

# System description

## 1. General

EIGERFLEX® is Brugg Pipe Systems protected name for a flexible, pre-insulated cold water pipe featuring an integrated frost protection strip (FPC). This pipe system is especially suitable for cold water and waste water pipes which cannot be installed at depths that are safe from frost.

The EIGERFLEX® cold water pipe features a medium pipe produced from high-density polyethylene (PE100) as per standard EN 12162. Polyethylene pressure pipes are the standard for drinking water and waste water systems, and also for the gas supply sector, and they are excellently suited to the areas of application just mentioned. The pipes are joined by means of standardised screwed connectors, mechanical pipe couplings, with normal commercial electrowelded fittings or by means of polyfusion welding technology.

The heat insulation consists of CFC-free flexible rigid polyurethane foam with excellent insulating properties. The bending capacity of the flexible EIGERFLEX® cold water pipe means that it can be adapted to all pipe routing conditions without problems. It is possible to pass over or under existing supply pipes, and obstacles are easily bypassed. With flexible EIGERFLEX® cold water pipe, you can choose the shortest pipe route without having to consider classical pipe construction methods.

The self-limiting frost protection strip (FPC) is used with different power capacities (11 or 18 W/m), regardless of the thickness of the medium pipe or the insulation. EIGERFLEX® cold water pipe is prefabricated as appropriate and supplied in the required lengths; it always offers the same performance, regardless of the quantities ordered. The maximum length of the heating circuit varies according to the cut-in temperature, which must be controlled by a thermostat.

The desired length of flexible EIGERFLEX® cold water pipe is delivered to site in continuous form, either in rings or on a cable drum. Thanks to the generous delivery lengths, pipes can be laid largely without connection points in the ground, so the width of the pipe trench can be considerably reduced. Substantial savings are possible because underground construction work is minimised and installation is fast as well as simple.

## 2. Range of applications

Max. continuous operating temperature $T_{Bmax}$ :	-20 to +20 °C
Max. permitted operating pressure p:	max. 16 bar

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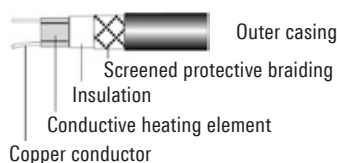
## 1. Medium pipe

Material: Polyethylene class PE100 with high density, to DIN EN ISO 1216262  
 Life expectancy: 50 years at 20 °C (16 bar) resp. 40 °C (11.6 bar) to DIN 8074 (SF 1.25)  
 Characteristics: Suitable for cold water and sewage/waste water pipes

PE medium pipe	Ref. temp. °C	Value	Test standard
Density	–	952 - 960 kg/m <sup>3</sup>	DIN 53479
Heat conductivity	40 - 46	0.40 W/mK	DIN 52612
Ultimate tensile strength (tearing resistance)	20	32 N/mm <sup>2</sup>	DIN 53455
Modulus of elasticity	20	1000 N/mm <sup>2</sup>	DIN 53457
Linear expansion coefficient	20	1.8 · 10 <sup>-4</sup> 1/K	DIN 52328
Crystallite melting range	–	130 - 135 °C	–

## 2. Frost protection strip

Material:



Frost protection strip, selfregulating power output	25 - 50 mm Power delivery 11 W/m	63 - 110 mm Power delivery 18 W/m
Dimensions	Width 7.7 mm, Thickness 5.3 mm	Width 7.7 mm, Thickness 5.3 mm
Minimum bending radius	20 mm	20 mm
Operating voltage	230 V AC 50 Hz	230 V AC 50 Hz
Max. operating temperature powered	Continuous operation 65 °C, short periods 85 °C, to –30 °C	Continuous operation 65 °C, short periods 85 °C, to –30 °C
Max. heating circuit length:	128 m / 16 A at 10 °C 100 m / 10 A at 10 °C	102 m / 16 A at 10 °C 60 m / 10 A at 10 °C
Power delivery (W/m bei 10 °C)	11 W/m	18 W/m

To protect people and equipment, we basically specify a 30 mA residual current-operated device (FI).

## 3. Heat insulation

Material: CFC-free, 100% CO<sub>2</sub>-driven polyurethane foam (PUR)

PUR-insulation	Ref. temperature °C	Value	Test standard
Density	–	> 60 kg/m <sup>3</sup>	ISO 845
Heat conductivity	30	≤ 0.0234 W/mK	EN 253 and ISO 8497
Closed cellular structure	–	≥ 90 %	–
Water absorption after 24 hrs.	–	≤ 10 %	EN 253

## 4. Enveloppe de protection

Material: Polyethylene of low density, PE-LLD, extruded seamless  
 Purpose: Protection against mechanical effects and moisture

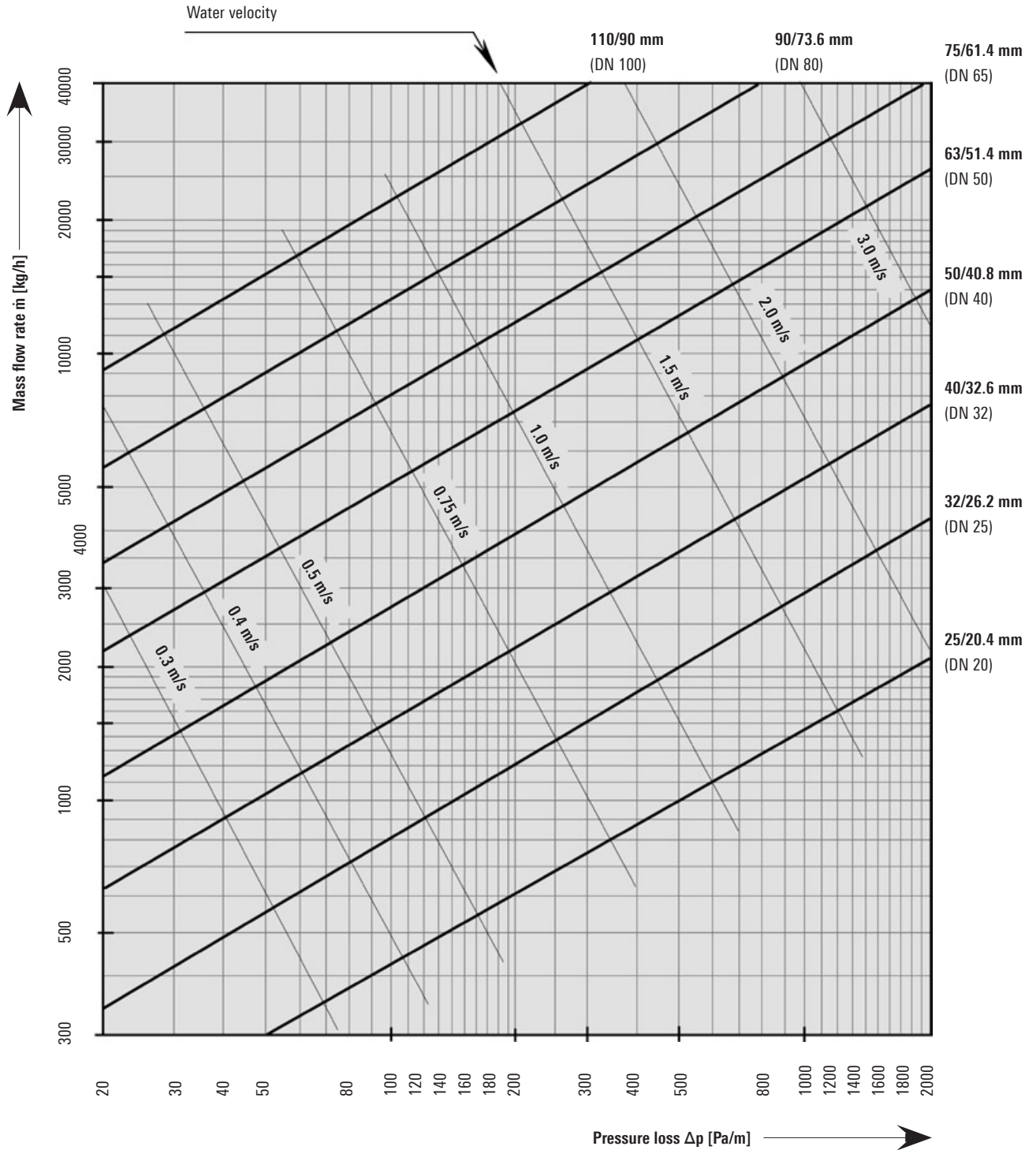
PE-LLD-protective casing	Ref. temperature °C	Value	Test standard
Density	–	918 - 922 kg/m <sup>3</sup>	ISO 1183
Heat conductivity	–	0.33 W/mK	DIN 52612
Crystallite melting range	–	122 °C	ISO 11357-3

# Pressure loss

DN 20 - DN 100 (SDR 11)

Water temperature 20 °C

Roughness  $\epsilon = 0.01$  mm (PE100)  
 (1 mmWS = 9.81 Pa)



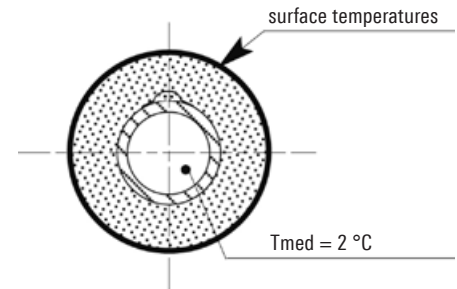
# Heat loss

Heat losses at different external temperatures or surface temperatures of the casing pipe.

Medium temperature: 2 °C

The frost protection strip can no longer compensate for a heat loss of more than 10 W/m, and there is a **danger of freezing**.

If the pipes are laid underground (covered height of 0.6 m), the heat losses are **reduced** by at least **20%**.



surface temperature of the outer casing °C	EIGERFLEX® pipe dimensions							
	25/76	32/76	40/91	50/91	63/126	75/126	90/162	110/162
	q W/m Medium temperature: 2 °C							
-1	0.6	0.7	0.8	1.1	0.9	1.2	1.1	1.7
-2	0.8	1.0	1.0	1.4	1.2	1.6	1.4	2.2
-3	1.0	1.2	1.3	1.8	1.6	2.0	1.8	2.8
-4	1.1	1.4	1.6	2.2	1.9	2.5	2.2	3.4
-5	1.3	1.7	1.8	2.5	2.2	2.9	2.5	3.9
-6	1.5	1.9	2.1	2.9	2.5	3.3	2.9	4.5
-7	1.7	2.2	2.3	3.2	2.8	3.7	3.2	5.0
-8	1.9	2.4	2.6	3.6	3.1	4.1	3.6	5.6
-9	2.1	2.6	2.9	4.0	3.4	4.5	4.0	6.2
-10	2.3	2.9	3.1	4.3	3.7	4.9	4.3	6.7
-11	2.5	3.1	3.4	4.7	4.0	5.3	4.7	7.3
-12	2.7	3.4	3.6	5.0	4.3	5.7	5.0	7.8
-13	2.9	3.6	3.9	5.4	4.7	6.1	5.4	8.4
-14	3.0	3.8	4.2	5.8	5.0	6.6	5.8	9.0
-15	3.2	4.1	4.4	6.1	5.3	7.0	6.1	9.5
-16	3.4	4.3	4.7	6.5	5.6	7.4	6.5	<b>10.1</b>
-17	3.6	4.6	4.9	6.8	5.9	7.8	6.8	10.6
-18	3.8	4.8	5.2	7.2	6.2	8.2	7.2	11.2
-19	4.0	5.0	5.5	7.6	6.5	8.6	7.6	11.8
-20	4.2	5.3	5.7	7.9	6.8	9.0	7.9	12.3
-21	4.4	5.5	6.0	8.3	7.1	9.4	8.3	12.9
-22	4.6	5.8	6.2	8.6	7.4	<b>9.8</b>	8.6	13.4
-23	4.8	6.0	6.5	9.0	7.8	10.2	9.0	14.0
-24	4.9	6.2	6.8	9.4	8.1	10.7	9.4	14.6
-25	5.1	6.5	7.0	9.7	8.4	11.1	9.7	15.1
-26	5.3	6.7	7.3	<b>10.1</b>	8.7	11.5	<b>10.1</b>	15.7
-27	5.5	7.0	7.5	10.4	9.0	11.9	10.4	16.2
-28	5.7	7.2	7.8	10.8	9.3	12.3	10.8	16.8
-29	5.9	7.4	8.1	11.2	9.6	12.7	11.2	17.4
-30	6.1	7.7	8.3	11.5	<b>9.9</b>	13.1	11.5	17.9
-31	6.3	7.9	8.6	11.9	10.2	13.5	11.9	18.5
-32	6.5	8.2	8.8	12.2	10.5	13.9	12.2	19.0
-33	6.7	8.4	9.1	12.6	10.9	14.3	12.6	19.6
-34	6.8	8.6	9.4	13.0	11.2	14.8	13.0	20.2
-35	7.0	8.9	9.6	13.3	11.5	15.2	13.3	20.7
-36	7.2	9.1	<b>9.9</b>	13.7	11.8	15.6	13.7	21.3
-37	7.4	9.4	10.1	14.0	12.1	16.0	14.0	21.8
-38	7.6	9.6	10.4	14.4	12.4	16.4	14.4	22.4
-39	7.8	9.8	10.7	14.8	12.7	16.8	14.8	23.0
-40	8.0	10.9	10.9	15.1	13.0	17.2	15.1	23.5

Danger of freezing