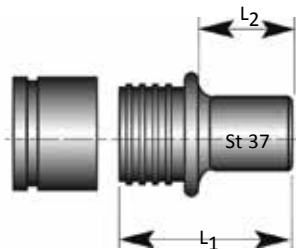
We offer a pre-fitting service for transition couplings on Hiline e-Flex pipes up to 63mm (DN 51.4mm). Pre-fitting applies to PEX-LOK Axial compression fittings only (and includes ball valves). Please contact us for details.

PEX-LOK Axial compression-type connector with external thread (BSP)



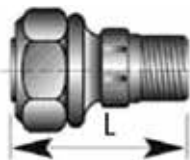
Heating, 6 bar			Part No
Material: brass			
PEX pipe	Screwed connector L		
mm	mm	mm	
25 x 2.3	25 x 2.3 - 3/4"	62	HF.25.MA/J
32 x 2.9	32 x 2.9 - 1"	72	HF.32.MA/J
40 x 3.7	40 x 3.7 - 1 1/4"	82	HF.40.MA/J
50 x 4.6	50 x 4.6 - 1 1/2"	89	HF.50.MA/J
63 x 5.8	63 x 5.7 - 2"	109	HF.63.MA/J
75 x 6.8	75 x 6.8 - 2 1/2"	110	HF.75.MA/J
90 x 8.2	90 x 8.2 - 3"	115	HF.90.MA/J
110 x 10.0	110 x 10.0 - 4"	120	HF.110.MA/J
125 x 11.4	125 x 11.4 - 5"	125	HF.125.MA/J

PEX-LOK Axial compression-type connector with weld end



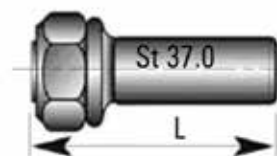
Heating, 6 bar				Part No
Material: Steel				
PEX pipe	Weld end	L1	L2	
mm	mm	mm	mm	
25 x 2.3	26.9 x 2.65	50	20	HF.25.PSA/J
32 x 2.9	33.7 x 2.3	60	24	HF.32.PSA/J
40 x 3.7	42.4 x 2.6	70	29	HF.40.PSA/J
50 x 4.6	48.3 x 2.6	85	37	HF.50.PSA/J
63 x 5.8	60.3 x 2.9	90	32	HF.63.PSA/J
75 x 6.8	76.1 x 3.2	95	35	HF.75.PSA/J
90 x 8.2	88.9 x 3.2	95	35	HF.90.PSA/J
110 x 10.0	114.3 x 3.6	90	30	HF.110.PSA/J
125 x 11.4	139.7 x 3.6	108	48	HF.125.PSA/J
140 x 12.7	139.7 x 3.6	112	50	HF.140.PSA/J

PEX-LOK Screw-type connector with external thread (BSP - for above-ground use only)



Heating, 6 bar			Part No
Material: Brass			
PEX pipe	Screwed connector	L	
mm	mm	mm	
25 x 2.3	25 x 2.3 - 3/4"	53	HF.25.SMA
32 x 2.9	32 x 2.9 - 1"	63	HF.32.SMA
40 x 3.7	40 x 3.7 - 1 1/4"	67	HF.40.SMA
50 x 4.6	50 x 4.8 - 1 1/2"	71	HF.50.SMA
63 x 5.8	63 x 5.7 - 2"	80	HF.63.SMA
75 x 6.8	75 x 6.8 - 2 1/2"	92	HF.75.SMA
90 x 8.2	90 x 8.2 - 3"	92	HF.90.SMA
110 x 10.0	110 x 10.0 - 4"	102	HF.110.SMA

PEX-LOK Screw-type connector with weld end (for above-ground use only).



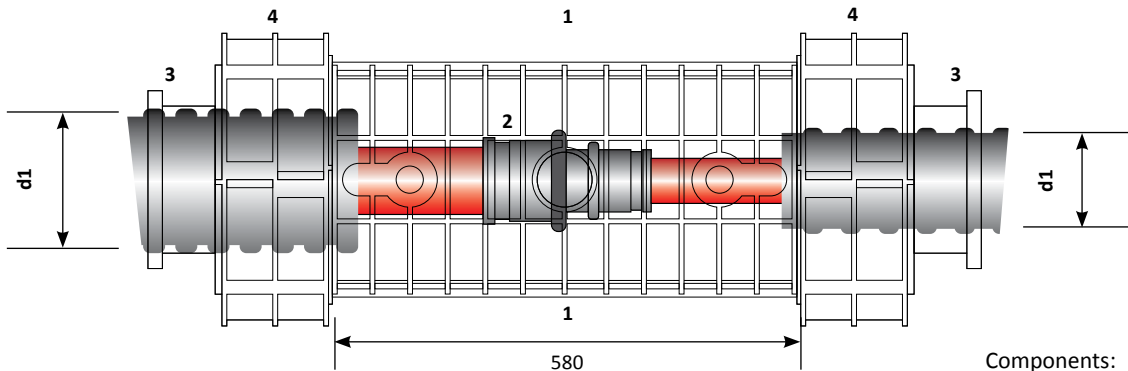
Heating, 6 bar			Part No
Material: Brass			
PEX pipe	Weld end	L	
mm	mm	mm	
25 x 2.3	26.9 x 2.65	180	HF.25.SPSA
32 x 2.9	33.7 x 2.3	180	HF.32.SPSA
40 x 3.7	42.4 x 2.6	185	HF.40.SPSA
50 x 4.6	48.3 x 2.6	190	HF.50.SPSA
63 x 5.8	60.3 x 2.9	195	HF.63.SPSA
75 x 6.8	78.1 x 3.2	200	HF.75.SPSA
90 x 8.2	88.9 x 3.2	240	HF.90.SPSA
110 x 10.0	114.3 x 3.6	280	HF.110.SPSA

4.2.1.5 Tooling

For information on the tooling required for the PEX-LOK compression connectors, please refer to section 4.4.5

4.2.2 Casing Joints & Insulation

4.2.2.1 Straight Shell Sleeve Kit



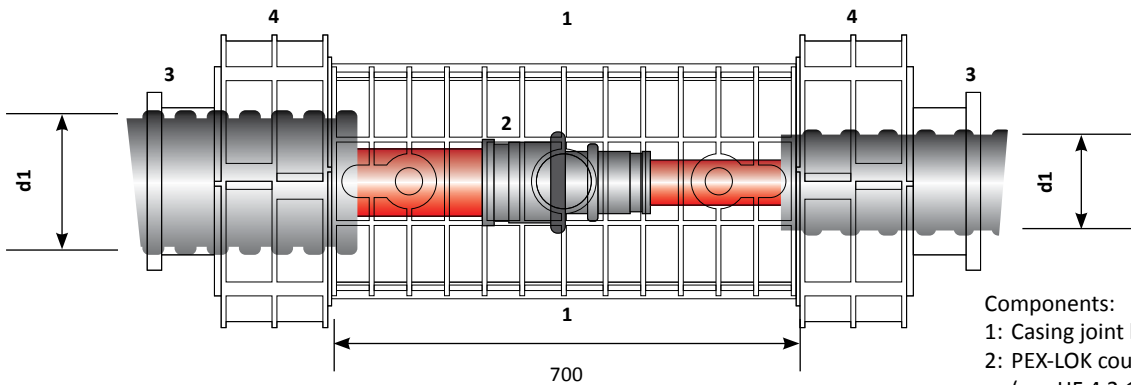
Dimensions \varnothing 76 - 142 mm
Hiline e-Flex I-Shell

Outer casing	\varnothing d2 Part Numbers				
\varnothing d1	76	91	111	126	142
76	HF.7676.IS-/BK				
91	HF.9176.IS-/BK	HF.9191.IS-/BK			
111	HF.11176.IS-/BK	HF.11191.IS-/BK	HF.111111.IS-/BK		
126	HF.12676.IS-/BK	HF.12691.IS-/BK	HF.126111.IS-/BK	HF.126126.IS-/BK	
142	HF.14276.IS-/BK	HF.14291.IS-/BK	HF.142111.IS-/BK	HF.142126.IS-/BK	HF.142142.IS-/BK

Components:

- 1: Casing joint half-shells
 - 2: PEX-LOK coupling* (see HF 4.2.1.)
 - 3: Sealing rings (differing diameters if reducing casing size)
 - 4: Green sealing clamps
 - 5: Green plug-in clips (not shown)
 - 6: PUR Foam insulation kit (see HF 4.2.2.5)
 - 7: Sealing plugs (not shown)
 - 8: Instruction manual (see HF 5.3)
- (* Not included in the kit)

Note: Hiline e-Flex shells are not suitable for long-term UV exposure



Dimensions \varnothing 162 - 202 mm
Hiline e-Flex Big I-Shell

Outer casing	\varnothing d2 Part Numbers			
\varnothing d1	142	162	182	202
162	HF.162142.IS-/BK	HF.162162.IS-/BK		
182	HF.182142.IS-/BK	HF.182162.IS-/BK	HF.182182.IS-/BK	
202	HF.202142.IS-/BK	HF.202162.IS-/BK	HF.202182.IS-/BK	HF.202202.IS-/BK

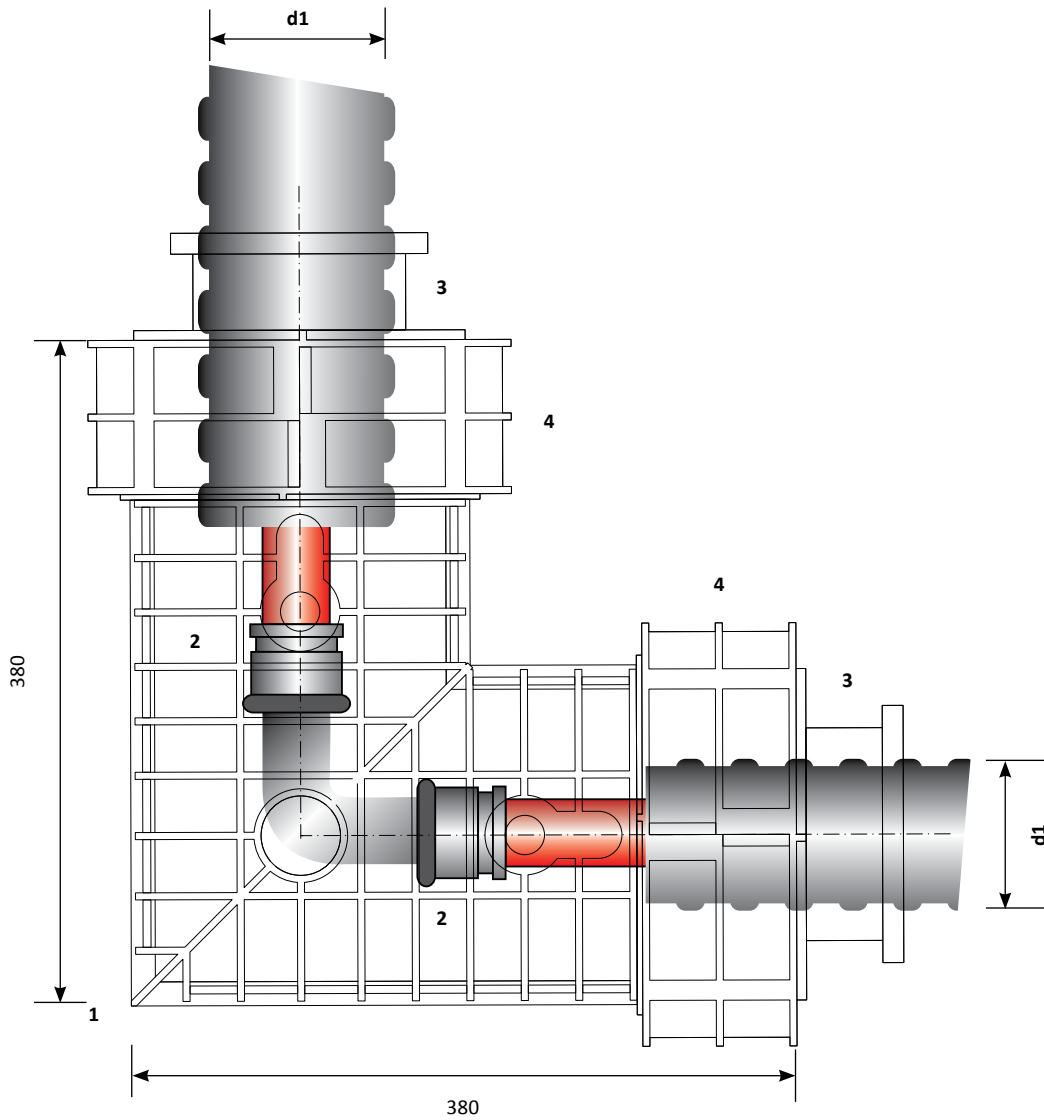
Components:

- 1: Casing joint half-shells
 - 2: PEX-LOK coupling* (see HF 4.2.1.)
 - 3: Sealing rings (differing diameters if reducing casing size)
 - 4: Green sealing clamps
 - 5: Green plug-in clips (not shown)
 - 6: PUR Foam insulation kit (see HF 4.2.2.5)
 - 7: Sealing plugs (not shown)
 - 8: Instruction manual (see HF 5.3)
- (* Not included in the kit)

Note: Hiline e-Flex shells are not suitable for long-term UV exposure

4.2.2.2 90-Degree Shell Sleeve

Dimensions \varnothing 76 - 142 mm



Hiline e-Flex L-shell, UNO/DUO

Outer casing		\varnothing d2 Part Numbers			
\varnothing d1	76	91	111	126	142
76	HF.7676.LS-/BK				
91		HF.9191.LS-/BK			
111			HF.111111.LS-/BK		
126				HF.126126.LS-/BK	
142					HF-142142.LS-/BK

Components:

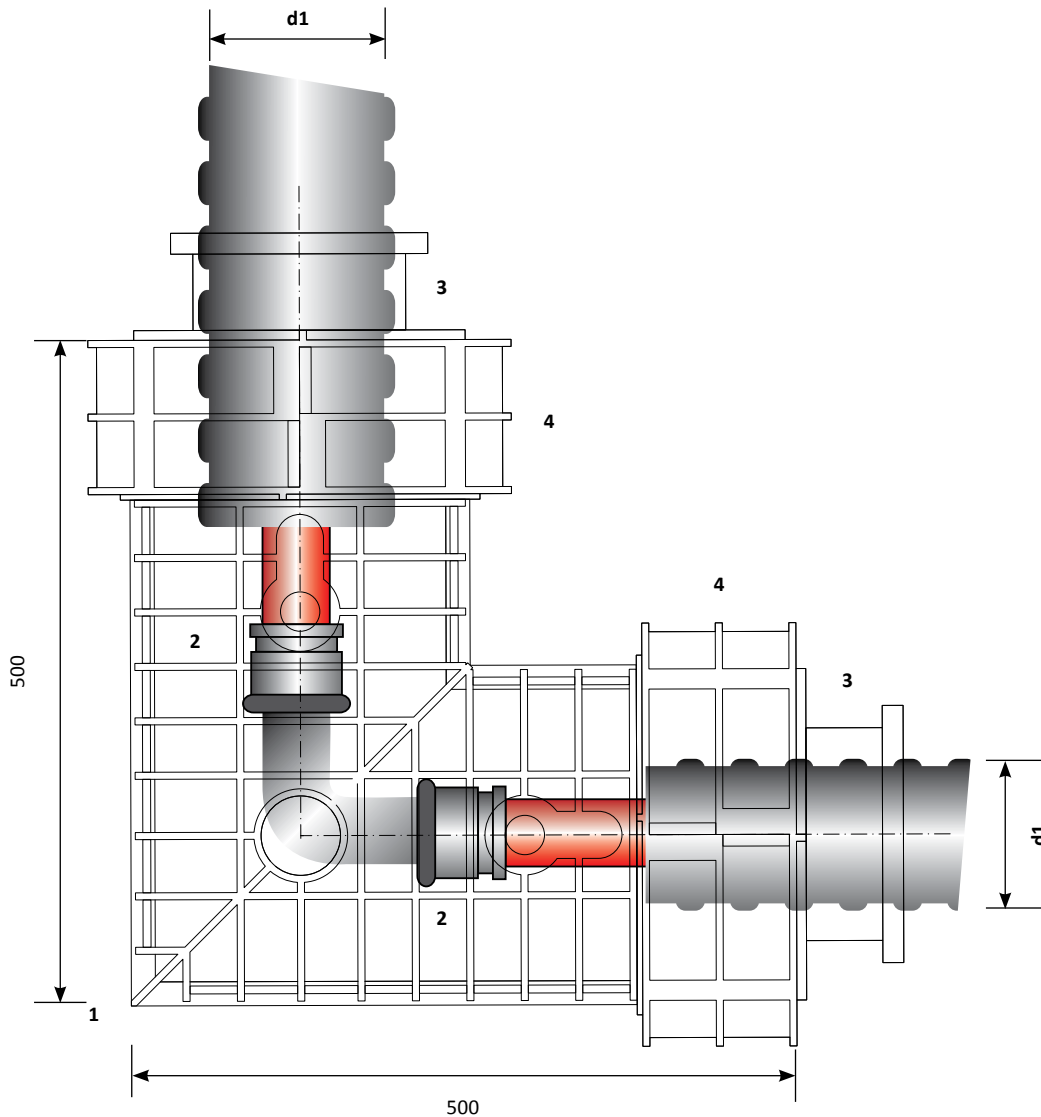
- 1: Casing joint half-shells
 - 2: PEX-LOK coupling* (see HF 4.2.1.)
 - 3: Sealing rings (differing diameters if reducing casing size)
 - 4: Green sealing clamps
 - 5: Green plug-in clips (not shown)
 - 6: PUR Foam insulation kit (see HF 4.2.2.5)
 - 7: Sealing plugs (not shown)
 - 8: Instruction manual (see HF 5.3)
- (* Not included in the kit)

Hiline e-Flex shells are reducible from \varnothing 142 mm.

Note: Hiline e-Flex shells are not suitable for long-term UV exposure

4.2.2.2 - 90-Degree Shell Sleeve (continued)

Dimensions \varnothing 162 - 202 mm



Hiline e-Flex L-shell, UNO/DUO

Outer casing		\varnothing d2 Part Numbers	
\varnothing d1	162	182	202
162	HF.162162.LS-/BK		
182		HF.182182.LS-/BK	
202			HF.202202.LS-/BK

Hiline e-Flex Big-shells are reducible from \varnothing 202 mm to \varnothing 76 mm.

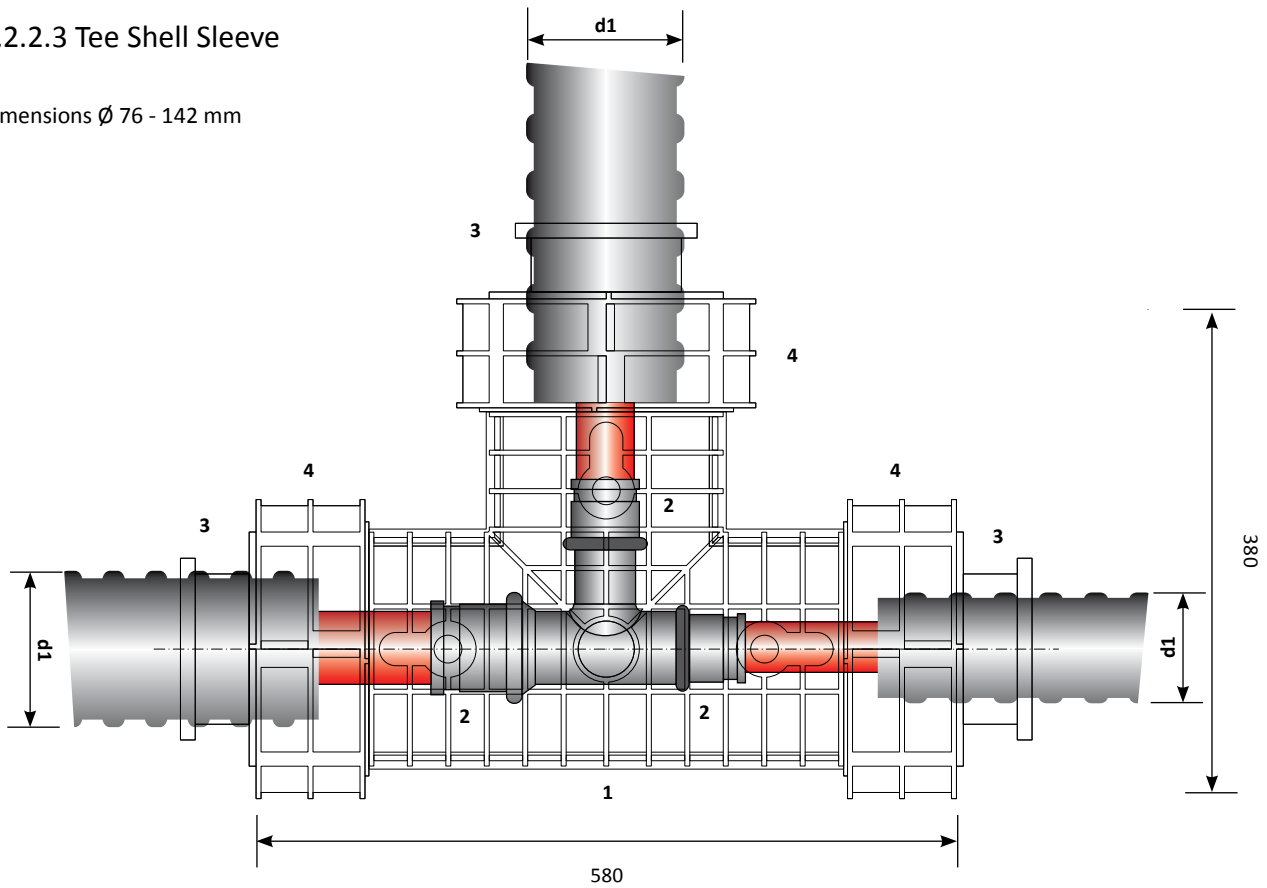
Note: Hiline e-Flex shells are not suitable for long-term UV exposure

Components:

- 1: Casing joint half-shells
 - 2: PEX-LOK coupling* (see HF 4.2.1.)
 - 3: Sealing rings (differing diameters if reducing casing size)
 - 4: Green sealing clamps
 - 5: Green plug-in clips (not shown)
 - 6: PUR Foam insulation kit (see HF 4.2.2.5)
 - 7: Sealing plugs (not shown)
 - 8: Instruction manual (see HF 5.3)
- (* Not included in the kit)

4.2.2.3 Tee Shell Sleeve

Dimensions \varnothing 76 - 142 mm



Hiline e-Flex tee-shell, UNO/DUO

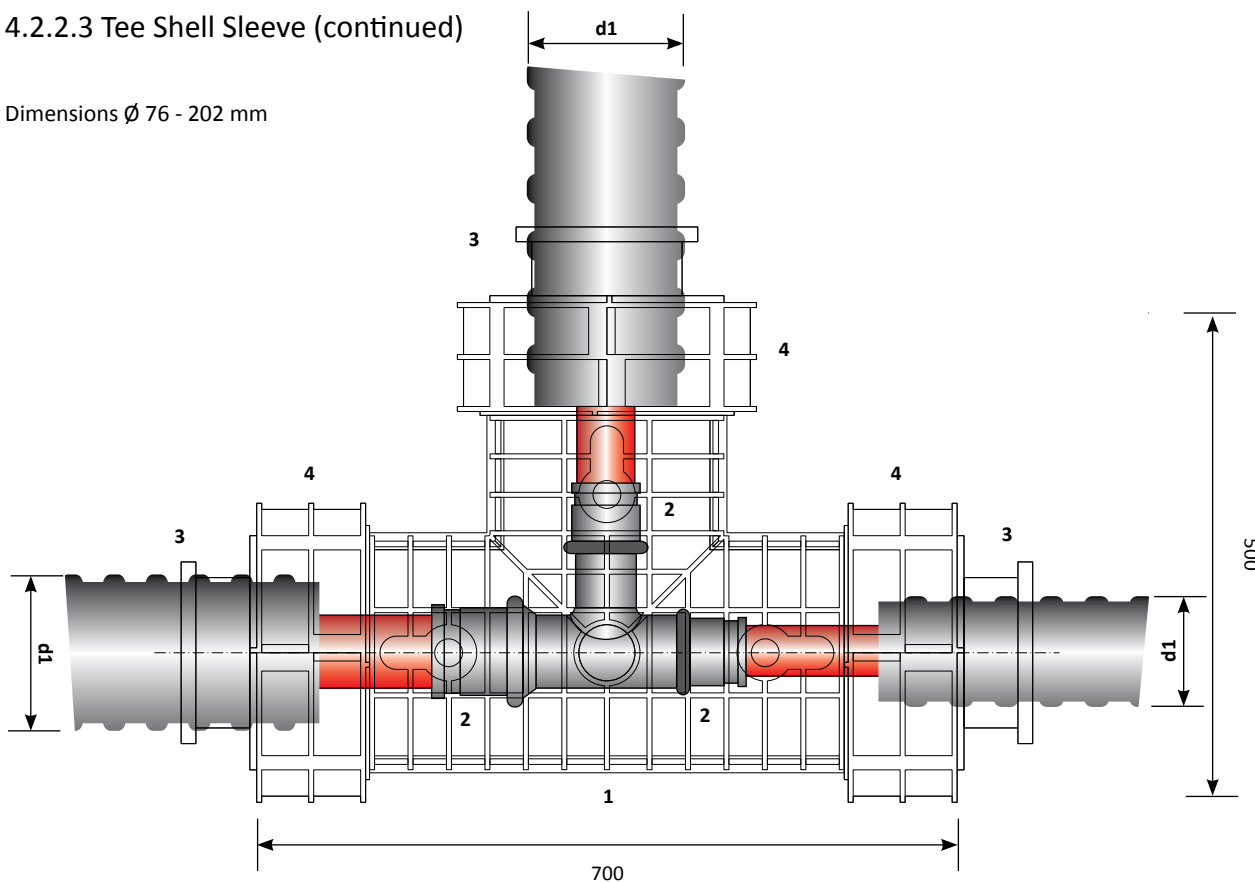
Outer casing	Branch, \varnothing d2 Part Numbers				
\varnothing d1 - \varnothing d3	76	91	111	126	142
76 - 76	HF.767676.TS-/BK				
91 - 91	HF.917691.TS-/BK	HF.919191.TS-/BK			
91 - 76	HF.917676.TS-/BK	HF.919176.TS-/BK			
111 - 111	HF.11176111.TS-/BK	HF.11191111.TS-/BK	HF.11111111.TS-/BK		
111 - 91	HF.1117691.TS-/BK	HF.1119191.TS-/BK	HF.11111191.TS-/BK		
111 - 76	HF.1117676.TS-/BK	HF.1119176.TS-/BK	HF.11111176.TS-/BK		
126 - 126	HF.12676126.TS-/BK	HF.12691126.TS-/BK	HF.126111126.TS-/BK	HF.126126126.TS-/BK	
126 - 111	HF.12676111.TS-/BK	HF.12691111.TS-/BK	HF.126111111.TS-/BK	HF.126126111.TS-/BK	
126 - 91	HF.1267691.TS-/BK	HF.1269191.TS-/BK	HF.12611191.TS-/BK	HF.12612691.TS-/BK	
126 - 76	HF.1267676.TS-/BK	HF.1269176.TS-/BK	HF.12611176.TS-/BK	HF.12612676.TS-/BK	
142-142	HF.14276142.TS-/BK	HF.14291142.TS-/BK	HF.142111142.TS-/BK	HF.142126142.TS-/BK	HF.142142142.TS-/BK
142-126	HF.14276126.TS-/BK	HF.14291126.TS-/BK	HF.142111126.TS-/BK	HF.142126126.TS-/BK	HF.142142126.TS-/BK
142-111	HF.14276111.TS-/BK	HF.14291111.TS-/BK	HF.142111111.TS-/BK	HF.142126111.TS-/BK	HF.142142111.TS-/BK
142-91	HF.1427691.TS-/BK	HF.1429191.TS-/BK	HF.14211191.TS-/BK	HF.14212691.TS-/BK	HF.14214291.TS-/BK
142-76	HF.1427676.TS-/BK	HF.1429176.TS-/BK	HF.14211176.TS-/BK	HF.14212676.TS-/BK	HF.14214276.TS-/BK

Note: Hiline e-Flex shells are not suitable for long-term UV exposure

- Components:
- 1: Casing joint half-shells
 - 2: PEX-LOK coupling* (see HF 4.2.1.)
 - 3: Sealing rings (differing diameters if reducing casing size)
 - 4: Green sealing clamps
 - 5: Green plug-in clips (not shown)
 - 6: PUR Foam insulation kit (see HF 4.2.2.5)
 - 7: Sealing plugs (not shown)
 - 8: Instruction manual (see HF 5.3)
- (* Not included in the kit)

4.2.2.3 Tee Shell Sleeve (continued)

Dimensions \varnothing 76 - 202 mm



Hiline e-Flex Big Tee-Shell, UNO/DUO

Outer casing	Branch, \varnothing d2								Part Numbers
\varnothing d1 - \varnothing d3	76	91	111	126	142	162	182	202	
162-162	16276162/BK	16291162/BK	16211162/BK	162126162/BK	162142162/BK	162162162/BK			
162-142	16276142/BK	16291142/BK	16211142/BK	162126142/BK	162142142/BK	162162142/BK			
162-126	16276126/BK	16291126/BK	16211126/BK	162126126/BK	162142126/BK	162162126/BK			
162-111	16276111/BK	16291111/BK	16211111/BK	162126111/BK	162142111/BK	162162111/BK			
162-91	1627691/BK	1629191/BK	16211191/BK	16212691/BK	16214291/BK	16216291/BK			
162-76	1627676/BK	1629176/BK	16211176/BK	16212676/BK	16214276/BK	16216276/BK			
182-182	18276182/BK	18291182/BK	18211182/BK	182126182/BK	182142182/BK	182162182/BK	182182182/BK		
182-162	18276162/BK	18291162/BK	18211162/BK	182126162/BK	182142162/BK	182162162/BK	182182162/BK		
182-142	18276142/BK	18291142/BK	18211142/BK	182126142/BK	182142142/BK	182162142/BK	182182142/BK		
182-126	18276126/BK	18291126/BK	18211126/BK	182126126/BK	182142126/BK	182162126/BK	182182126/BK		
182-111	18276111/BK	18291111/BK	18211111/BK	182126111/BK	182142111/BK	182162111/BK	182182111/BK		
182-91	1827691/BK	1829191/BK	18211191/BK	18212691/BK	18214291/BK	18216291/BK	18218291/BK		
182-76	1827676/BK	1829176/BK	18211176/BK	18212676/BK	18214276/BK	18216276/BK	18218276/BK		
202-202	20276202/BK	20291202/BK	202111202/BK	202126202/BK	202142202/BK	202162202/BK	202182202/BK	202202202/BK	
202-182	20276182/BK	20291182/BK	20211182/BK	202126182/BK	202142182/BK	202162182/BK	202182182/BK	202202182/BK	
202-162	20276162/BK	20291162/BK	20211162/BK	202126162/BK	202142162/BK	202162162/BK	202182162/BK	202202162/BK	
202-126	20276126/BK	20291126/BK	20211126/BK	202126126/BK	202142126/BK	202162126/BK	202182126/BK	202202126/BK	
202-111	20276111/BK	20291111/BK	20211111/BK	202126111/BK	202142111/BK	202162111/BK	202182111/BK	202202111/BK	
202-91	2027691/BK	2029191/BK	20211191/BK	20212691/BK	20214291/BK	20216291/BK	20218291/BK	20220291/BK	
202-76	2027676/BK	2029176/BK	20211176/BK	20212676/BK	20214276/BK	20216276/BK	20218276/BK	20220276/BK	

Part Numbers: to determine the part number, please take the value shown in the table above and prefix with HF. and suffix with a .TS-/BK So a 182mm main pipe with a 76mm branch tee would be HF.18276182.TS-/BK

Components:

- 1: Casing joint half-shells
- 2: PEX-LOK coupling* (see HF 4.2.1.)
- 3: Sealing rings (differing diameters if reducing casing size)
- 4: Green sealing clamps

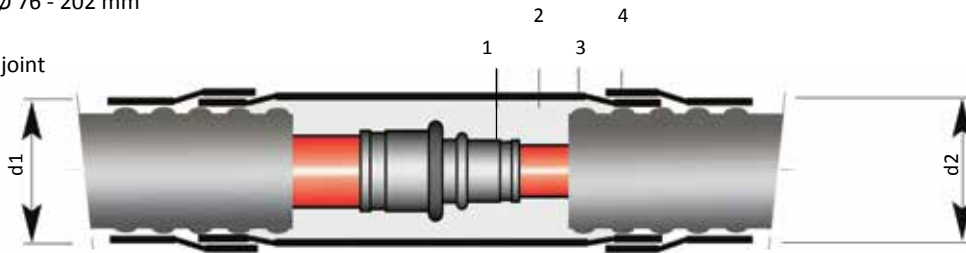
- 5: Green plug-in clips (not shown)
- 6: PUR Foam insulation kit (see HF 4.2.2.5)
- 7: Sealing plugs (not shown)
- 8: Instruction manual (see HF 5.3)
- (* Not included in the kit)

Note: Hiline e-Flex shells are not suitable for long-term UV exposure

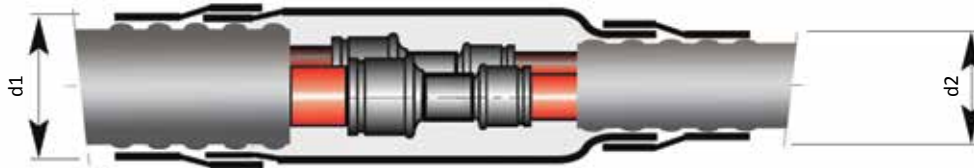
4.2.2.4 Heat Shrink Casing Joint

Dimensions \varnothing 76 - 202 mm

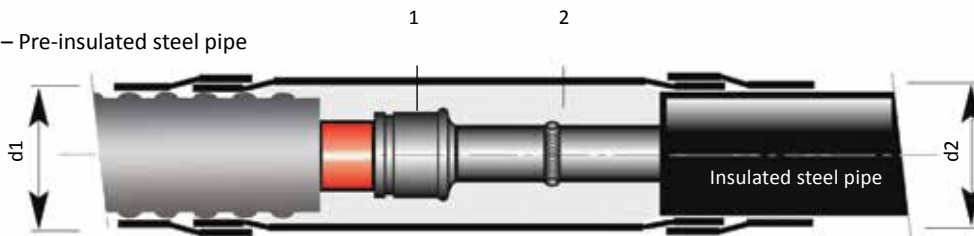
Hiline e-Flex joint



Hiline e-Flex reduction joint



Hiline e-Flex – Pre-insulated steel pipe



Hiline e-Flex

		Part Numbers								
		\varnothing d2	76	91	111	126	142	162	182	200
\varnothing d1	76	7676/BK	9176/BK							
	91		9191/BK	11191/BK						
	111			111111/BK	126111/BK					
	126				126126/BK	142126/BK				
	142					142142/BK	162142/BK			
	162						162162/BK	182162/BK		
	182							182182/BK	200182/BK	
	200								200200/BK	

- Components:
- 1: PEX-LOK coupling*; see HF 4.2.1.1
 - 2: PUR Foam insulation kit; see HF 4.2.2.5
 - 3: Heat-shrink sleeve
 - 4: Heat-shrink bands (2x)
 - 5: Sealing plugs (x2 not shown)
- (* Not included in the kit)

Hiline e-Flex to pre-insulated steel pipe

		Part Numbers											
		\varnothing d2	90	110	125	140	160	180	200	225	250	280	315
\varnothing d1	76	9076/BK	11076/BK	12576/BK									
	91	9091/BK	11091/BK	12591/BK	14091/BK								
	111	90111/BK	110111/BK	125111/BK	140111/BK								
	126		110126/BK	125126/BK	140126/BK	160126/BK							
	142			125142/BK	140142/BK	160142/BK	180142/BK						
	162				140162/BK	160162/BK	180162/BK	200162/BK	225162/BK	250162/BK			
	182				140182/BK	160182/BK	180182/BK	200182/BK	225182/BK	250182/BK			
	200									250200/BK	280200/BK	315200/BK	

Part Numbers: to determine the part number, please take the value shown in the table above and prefix with HF. and suffix with a .HSJ So a heat shrink joint for connecting 126mm to 111mm casings would need a HF.126111.HSJ

4.2.2.5 Insulation of Casing Joints

Hiline e-Flex CFC-free polyurethane foam insulation for shell sleeves and heat-shrink-type joints in dimensions HF 25/76 - 160/250. The required quantity of foam is delivered in suitable container sizes for the various joints and T-pieces. The components are supplied separately in two bottles and are only mixed together when needed.

Safety Advice

Please note that safety regulations and installation instructions are supplied with the product. Protective goggles and gloves must be worn during the installation process.

Hiline e-Flex PUR foam insulation Kits

Foam kits are supplied automatically when purchasing shell sleeve and heat-shrink-type joints, however, should additional quantities be required, the part numbers are detailed in the tables below.



Protective goggles



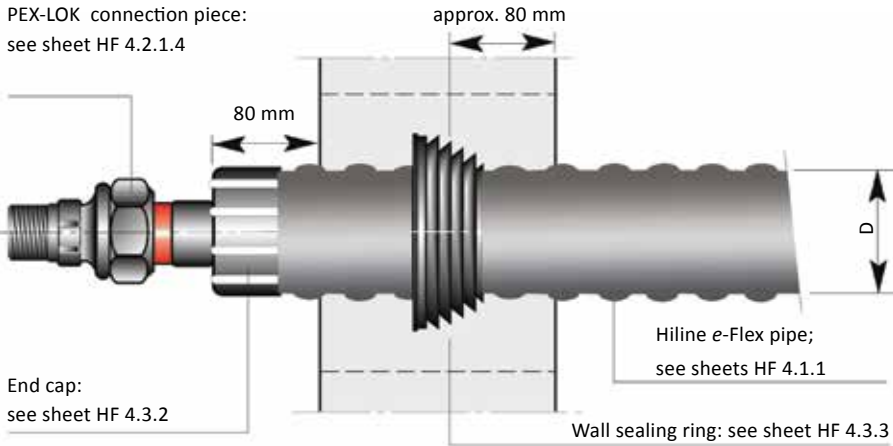
Synthetic gloves



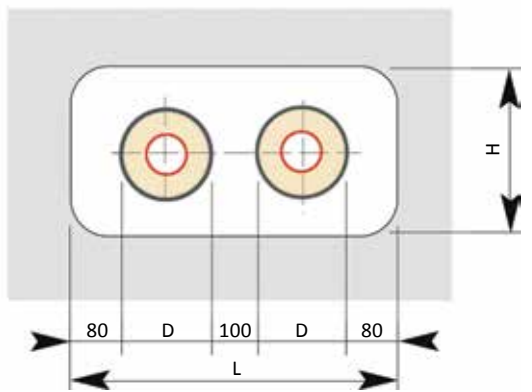
4.3 TERMINATIONS

4.3.1.1 Building Entry (wall opening)

PEX-LOK connection piece:
see sheet HF 4.2.1.4



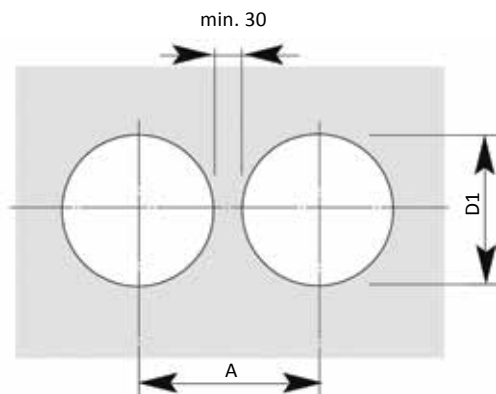
Wall opening



Dimensions in mm

Outer casing	L min	H min
Ø D		
mm	mm	mm
76	450	250
91	500	250
111	500	300
126	550	300
142	600	350
162	650	350
182	670	380
202	720	400

Core bores



Dimensions in mm

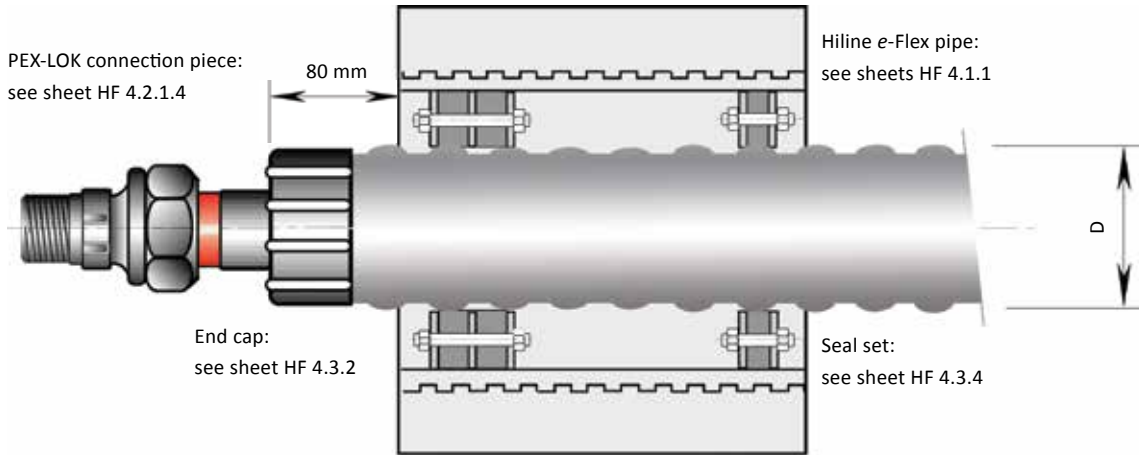
Outer casing	A	D1
Ø D		
mm	mm	mm
76	210	180
91	230	180
111	250	230
126	270	230
142	290	230
162	310	280
182	330	280
202	400	350

4.3.1.2 Building Entry (core drilled)

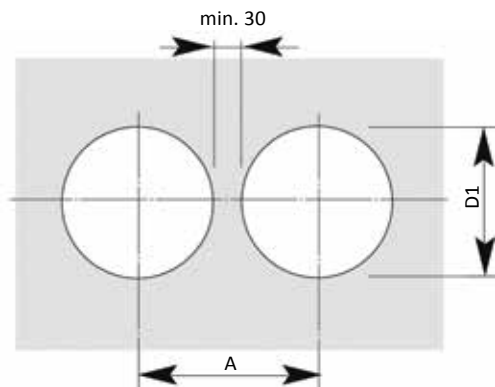
Core bores/cement pipe liners

PEX-LOK connection piece:
see sheet HF 4.2.1.4

Wall penetration



Core bores



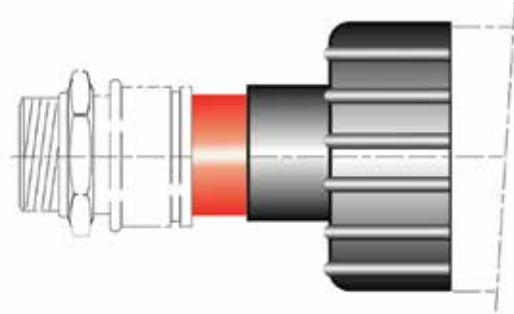
Dimensions in mm

Outer casing	D1	A
Ø D		
mm	mm	mm
76	180	150
91	180	150
111	230	200
126	230	200
142	230	200
162	280	250
182	280	250
202	330	300

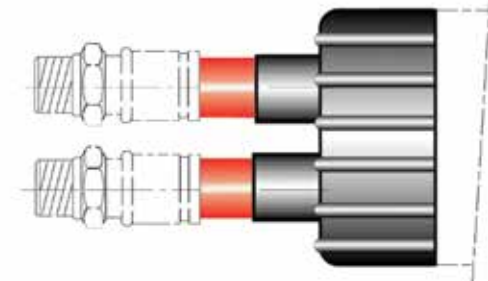
4.3.2 End Cap

Heat-shrinkable

Heat-shrink end cap, UNO

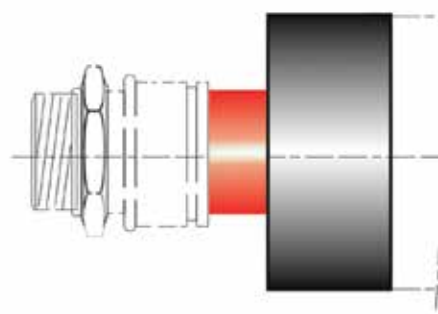


Heat-shrink end cap, DUO



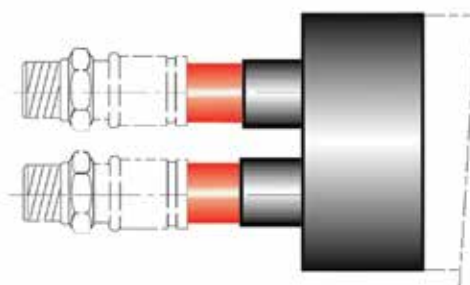
Push-fit

LDPE end cap, UNO



LDPE end caps are suitable for dry areas only.

LDPE End cap, DUO



Heat-Shrink End Caps

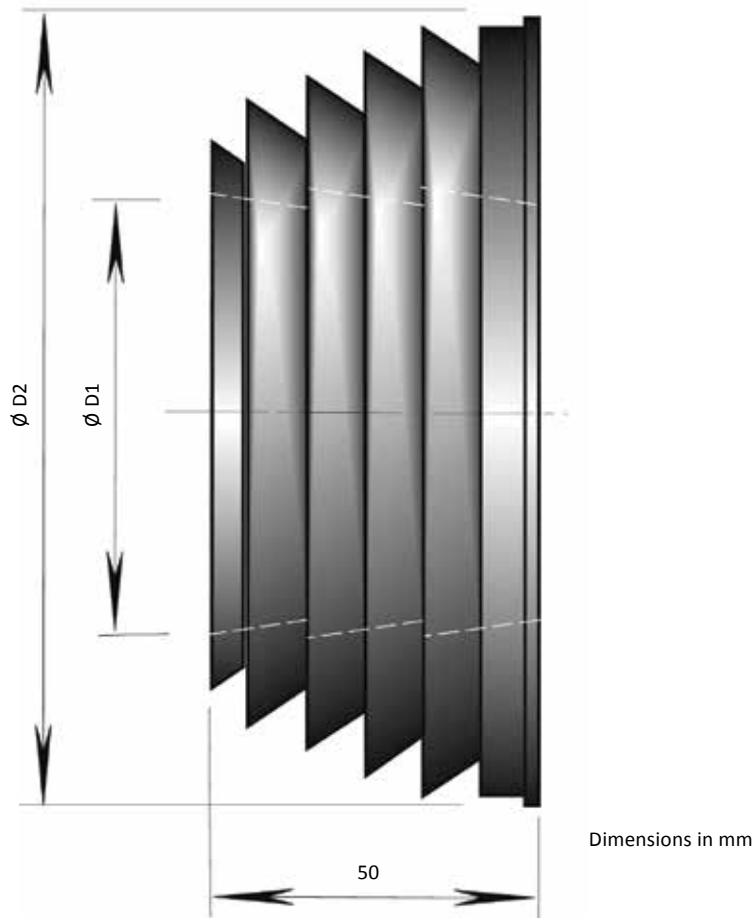
Type	Dimensions	Part No
HF UNO	25/76	HF.2576.HSECU/BK
HF UNO	32/76 - 50/111	HF.327650111.HSECU/BK
HF UNO	63/126 - 75/142	HF.6312675142.HSECU/BK
HF UNO	90/162 - 125/182	HF.90162125182.HSECU/BK
HF UNO	140/202	HF.140202.HSECU/BK
HF DUO	2 X 25/91	HF.252591.HSECD/BK
HF DUO	2 X 32/111 - 2 X 40/126	HF.3240111126.HSECD/BK
HF DUO	2 X 50/162	HF.5050162.HSECD/BK
HF DUO	2 X 63/182 - 2 X 75/202	HF.6375182202.HSECD/BK

LDPE End Cap (non-heat-shrinkable)

Type	Dimensions	Part No
HF UNO	25/76	HF.2576.ECU/BK
HF UNO	32/76	HF.3276.ECU/BK
HF UNO	40/91	HF.4091.ECU/BK
HF UNO	50/111	HF.50111.ECU/BK
HF UNO	63/126	HF.63126.ECU/BK
HF UNO	75/142	HF.75142.ECU/BK
HF UNO	90/126	HF.90162.ECU/BK
HF UNO	110/162	HF.110162.ECU/BK
HF UNO	110/182	HF.110182.ECU/BK
HF UNO	125/182	HF.125182.ECU/BK
HF UNO	140/202	HF.140202.ECU/BK
HF DUO	2x25/91	HF.252591.ECD/BK
HF DUO	2x32/111	HF.3232111.ECD/BK
HF DUO	2x40/126	HF.4040126.ECD/BK
HF DUO	2x50/162	HF.5050162.ECD/BK
HF DUO	2x63/182	HF.6363182.ECD/BK
HF DUO	2x75/202	HF.7575202.ECD/BK

4.3.3 Wall Sealing Ring

For wall openings



Hiline e-Flex UNO

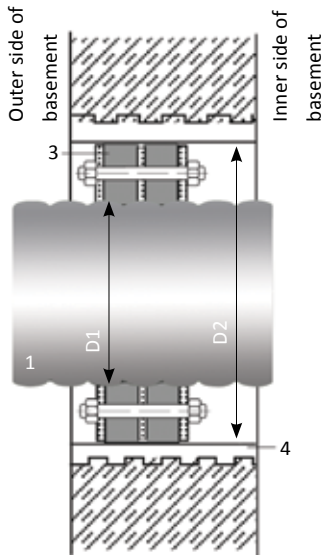
Outer casing pipe diameter	Neoprene wall sealing ring		Part No
	ø D1, inner	ø D2, outer	
mm	mm	mm	
76	74	118	HF.76.WSRN/BK
91	88	133	HF.91.WSRN/BK
111	107	153	HF.111.WSRN/BK
126	122	168	HF.126.WSRN/BK
142	137	183	HF.142.WSRN/BK
162	155	203	HF.162.WSRN/BK
182	175	223	HF.182.WSRN/BK
202	195	230	HF.202.WSRN/BK

Building entry (see sheet HF 4.3.1.1)

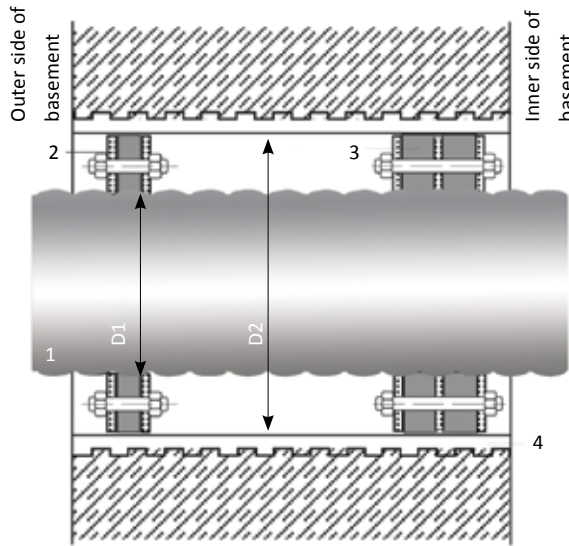
4.3.4 Wall Seal (compression type)

For core bores/cement liner pipes

Standard



With additional centring ring



Core bores

Perfect bores are required for installation. As hairline cracks may be present in the concrete or result from drilling, it is advisable to seal the entire length of the borehole with suitable sealant (such as AQUAGARD). Tightness can only be guaranteed if this recommendation is followed.

1: Hiline e-Flex district heating pipe

2: Seal set, single-seal 1 x 40 mm, Shore hardness D 35

3: Seal set, double-seal* 2 x 40 mm, Shore hardness D 35

4: Liner pipe: made of fibre cement or coated core bore

* Suitable for pressure from water up to 0.5 bar

Outer Casing Pipe	Liner pipe, core bore	Seal set	Core bore	Part No
∅ D1	∅ D2	∅ inner	∅	
mm	mm	mm	mm	
76	150	78 - 85	150	HF.76.WSRC
91	150	86 - 94	150	HF.91.WSRC
111	200	105 - 115	200	HF.111.WSRC
126	200	125 - 135	200	HF.126.WSRC
142	200	137 - 145	200	HF.142.WSRC
162	250	157 - 165	250	HF.162.WSRC
182	250	180 - 190	250	HF.182.WSRC
202	300	198 - 207	300	HF.202.WSRC

Building entry (see sheet HF 4.3.1.2)

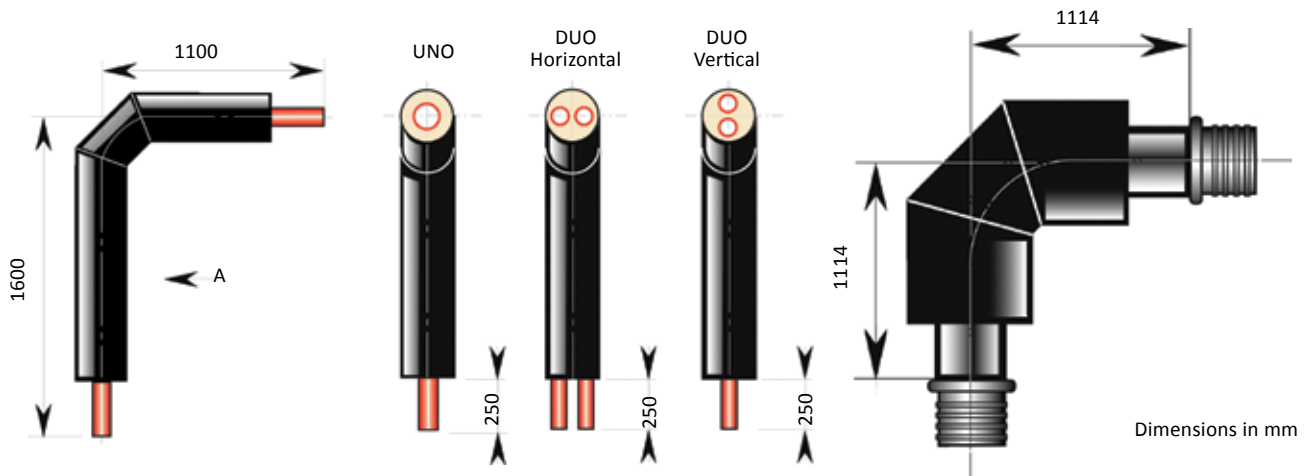
4.3.5 Building Entry Bends

Heating 6 bar, UNO and DUO

Bend, 90°

Dimensions: HF 25/76 - 125/182

Bend, 90° Steel with welded-on
PEX-LOK compression coupling
Dimensions: HF 140/202



Please Note: Hiline e-Flex pre-insulated House Entry bends in dimensions 140/202 are constructed with pre-insulated steel with pre-installed PEX-LOK compression connections as detailed in section 4.2.1.4. These fittings are also Steel grade St 37.0 P235GH TC1 - Coated with heavy-duty corrosion inhibiting compound Ardrox AV15.

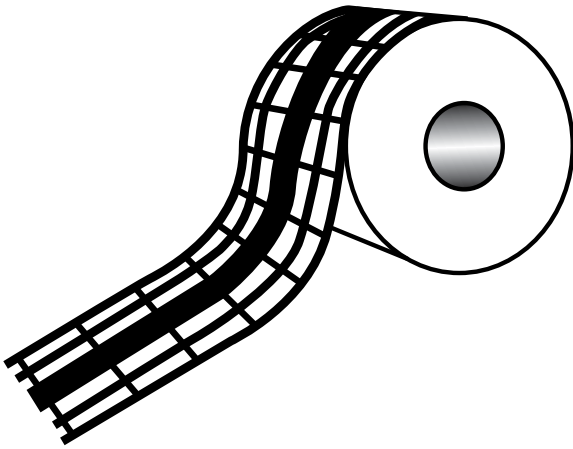
Hiline e-Flex UNO

Type	PEX service pipe	Outer casing	Weight	Part No
	d	D		
	mm	mm	kg/unit	
25/ 76	25	75	2.30	HF.2576.LPU
32/ 76	32	75	2.50	HF.3276.LPU
40/ 91	40	90	3.47	HF.4091.LPU
50/111	50	110	4.92	HF.50111.LPU
63/126	63	125	6.50	HF.63126.LPU
75/142	75	140	8.47	HF.75142.LPU
90/162	90	160	11.40	HF.90162.LPU
110/162	110	160	14.23	HF.110162.LPU
110/182	110	180	16.19	HF.110182.LPU
125/182	125	180	17.20	HF.125182.LPU
140/225	140	225	40.95	HF.140202.LPU

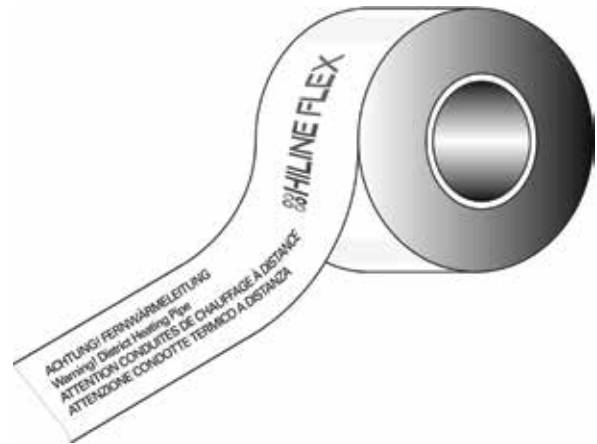
Hiline e-Flex DUO

Type	PEX service pipe	Outer casing	Weight	Part No
	d	D		
	mm	mm	kg/unit	
25 + 25/ 91	2 x 25	90	4.32	HF.252591.LPD
32 + 32/111	2 x 32	110	4.67	HF.3232111.LPD
40 + 40/126	2 x 40	125	7.42	HF.4040126.LPD
50 + 50/162	2 x 50	160	9.90	HF.5050162.LPD
63 + 63/182	2 x 63	180	13.96	HF.6363182.LPD
75 + 75/202	2 x 75	202	17.50	HF.7575202.LPD

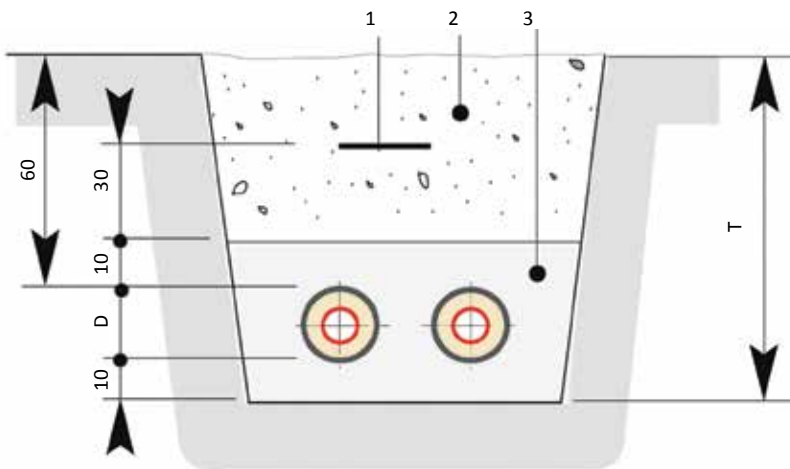
4.4.1 Buried Mains Warning Tape



Detectable Mesh Warning Tape (200mm x 100m roll)
With tracer wires for detection from above ground.
To be laid in the ground as detailed Part number: H-WM



Standard LDPE Warning Tape (150mm x 365m roll)
To be laid in the ground as detailed below.
Part number: H-WT

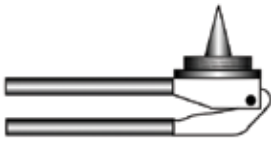


- 1 Pipe warning tape
 - 2 Excavated material
 - 3 Washed sand
- Installation depth; see sheet HF 3.6.3

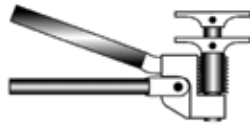
4.4.2 Tools for PEX-LOK Axial Compression Joints

For tool sales and hire enquiries, please contact CPV Ltd using the details found at the rear of this document.

Manual tool for PEX \varnothing 25 - 40 mm (packed in one case)
Part No. HF.25-40.CTK



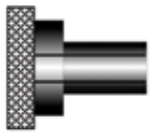
Expander tool, up to \varnothing 32 mm (basic tool)



Press tool, up to \varnothing 40 mm
Expander tool for \varnothing 40 mm (basic tool)



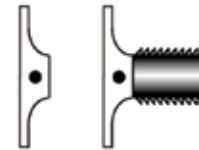
Case with basic tool including head and yoke



Expander head, up to \varnothing 32 mm

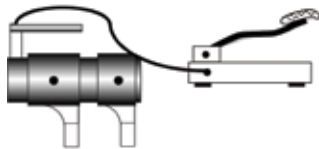


Expander head, over \varnothing 40 mm



Press yoke, \varnothing 25 - 40 mm

Hydraulic tool for PEX \varnothing 50 - 110 mm (packed in two cases)
Part No. HF.50-110.CTK



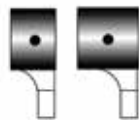
Hydraulic press and expander tool \varnothing 50 - 110 mm including foot pump (basic tool)



Case with basic tool (without heads and yoke)



Expander head \varnothing 50 - 110 mm



Press yoke \varnothing 50, 63 mm

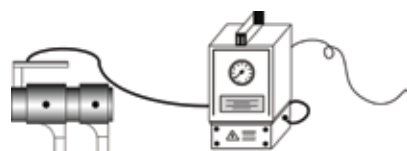


Reducer \varnothing 75/90 mm for yoke, \varnothing 110 mm



Case with expander heads and press yoke

Electro-hydraulic tool for PEX \varnothing 125 - 160 mm (packed in two or three cases)
Part No. HF.125-160.CTK and HF.160/125.CTK



Hydraulic press and expander tool \varnothing 125 - 160 mm including foot pump (basic tool)



Case with basic tool (without heads and yoke)



Case with expander heads and press yoke. (\varnothing 140 mm)



Expander head \varnothing 125 - 160 mm



Press yoke \varnothing 140 mm, 160 mm



Reducer \varnothing 125 mm for yoke, \varnothing 160 mm



Case with expander heads and press yoke. (\varnothing 125 and 160 mm)

5.1 LOGISTICS AND PIPE COIL HANDLING

5.1.1 Transportation

The load must be secured with appropriate method to avoid shifting during transportation. Any load-securing methods must not damage the outer casing – so 50mm-wide nylon webbing straps must be used.

5.1.2 Lifting

When lifting, care must be taken to avoid damaging the outer casing from point loads. If using fork lift or telehandler, suitable fork extensions or attachments must be used with radii to protect the pipe casing. Ensure that the coil is secured to avoid it slipping off.

If lifting by another means – such as a crane – 50mm-wide nylon webbing straps must be used. Rope must not be used for this purpose.

Make sure that the coil is lifted well-clear of the ground to avoid damage from obstacles and being dragged.

5.1.3 Site Storage

It is recommended that pipe coils are stored flat on wooden supports. As with transportation, the area must be free of sharp objects that could damage the outer casing. **If coils are stored vertically, they must be chocked to prevent rolling.**



5.1.1 Pipe Coils (continued)

5.1.4 Cutting Straps, Uncoiling and Straightening

Pipes with an outside diameter of up to 126mm can be uncoiled in an upright position. For larger dimensions it is recommended that a pipe uncoiler is used. Please contact us for further advice.

Cut the pipe coil straps by layer, working from the outside towards the inside while unwinding the coil into the trench or adjacent location. Do not cut all straps at the same time. When installing Hiline e-Flex pipes in ambient temperatures of 0°C or below, it may be necessary to gently heat the pipe with a soft flame to a temperature of no more than 60°C (when the pipe casing’s surface shines) to enable straightening.

At the jointing area, a length of a suitably-dimensioned wood can be used to straighten the heated pipe – secured via the gentle application of 50mm-wide webbing straps (as pictured right). Once fixed in place, the pipe casing can be allowed to cool before the restraining straps are released.

Please note: rope, wire or chains must not be used for this process and the temperature of the casing must not exceed 60°C.

5.1.5 Bending Radius

When installing Hiline e-Flex pipes in ambient temperatures of less than 0°C, we recommend that - prior to installation - the pipes are stored indoors or alternatively, the outer casing is warmed with a suitable heating appliance and installed immediately. Bend areas can be gently warmed with a soft burner flame. Please note the minimum bending radii in the table below.



Hiline e-Flex UNO	Minimum Bending Radius (m)*	Hiline e-Flex DUO	Minimum Bending Radius (m)*
25/76	0.70	25+25/91	0.80
32/76	0.70	32+32/111	0.90
40/91	0.80	40+40/126	1.00
50/111	0.90	50+50/162	1.20
63/126	1.00	63+63/182	1.40
75/142	1.10	75+75/202	1.60
90/162	1.20		
110/162	1.20		
110/182	1.40		
125/182	1.40		
140/202	1.60		

* Bending Radius at an ambient temperature of 10°C

5.2 PIPE LAYING

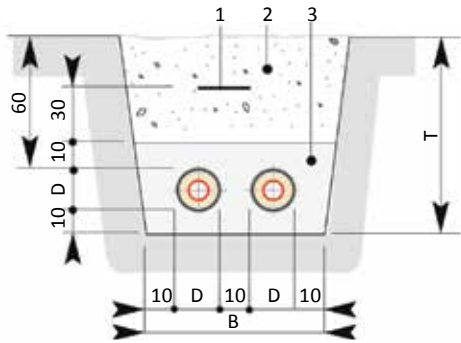
5.2.1 Trench Dimensions

Please refer to Section 3.6 regarding design considerations for trench dimensions – such as traffic loadings and special ground conditions.

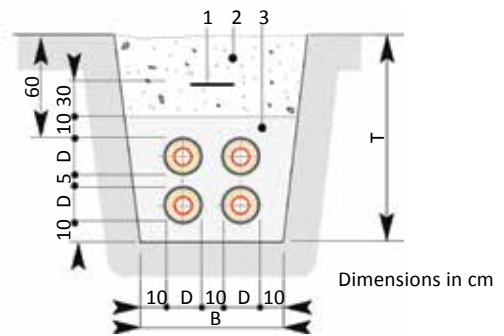
- 1: Pipe warning tape; see sheet HF 4.4.3
- 2: Excavated material
- 3: Washed sand

Trench profile, 2 Hiline e-Flex pipes

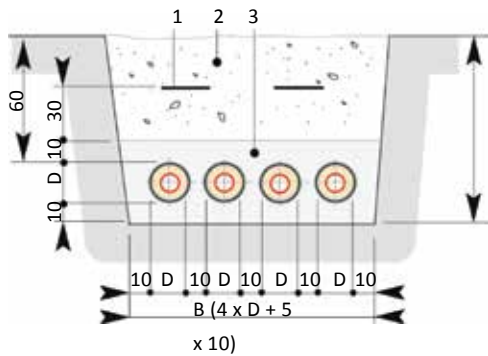
UNO



Trench profile, 4 Hiline e-Flex pipes



Trench profile, 4 Hiline e-Flex pipes



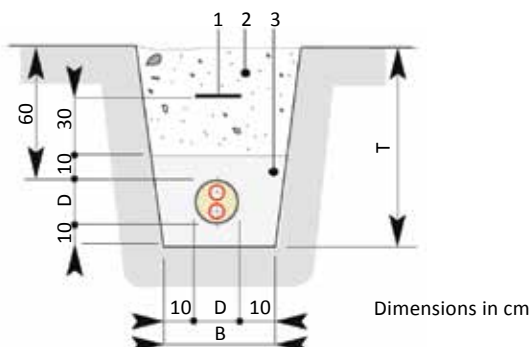
Installation depth:

Max. installation depth: 2.6 m
Our approval is required for installation at greater depths.

SLW 30 300 kN total load as per DIN 1072; if subject to higher traffic loads (e.g. SLW 60), a load-distributing superstructure as per RStO75 is required. With no traffic load, the minimum trench depth T can be reduced by 20 cm.

Outer casing	Width	Depth	Minimum
Ø D	B	T	Bending radius
mm	cm	cm	m
76	45	80	0.70
91	50	80	0.80
111	55	85	0.90
126	55	85	1.00
142	60	85	1.10
162	65	90	1.20
182	70	95	1.40
202	75	95	1.60

DUO

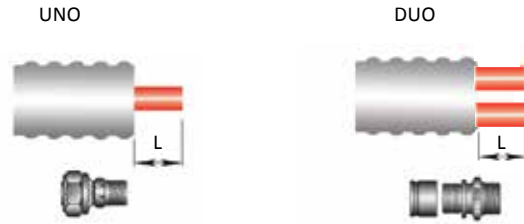


Outer casing	Width	Depth	Minimum
Ø D	B	T	Bending radius
mm	cm	cm	m
91	30	80	0.80
111	30	85	0.90
126	35	85	1.00
142	35	85	1.10
162	35	90	1.20
182	38	95	1.40
202	41	95	1.60

5.3 PIPE JOINTING

Training

Installer training is essential. Please contact us for details of our available training courses. They are available for every type of jointing technique across the entire Hiline range of pre-insulated pipe systems.



5.3.1 Preparation of Pipe Ends

When preparing the pipe ends for jointing with PEX-LOK axial compression fittings, the protruding pipe ends must be sized according to the table shown below. Using the diagrams, you will need to determine the L dimension.

Please Note: The PEX service pipe must be cut squarely and burr free.

Casing Joint or Sleeve		Pipe Termination	
Hiline e-Flex UNO	Dimension L	Hiline e-Flex UNO	Dimension L
OD 25 – 50mm	110mm	OD 25 – 50mm	140mm
OD 63 – 110mm	140mm	OD 63 – 140mm	180mm
OD 125 – 140mm	150mm		
Hiline e-Flex DUO		Hiline e-Flex DUO	
OD 25+25 – 50+50mm	110mm	OD 25+25 – 50+50mm	140mm
OD 63+63mm	140mm	OD 63+63mm	160mm
OD 75+75mm	160mm	OD 75+75mm	180mm

Please note: When terminating Hiline e-Flex DUO with screw-type connectors, the PEX pipe ends need to be staggered to facilitate tool access. Use L dimensions 80mm and 180mm respectively.



(1) Mark the distance L plus 10mm from the end of the pipe.



(2) Cut the casing pipe with a saw.



(3) Split the casing pipe with a knife or chisel. Note: Ensure you don't damage the service pipe.



(4) Peel off the casing.



(5) Cut back and remove the insulation along the length (see table for dimensions L).



(6) Clear off remaining insulation from exposed pipe ends.

5.3.2 Service Pipe Jointing

Before starting this process, please ensure that the pipe ends have been prepared as detailed in section 5.3.1. If using shell sleeves it is important that the casing joint sealing rings are located on all ends of the pipe outer casing (see section 5.3.3.2). If joining the casing with heat-shrink joints, please ensure that the oversleeve and heat shrinkable bands are in place (refer to section 5.3.4). Please Note: Hiline e-Flex DUO has one of its two service pipes marked with a blue stripe to ease identification of flow and return.



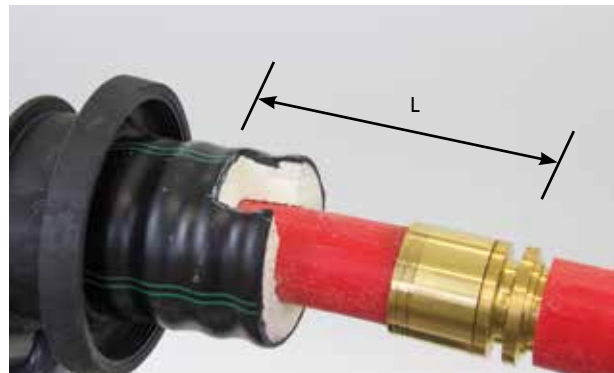
(1) The PEX-LOK compression sleeve can be slid onto the prepared pipe ends. The square end faces the insulation and the chamfered end faces towards the joint.



(2) Expand the pipe end twice – offset by approximately 30°. Ensure that the compression sleeve is slid well back from the area being expanded.



(3) Insert the PEX-LOK fitting (tee, elbow or straight coupling). Locate the clamping jaws on the tool and clamp onto the joint. For dimensions over 40mm, a lubricant of petroleum jelly must be used in the area of the compression sleeve.



(4) If required for additional compression sleeve connection, a recess can be cut out to allow room for the clamping tool (see table below).

Service Pipe OD	Length L Tool A1 or M1	Length L Tool G1
20-40mm	170mm	-
40-110mm	-	270mm



(5) Clamp the second pipe. If this is a straight or 90 degree coupling, then the connection is completed.



(6) If creating a Tee-branch connection, clamp the third pipe. It may be necessary to make room for the clamping tool as discussed in step (4) above.

5.3.3 Jointing with Shell Sleeves

5.3.3.1 Components List

The components for the Shell Sleeve casing joint system are detailed below.

Site Safety and COSHH

Please ensure that all instructions are followed carefully and that the correct site safety equipment such as gloves and eye protection are worn at the appropriate times. COSHH data sheets are available on request for adhesives and foam insulation component liquids.

1. Upper shell half with plug holes
1. Lower shell half without plug holes (not shown)
2. Green clamps
3. Green plugs
4. Green plug-in clips
5. Sealing rings
6. Foam insulation kit
7. Instruction manual

1



2



3



4



5



6



7

Important information on handling this product safely and correctly

- Never expose the foam (6) or shell (1) to sunlight or heat sources! Store in a cool and dry place.
- Always install sealing rings (4) before fittings (sealing rings cannot be installed afterwards.)
- Always make sure pipes are clean and surfaces on both shells are free of grease.
- Wear safety goggles and gloves and working with foam.
- Only use the correctly-sized foam kit for the respective joint.

5.3.3.2 Preparation for Jointing

Positioning

Ensure pipes are positioned as per the pictures – according to the type of joint – Tee, Straight or 90-degree bend coupling.

Tee



Straight coupling



Bend



Sealing Rings

Pull the sealing rings over the clean outer casing pipe ends for all pipes being connected – ensuring that the larger diameter end is facing the joint area. Note that this needs to be done before the service pipes are joined as the sealing ring cannot be fitted afterwards.



5.3.3.3 Fitting the Shell Sleeve Joint



(1) Position the lower shell sleeve so that its edges fit inside the sealing rings. Note that the lower half of the shell sleeve does not have any plug holes.



(2) Position the upper half of the shell sleeve over the lower half, taking care to align the longer catches (as ringed on the photograph). Also ensure that all joining faces of the two shell halves are clean.



(3) Move the two halves of the shell joint together and allow the longer catches to click into place (see photograph).



(4) Working from the outside towards the inside, press all remaining catches into place, ensuring that they click.



(5) Making sure that the sealing areas are clean and all catches have securely clicked together, pull the sealing rings over the ends of the two shell halves.



(6) Secure the sealing ring into place by installing the two halves of the green clamps.

5.3.3.3 Fitting the Shell Sleeve Joint (continued)



(7) Identify the plug hole at the highest point, leaving this ready for filling the foam liquid, then close all remaining plug holes with the green plugs. These fit into notches cut out of the shell sleeve and are locked into place by twisting a quarter of a turn clockwise.



(8) Insert all the green plug-in clips to lock the two halves of the shell sleeve into place.



(9) Prepare the two-part PUR foam insulation kit in accordance with the instructions supplied, then pour the mixed foam liquid into the shell through the filling hole. PLEASE NOTE: Safety advice must be strictly adhered to when dealing with two-part foam and the correct PPE used to protect any operatives working in the joint area.



(10) Once the foam liquid has been poured, close the opening with the remaining green plug, ensuring that the plug's venting hole remains open. Do not fit the rubber plug until the next step.



(11) After 10 minutes, the foam insulation will have sufficiently cured to permit the closing of the plug's vent holes with the rubber plugs (fitted to the upper shell half).

5.3.4 Jointing with Heat-Shrink Casing Joint

Components List

- HDPE oversleeve materials (packed in white polythene) x 1
- Heat shrinkable bands x 2
- The components A and B forming PUR foam, batched in separate bottles
- Vent plugs x 2
- Welded plugs x 2

Please Note: Specialist training is required to install this type of joint. Please contact CPV for details



PLEASE NOTE: The heat-shrink joint and foam must be stored at a temperature below 25°C and kept out of direct sunlight. The installation of this joint must only be carried out in dry conditions and when ambient temperatures are over 5°C. Failure to comply with this may affect the integrity of the joint.

5.3.4 Jointing with Heat-Shrink Casing Joint (continued)

Tools Required

- Hand scraper / knife
- Course abrasive paper or belt sander
- Solvent degreaser and cotton rag
- Propane gas bottle and wide nozzle soft flame torch
- Petroleum jelly

- Marker pen
- Drill bit for pour hole (25mm taper)
- Pressure up tester and manometer
- Foot pump
- Socket fusion tool 110v
- Tapered tool ends (pair)
- Handle for welded plug
- Aluminium wedges (pair)

(1) Joint Preparation

Ensure that the pipe ends are prepared in accordance with the instructions detailed in section 5.3.1. The jointing area must be clean and free of dirt and grease. (Note: the joint pictured below shows the service pipe already joined)



(2) Joint

The HDPE joint oversleeve and heat-shrinkable bands need to be slid over the pipes before the service pipes are joined.



(3) Service Pipe Joints

Join the service pipes in accordance with the instructions detailed in section 5.3.2.



(4) Prepare Casing Ends

The final 250mm of both outer casing pipe ends in the joint area need to be sanded with an abrasive paper, cleaned with solvent and allowed to dry. When dry, this section of the casing should be heated with a soft flame from a gas burner to reach a temperature of 60°C one minute after heating. DO NOT OVERHEAT!

(5) Position Joint

Remove packaging and slide over the heat-shrinkable tube sleeve so that it is centrally placed on the case pipe overlap. Clean external surfaces from dirt, paying more attention to the area inside the heat-shrinkable tube sleeve joint which is lined with adhesive. Position the tube sleeve with two aluminium wedges at both ends to secure position.



(6) Shrink Down Oversleeve

The ends of the heat-shrinkable tube sleeve should now be shrunk-down with a soft flame over a length of 100-150 mm. Heating should be started with a small flame moved from the middle towards the tube edges until uniform traces of glue begin showing out from under the edges, while the tube fits tightly. Proceed carefully, paying attention to not overheat the oversleeve until approximately 30-40mm each end has shrunk down onto the service pipe.



5.3.4 Jointing with Heat-Shrink Casing Joint (continued)



(7) Fit the Heat-Shrinkable Bands
Clean the area of the oversleeve and outer casing pipe in the area in which the heat shrink bands will be fitted. Remove the bands from their protective packaging and position them centrally over the overlapping ends of the oversleeve and the outer casing pipe.



(8) The heat-shrinkable bands can be shrunk down – starting from the oversleeve end. Apply a soft flame from a propane-butane burner. While heating, move the flame in circular movements around the band – taking care not to overheat the area. Repeat this process for the other end of the band – shrinking it down onto the pipe’s outer casing – then follow the same steps for the other heat shrink band. Allow both bands to cool before proceeding.



(9) Holes
Bore a 25mm diameter hole in the top of the casing joint – above the uninsulated section – approximately 100mm from the centre line of the oversleeve (clear of the heat-shrink bands).



(10) Apply an air pressure test of 0.2 bar for 15 minutes and check for air tightness with soapy water on all joint areas - ensuring there is no drop in pressure. Remove the air test equipment and bore a second 25mm diameter hole approximately 100mm the other side of the centre line on the top of the oversleeve.



(11) Non-Stick Agent
Apply a non-stick agent (such as petroleum jelly or polish) to the areas around the two 25mm holes to prevent excess foam sticking to the oversleeve.

5.3.4 Jointing with Heat Shrink Casing Joint (continued)



(12) Foam Insulation

Ensuring that the joint area has cooled to at least 40°C, pour the mixed foam liquid into one of the two holes. Make sure that the mixture is to the correct volumes following the supplied instructions. The reaction time for the mixed liquids is approximately 50 seconds at an ambient temperature of 20°C



Once poured, both holes need to be blocked with venting plugs down to the first notch. When foam appears in the plugs' vent holes, the plugs can be driven into place with a hammer.

(13) Sealing Plugs

Once the foam has hardened, the excess foam can be cleaned away and the areas around the vent plugs degreased. To seal the holes, the vent plugs need to be removed and the openings thoroughly cleaned with a scraper and abrasive paper.



(14) Using a pre-heated electric fusion welding tool, the welded plugs need to be put into the heater, with the male end of the heater placed into the joints filler hole. When heated, the plug can be pressed into place in the hole with hand pressure until there's a visible 2mm bead melt on both the plug and hole. Repeat this process for the second hole.



When completed and cooled, the plug should protrude no more than 1-2mm.



Excess bead can be trimmed if required.

5.4 PIPE TERMINATIONS

5.4.1 End Caps

Introduction

There are two types of end cap available to protect the exposed ends of the insulation. A heat-shrink type for areas containing moisture and slide-on LDPE type for general protection and aesthetics. Before fitting, the pipe ends must be stripped back to the dimensions detailed in section 5.3.1.

Heat-Shrink End Caps

- (1) The ends of the outer casing pipe need to be roughened up with abrasive paper and cleaned with solvent.
- (2) Pre-heat the heat shrink area to over 60°C. Use a temperature indicator strip to check this temperature.
- (3) Slide on the end cap and shrink-down with a soft flame until adhesive appears on all edges of the end cap.

Push-Fit End Caps

As its name would suggest, simply prepare the pipe ends and push on the end cap.

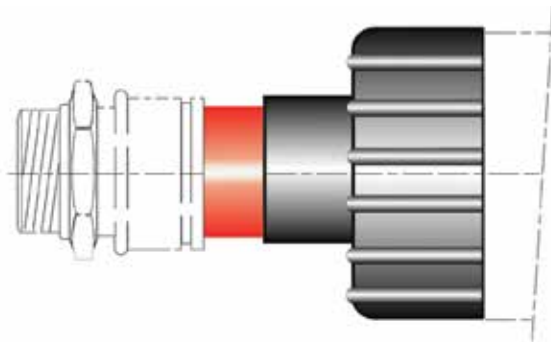
Hiline e-Flex UNO

Type
25/ 76
32/ 76
40/ 91
50/111
63/126
75/142
90/162
110/162
110/182
125/182
140/202

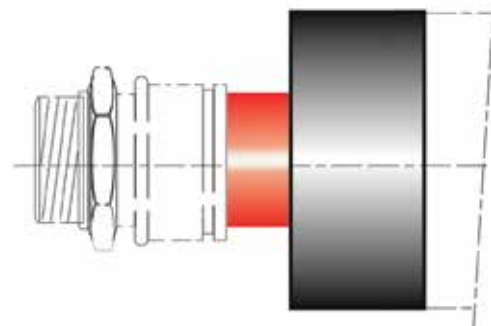
Hiline e-Flex DUO

Type
25 + 25/ 91
32 + 32/111
40 + 40/126
50 + 50/162
63 + 63/182
75 + 75/202

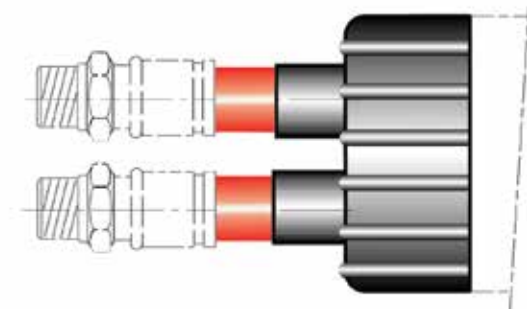
Heat-shrink end cap, UNO



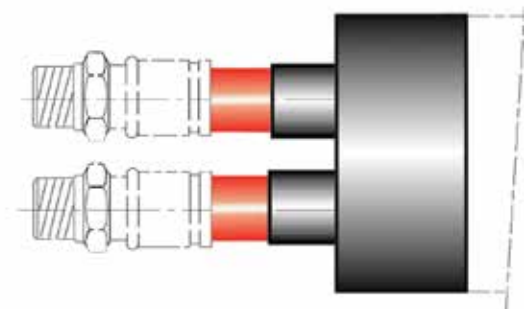
Push-fit LDPE End cap, UNO



Heat-shrink end cap, DUO



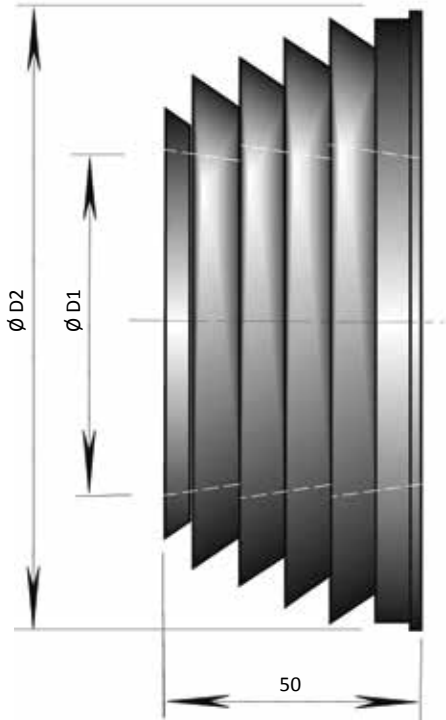
Push-fit LDPE End cap, DUO



5.4.2 Wall Entry Sleeves

5.4.2.1 Wall Sealing Ring

Wall sealing rings are used to seal the building against the ingress of moisture when using core-drilled holes. The diagrams on the following page detail the correct configuration for this termination.



Dimensions in mm

For wall openings

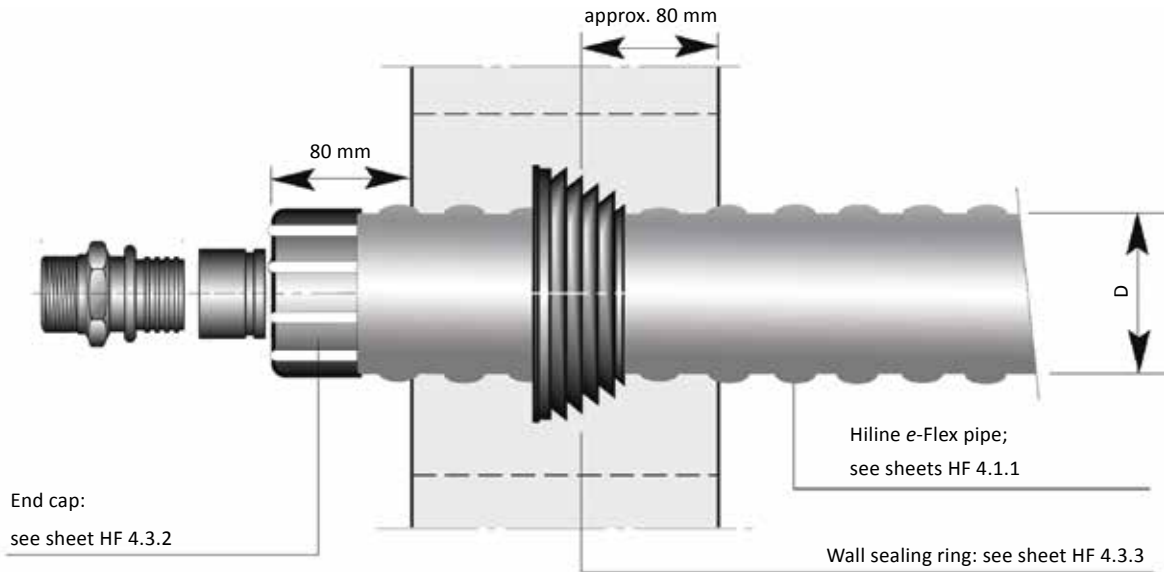
Hiline e-Flex UNO & DUO

Outer casing pipe diameter	Neoprene wall sealing ring	
	Ø D1, inner	Ø D2, outer
mm	mm	mm
76	74	118
91	88	133
111	107	153
126	122	168
142	137	183
162	155	203
182	175	223
202	195	230

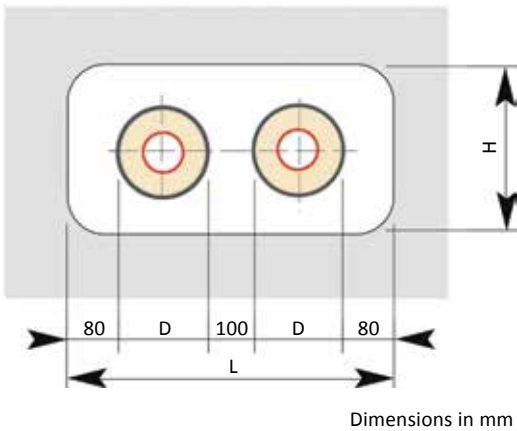
Building entry (see sheet HF 4.3.1.1)

5.4.2.1 Wall Sealing Ring

Wall penetration

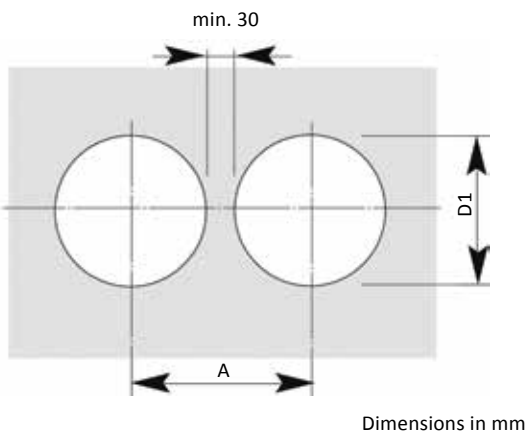


Wall opening



Outer casing	L min	H min
$\varnothing D$		
mm	mm	mm
76	450	250
91	500	250
111	500	300
126	550	300
142	600	350
162	650	350
182	670	380
202	720	400

Core bores

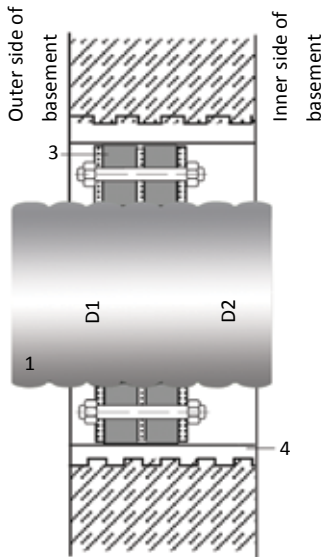


Outer casing	A	D1
$\varnothing D$		
mm	mm	mm
76	210	180
91	230	180
111	250	230
126	270	230
142	290	230
162	310	280
182	330	280
202	400	350

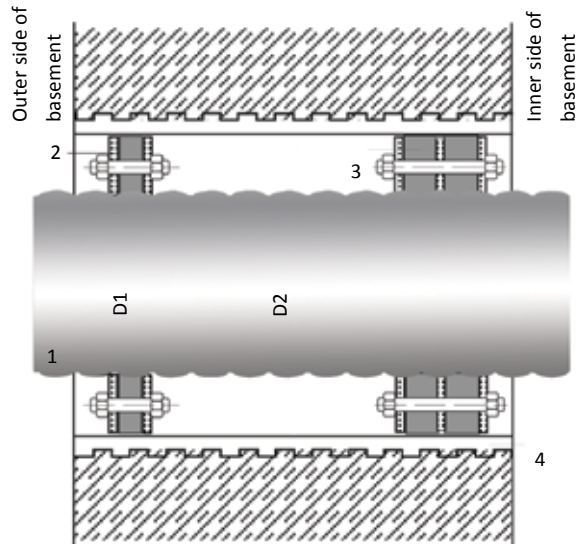
5.4.2.2. Wall Seal (compression type)

Core bores/cement liner pipes

Standard



With additional centring ring



Core bores

Perfect bores are required for installation. As hairline cracks may be present in the concrete or result from drilling, it is advisable to seal the entire length of the borehole with suitable sealant (such as AQUAGARD).

Tightness can only be guaranteed if this recommendation is followed.

- 1 Hiline e-Flex district heating pipe
- 2 Seal set, single-seal
1 x 40 mm, Shore hardness D 35
- 3 Seal set, double-seal*
2 x 40 mm, Shore hardness D 35
- 4 Liner pipe: made of fibre cement or coated core bore

* Suitable for pressure from ground water up to 0.5 bar

Outer Casing	Liner pipe, core bore	Seal set	Core bore
∅ D1	∅ D2	∅ inner	∅
mm	mm	mm	mm
76	150	78 - 85	150
91	150	86 - 94	150
111	200	105 - 115	200
126	200	125 - 135	200
142	200	137 - 145	200
162	250	157 - 165	250
182	250	180 - 190	250
202	300	198 - 207	300

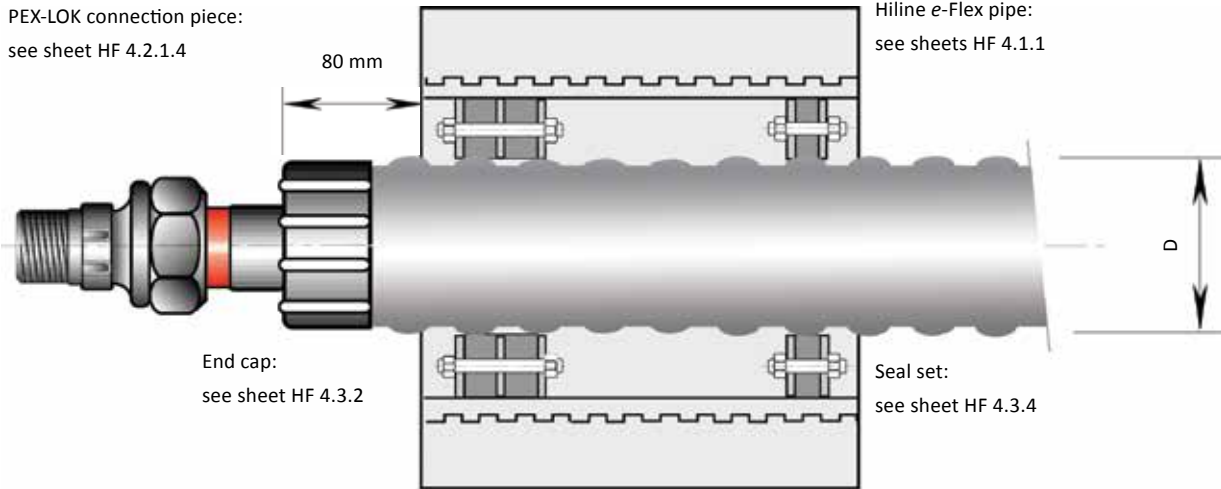
Building entry (see sheet HF 4.3.1.2)

5.4.2.2. Wall Seal (continued)

Wall penetration

PEX-LOK connection piece:
see sheet HF 4.2.1.4

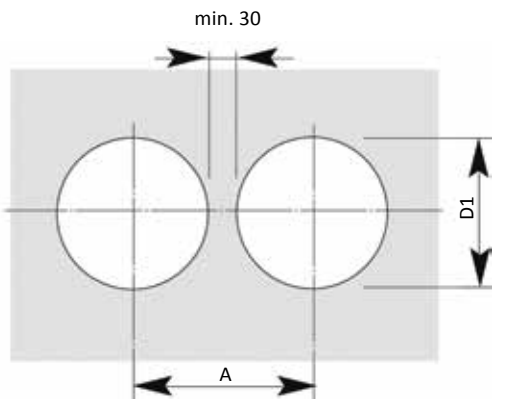
Hiline e-Flex pipe:
see sheets HF 4.1.1



End cap:
see sheet HF 4.3.2

Seal set:
see sheet HF 4.3.4

Core bores



Dimensions in mm

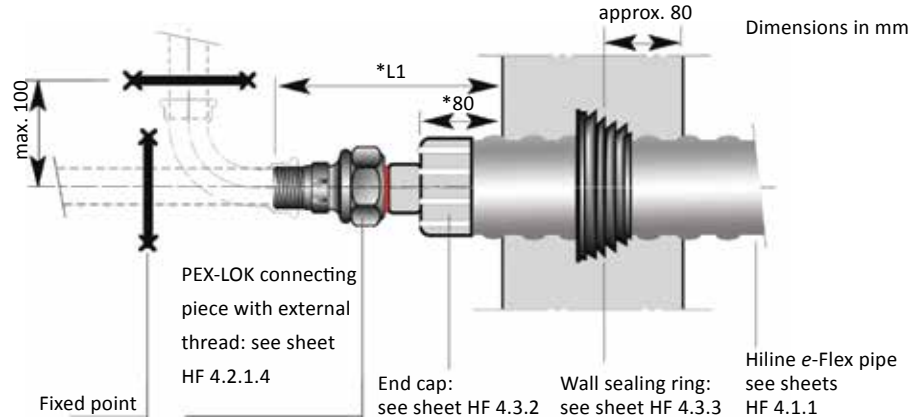
Outer casing	D1	A
$\varnothing D$		
mm	mm	mm
76	180	150
91	180	150
111	230	200
126	230	200
142	230	200
162	280	250
182	280	250
202	330	300

5.4.3 Building Termination

Shaft entry, fixed point forces

Connection with external thread

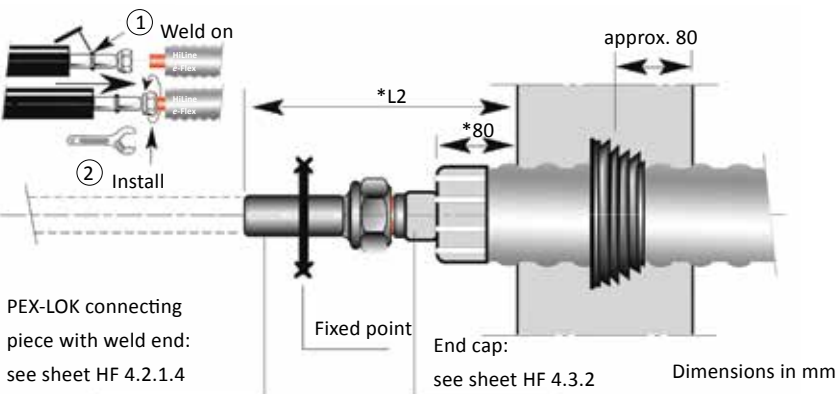
Fixed point forces occurring Hiline e-Flex heating, 6 bar



Hiline e-Flex

Heating, 6 bar	
PEX pipe	L1
mm	mm
25	260
32	260
40	270
50	270
63	320
75	320
90	330
110	340
125	340

Connection with weld end



Hiline e-Flex

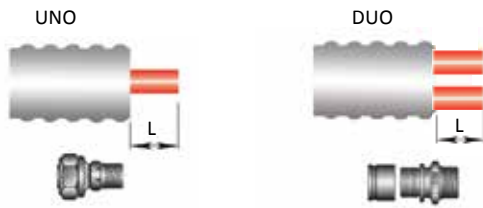
Heating, 6 bar	
PEX pipe	L2
mm	mm
25	250
32	250
40	260
50	270
63	310
75	310
90	310
110	310
125	310
140	340

* Dimensions can be reduced by max. 60 mm if end cap is walled in.

Maximum fixed point forces occurring per pipe for:			
90 °C, 6 bar		60 °C, 6 bar	
Type	Fmax [N]	Type	Fmax [N]
25/ 76	925	25/ 76	755
32/ 76	1495	32/ 76	1225
40/ 91	2365	40/ 91	1940
50/111	3685	50/111	3015
63/126	5785	63/126	4740
75/142	8205	75/142	6720
90/162	11860	90/162	9720
110/182	17675	110/182	14480
125/182	22878	125/182	18745
140/202	28747	140/202	23553

5.4.3 Building Termination (continued)

When preparing the pipe ends for termination with a PEX-LOK transition coupling (see 4.2.1.4), the protruding pipe ends must be sized according to the table shown below. Using the diagrams, you will need to determine the L dimension.



Hiline e-Flex UNO	L
OD 25 – 50mm	140mm
OD 63 – 140mm	180mm
Hiline e-Flex DUO	
OD 25+25 – 50+50mm	140mm
OD 63+63mm	160mm
OD 75+75mm	TBC

Please note: When terminating Hiline e-Flex DUO with screw-type connectors, the PEX pipe ends need to be staggered to facilitate tool access. Use L dimensions 80mm and 180mm respectively.



(1) Mark the distance plus 10mm from the end of the pipe.



(2) Cut the casing pipe with a saw.



(3) Split the casing pipe with a knife or chisel. Note: Ensure you don't damage the service pipe.



(4) Peel off the casing.



(5) Cut back and remove the insulation along the length (see table for dimension L).



(6) Clear off remaining insulation from exposed pipe ends.



(7) Install the wall sealing ring.



(8) Fit the Heat-Shrink End Cap (see section 5.4.1).

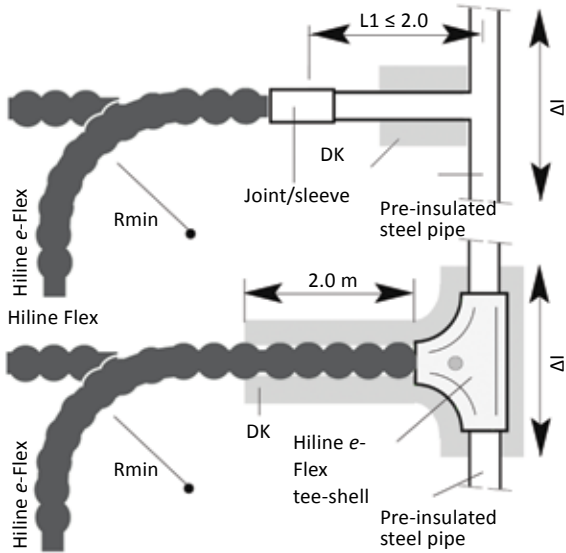


(9) Install the PEX-LOK transition coupling with either a welded or screw-thread adaptors – see sections 4.2.1.4 and 5.3.2 for details.

5.4.4 Connecting to Pre-insulated Rigid Steel Pipe Systems

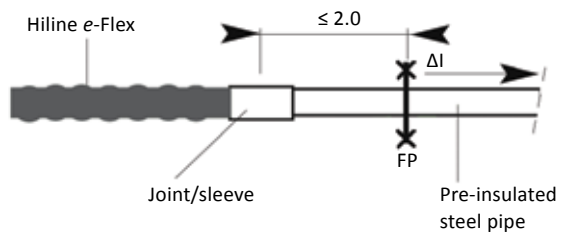
Due to the expansion forces that are present in pre-insulated steel pipe systems, care must be taken when transitioning into Hiline e-Flex. The following illustrations show four different methods of limiting the potentially damaging expansion forces being transferred into the Hiline e-Flex system. For further advice and advanced stress analysis, please contact our technical department using the details at the rear of this document.

1. Junction with T-piece



The transverse expansion Δl must not exceed the expansion that can be accommodated by the junction pipe and the Hiline e-Flex pipe.

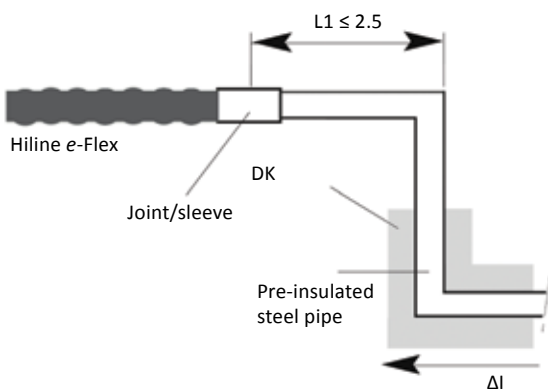
2. Transition with fixed point



Dimensions in m

The thermal movement Δl of the pre-insulated steel pipe cannot be compensated by the Hiline e-Flex pipes. A fixed point must be installed.

3. Transition with Z-bend



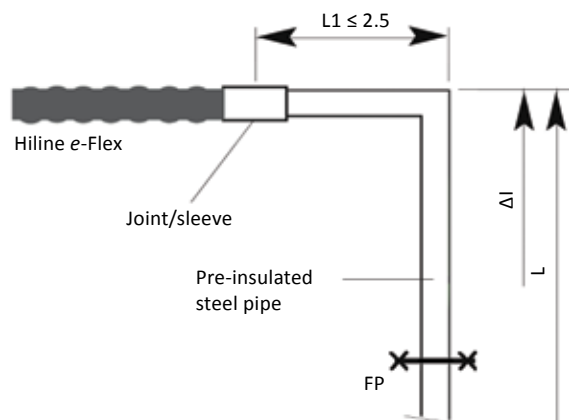
Static design of the Z-bend according to expansion variable Δl .

Δl = Thermal movement

FP = Fixed point (plastic casing pipe)

DK = Expansion pad

4. Transition with expansion bend



Dimensions in m

If pipe length L or Δl is more than permitted for $L1$, a fixed anchor point must be installed.

- Design of expansion components
- Positioning of expansion pads

6.0 COMMISSIONING

6.1.0 Pressure Testing

All pipes and joints must be pressure tested before trenches are backfilled. It is recommended that, where possible, the pressure test is carried out before the outer casing joints are fitted to facilitate visual inspection of the service pipe jointing area.

6.1.1 Test Procedure with Water

Having inspected the pipe network for any signs of damage, the system must be flushed and clear of any dirt and debris that may have entered the service pipe during the installation process.

When full and all air has been vented, the system shall be pressurised to 6 bar or 1.5 times the operating pressure (use the greater of the two values). Having closed the isolation valves on the system, inspect the connections to ensure that there is no leakage.

Due to the flexible mechanical properties of the PE-Xa service pipe, the pressurisation process will need to be repeated a few times. The following steps must be followed and the pressures recorded on the Pressure Test Sheet (See HF 6.4).

Preliminary Test

- System initial pressurisation
- Time elapsed: 10min – re-pressurise to test pressure
- Time elapsed: 20min - re-pressurise to test pressure
- Time elapsed: 30min – record pressure
- Time elapsed: 60min – record pressure. A fall in pressure of <0.6 bar is acceptable this stage.

Main Test

- Time elapsed: 180min – record pressure. A fall in pressure of <0.2 bar is acceptable.

NOTE: Check whole installation, particularly junction points, with regard to leak-tightness using a visual test. Water should not leak out at any point on the installation, particularly at the junction points. The maximum permissible operating pressure to DIN 16892/93 may not be exceeded during the test.

6.2.0 Drawings

It is important to record the 'as-installed' pipe network dimensions in accordance with standard DIN 2425-2 and any other relevant standards as required by appropriate regulations for building services and buried utilities.

6.3 WATER TREATMENT

Any water treatment used must be compatible with PE-Xa and the components of the axial compression jointing system. Please note that certain sizes of service pipe joints and pre-insulated fittings may contain steel components, so may need an appropriate water treatment to be in place.

6.4 PRESSURE TEST REPORT

COPY FORM

Pressure test sheet:
Test in line with DIN 1988 Part 2
Medium: Water

1. Installation Details

Building project: _____

Property owner: _____

Street / house number: _____

Postcode/town: _____

2. Preliminary Test

2.1 Test pressure:	bar (recommended 1.5 times operating pressure)
2.2 Recorded pressure after 10 min.	bar (re-pressurise)
2.3 Recorded pressure after 20 min.	bar (re-pressurise)
2.4 Recorded pressure after 30 min.	bar
2.5 Recorded pressure after 60 min.	bar (permissible fall in pressure < 0.6 bar)

3. Main Test

3.1 Test pressure	bar (result of the preliminary test as per point 2.5)
3.2 Recorded pressure after 2 hours	bar (permissible fall in pressure < 0.2 bar)
3.3 Comments on test:	

Check whole installation, particularly junction points, with regard to leak-tightness using a visual test. Water should not leak out at any point on the installation, particularly at the junction points. The maximum permissible operating pressure to DIN 16892/93 may not be exceeded during the test.

4. Confirmation

For the customer: _____

For the contractor: _____

Location: _____

Date: _____

Attachments: _____

About CPV Ltd

Founded in 1948, and the first British company to manufacture pre-insulated pipe systems for district heating applications, CPV operates in a wide array of sectors, with products satisfying many applications. Our state-of-the-art production facility - based at the site of our headquarters near Romsey in Hampshire - is backed by a comprehensive selection of research, design, engineering, testing, quality, training and support services; ensuring the perfect marriage between our products and the applications they serve.



District Heating Pipe Systems

World-class support Services

At CPV we pride ourselves by the way in which we support our customers – from the moment that they first contact us through to their long-term operation and maintenance of a pre-insulated pipe network. As manufacturer, it's important to us to ensure that our systems deliver exceptional performance throughout their working life. Therefore, we have established an array of world-class support services that help our clients every step of the way.

Design and Stress Analysis

There are many factors that will affect the long-term integrity of a pre-insulated pipe system. Correctly identifying and dealing with the potential for thermal expansion of the pipe system is a critical element of the design process and we employ state-of-the-art sisKMR specialist stress analysis software tools.

Training

Training installers, supervisors and maintenance operatives, our brand new training centre allows for not only the theory, but hands-on practical experience in the correct method for installing the Hiline pipe systems. In addition to this, we also offer training courses in the design, installation, commissioning and maintenance

of electronic surveillance systems – including the use of our own buried pipe network, on which we can simulate moisture faults as part of the practical training.

On-site Support Services

Whether it's on-site training, site supervision or specialist advice, support and maintenance – our engineers are at hand to provide customer support as and when required.

Drawings

We can prepare detailed design drawings and as installed drawings that accurately record a completed system's on-site dimensions.

The CPV Hiline range of pre-insulated pipe systems also offers the following service pipe options (shown overleaf):

- Steel (Metric and Imperial)
- Glass-Reinforced Epoxy (GRE)
- Copper
- Rigid Polymers

Other Products from CPV include:

- Chemical and Hazardous Drainage Systems
- Single and Dual-Containment Pressure Pipe Systems
- Bulk Tanks and Vessels
- Custom Thermoplastic Extrusions
- Custom Thermoplastic Fabrications

PRODUCT SELECTOR TABLE

	1	2	3	4	5	6	7	8	9
	Hiline Steel	Hiline Copper	Hiline GRE	Hiline Aqua PP-R	Hiline Aqua Cool PE	Hiline e-Flex® PE-Xa	Hiline Fibre-Flex	Hiline Fibre-Flex Pro	Hiline S-Flex
	Hiline STEEL	Hiline COPPER	Hiline GRE	Hiline AQUA HEAT	Hiline AQUA COOL	Hiline e-FLEX	Hiline FIBREFLEX	Hiline FIBREFLEX PRO	Hiline S-FLEX
Size Range	DN20-DN1200	15-159 (OD)	DN32-DN630	20-315 (OD)	20-315 (OD)	25-160 (OD)	25-160 (OD)	32-160 (OD)	DN25-150
System Standards	EN 253, EN 448, EN 488, EN 489, EN 13941 & EN 14419	(*) EN 253 / 15632-1/2	(*) EN 253 / 15632-1/2	(*) EN 253 / 15632-1/2	(*) EN 253 / 15632-1/2	EN 15632-1/2	Technical Specification OFI CERT ZG 200-2 Class A	Technical Specification OFI CERT ZG 200-2 Class D	(*) EN 253 /15632-1/2
Service Pipe Standards	Seamless EN 10216-2 Welded EN 10217-2&5	EN 1057	ISO 14692-1/2/3/4 ASTM D2310 ASTM D2996	DIN 8077 DIN 8078	DIN 8074	EN 12318-2 DIN 16892 DIN 16893	None applicable as it has a unique composite construction	None applicable as it has a unique composite construction	AISI 316
Service Pipe Material & Grade	STEEL St 37.0 Seamless R-35, P235 GH Welded P235 GH, P235TR1 & TR2	COPPER Cu-DHP, R250 & R290	GRE ASTM D2310-11FX1 & ASTM D2996	PP-R & PP-RCT Multi-layer composite fibre reinforced	PE100 SDR17.6 or SDR11	PE-Xa with oxygen diffusion barrier	PE-Xa with oxygen diffusion barrier and aramid fibre reinforcement mesh	PE-Xa with oxygen diffusion barrier and aramid fibre reinforcement mesh	Stainless steel alloy to AISI 316 - assigned state standard 03X17H14M3 enriched
Casing Pipe Material	**HDPE and Metallic Spiral	HDPE and MDPE Barrier	HDPE	HDPE and MDPE Barrier	PE (PP and ABS also available)	Corrugated LDPE	Corrugated LDPE	Corrugated LDPE with diffusion barrier	Corrugated LDPE
Max Operating Pressure (bar)	25	10	10	10	10 (SDR17.6) 16 (SDR11)	6	10	16	16
Max Cont Operating Temp (°C)	140	120	120	80	+60 (down to -40)	80	80	95	120
Max Peak Operating Temp (°C)	152	130	120	95	60	95	95	115	150
Insulation Material	PUR	PUR	PUR	PUR	PUR	PUR	PUR	PUR	PUR
Insulation Series	1,2 & 3	1 & 2	1 & 2	1 & 2	1 & 2	1+2	1+2	1+2	1
Insulation Value (w/mK)	0.0244	0.024-0.029	0.024-0.029	0.024-0.029	0.024-0.029	0.021	0.021	0.021	0.0216
Delivered Lengths	6m & 12m	6m	9m & 11.9m	6m & 12m	5m, 6m & 12m	Up to 800m (coil)	Up to 590m (coil)	Up to 590m (coil)	Up to 220m (coil)
Electronic Surveillance	YES	YES	YES	YES	YES	N/A	N/A	N/A	YES
APPLICATIONS									
District Heating	●	●	●	●	○	●	●	●	●
District Cooling	●	●	●	●	●	●	●	●	●
Potable Water Services	●	●	●	●	○	●	○	○	○

(*) Generally manufactured in accordance with EN 253 and/or 15632-1/2 as no current standards exist for pre-insulated service pipes of these material types

(**) HDPE & *MDPE Casings can be supplied with oxygen diffusion barrier for diameters d75 - d400 (on request)



CPV Ltd
Woodington Mill
Woodington Road
East Wellow
Romsey
Hampshire
SO51 6DQ
United Kingdom

Tel: +44 (0)1794 322 884
Fax: +44 (0)1794 322 885
Email: enquiries@cpv.co.uk

Registered Office:
Station Road West, Ash Vale, Hampshire, GU12 5LZ
Registered in England and Wales No: 468471

www.cpv.co.uk
Follow us on Twitter: [@CPVltd](https://twitter.com/CPVltd)
Follow us on LinkedIn: [/cpv-limited](https://www.linkedin.com/company/cpv-limited)



FM 33749
ISO 9001

QUALIT196 Issue 9.0