

Ekoplastik FIBER BASALT PLUS

Assembly Instructions



FOR WATER SUPPLY AND HEATING

Different pipe types for any field of application



PPR

STABI

THERM PLUS

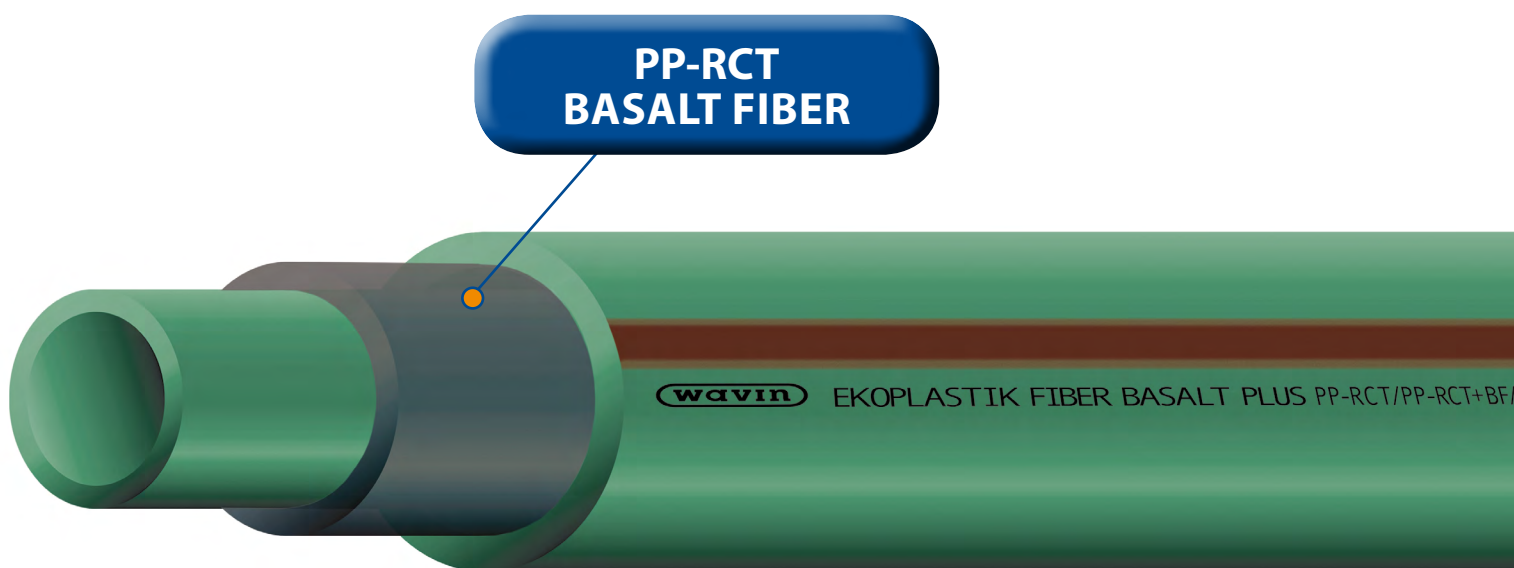
FIBER BASALT PLUS

Major areas of application of individual pipe types

	PPR PN10 Ø 20-125 mm	PPR PN16 Ø 16-125 mm	PPR PN20 Ø 16-125 mm	STABI Ø 16-110 mm	THERM PLUS Ø 20-40 mm	FIBER BASALT PLUS Ø 20-125 mm
	●	●	●	●	●	●
		●	●	●	●	●
			●	●	●	●
				●	●	●

Ekoplastik FIBER BASALT PLUS Pipe

- ▲ **BASALT FIBER** – high strength, lightness, pressure resistance
- ▲ **PP-RCT + BF** – higher flow rate, lower weight, high reliability
- ▲ **FIBER BASALT PLUS** – first pipe with basalt fiber and PP-RCT – polypropylen of new generation designed for hot and cold water and central heating.



System Ekoplastik

Pipes made of polypropylene

PPR, Typ 3

- ▲ All-plastic pipes
PPR PN 10, 16, 20
- ▲ Three-layer pipes with a perforated aluminum foil
STABI

PP-RCT, Typ 4

- ▲ Three-layer pipes with basalt fiber
BASALT PLUS
- ▲ Three-layer pipes with a non-perforated aluminum foil
THERM PLUS

Fittings of PPR

PPR Typ 3

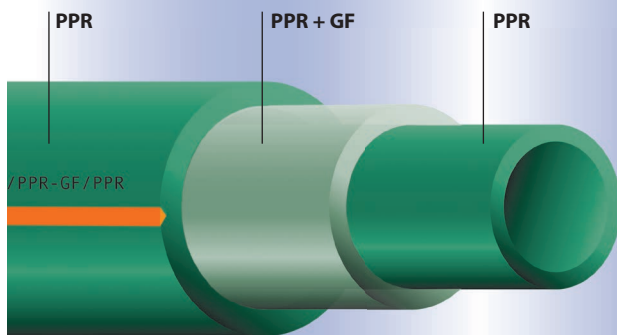
- ▲ Universal for all types of pipes

FIBER

PIPE OF TODAY

Existing benefits and application:

- A pipe in the pressure range PN 16 and PN 20
- 3 × lower linear thermal expansion
- Without shaving before welding

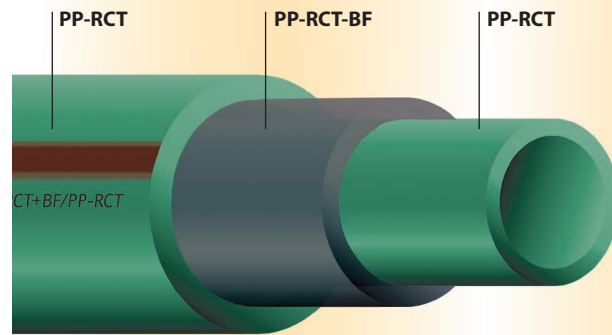


FIBER BASALT PLUS

UNIQUE PIPE OF TOMORROW

What improvements does the new BASALT FIBER PLUS pipe bring?

- Higher pressure resistance at higher temperatures by up to **50 %**
- Temperature resistance up to **90 °C**
- Higher flow rate by up to **20 %**
- All this while keeping other features of FIBER pipe:
 - » 3 × lower thermal linear expansion
 - » Without shaving before welding



Comparison of FIBER and FIBER BASALT PLUS parameters:

	FIBER	FIBER BASALT PLUS
	Characteristics	Characteristics
Composition	PPR PPR + GF PPR	PP-RCT PP-RCT + BF PP-RCT
Reinforcement	Glass fiber E-Glass	Basalt fiber Density +8 % Tensile strength +20 %
Pressure resistance according to Class 2 (warm water 70 °C)*	8 bar	10 bar
Pressure resistance according to Class 5 (heating Tmax 90 °C)*	6 bar	8 bar
Wall thickness (flow rate, weight)	S 2,5 (Ø 20-63) S 3,2 (Ø 75-125)	S 3,2 (Ø 20-63) S 4,0 (Ø 75-125)
Linear thermal expansion (mm/m °C)	0,05	0,05
Shaving of pipe before welding	No	No

* valid for Ø 20–63 mm, in accordance with EN ISO 15874

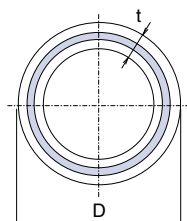
These Assembly Instructions define the application of FIBER BASALT PLUS pipes and represent an integral part of the Assembly Instructions of the Ekoplastik System. Information provided here concern specific features of FIBER BASALT PLUS pipes. Unless otherwise stated, the provisions of the Assembly Instructions for Ekoplastik System remaining the same.

1. UTILISATION OF FIBER BASALT PLUS PIPES

FIBER pipes are three-layered pipes. The inner and outer layers are made of polypropylene, type PP-RCT while the middle layer consists of polypropylene type 4 (PP-RCT) reinforced with basalt fibre (BF). The composition of the layers can be schematically described as PP-RCT/PP-RCT+BF/PP-RCT. FIBER BASALT PLUS pipes are designed for transport of cold and hot water, central heating, compressed air distribution systems and air-conditioning.

2. WARRANTY TERMS AND CONDITIONS

FIBER BASALT PLUS pipes as a part of the Ekoplastik system are guaranteed for the period of 10 years. This guarantee is only valid if the provisions of these instructions and the Assembly Instructions of the Ekoplastik System are observed. The guarantee only covers pipes and pipe fittings of the Ekoplastik System and pipelines made of them.



3. PRODUCT RANGE - BASIC INFORMATION

FIBER BASALT PLUS pipes are made in these dimensions (outer diameter of the pipe): 20, 25, 32, 40, 50, 63 mm (S 3,2) and 75, 90, 110, 125 mm (S 4). FIBER BASALT PLUS pipes are marked according to "S" series. Previous way of marking the pipes with "PN" number cannot be used for pipes made of new generation material PP-RCT, because working parameters of such pipes (pressure, temperature, service life) significantly exceed those of pipes made of PPR. FIBER BASALT PLUS pipes are welded to fittings of the Ekoplastik system in the same way as all-plastic pipes.

S	D [mm]	t [mm]	l [mm]	CODE	Packing	kg/m
S 3,2	20	2,8	4000	TTRFB020TRCT	100	0,153
	25	3,5	4000	TTRFB025TRCT	60	0,239
	32	4,4	4000	TTRFB032TRCT	40	0,385
	40	5,5	4000	TTRFB040TRCT	24	0,599
	50	6,9	4000	TTRFB050TRCT	16	0,941
	63	8,6	4000	TTRFB063TRCT	12	1,471
S 4	75	8,4	4000	TTRFB075TRCT	8	1,764
	90	10,1	4000	TTRFB090TRCT	4	2,546
	110	12,3	4000	TTRFB110TRCT	4	3,781
	125	14,0	4000	TTRFB125TRCT	4	4,891

l – pipe length

4. PROPERTIES OF FIBER PIPES

Advantages

Thanks to basalt fibres the pipes have 3 times lower linear thermal expansion and higher rigidity than all-plastic PPR pipes

Marking of FIBER pipes

The pipes are grey or green with a brown stripe. On the pipe there is a description containing the manufacturer's name, pipe designation, dimension x wall thickness, series, time, date, line number:

Wavin EKOPLASTIK FIBER BASALT PLUS PP-RCT/PP-RCT+BF/PP-RCT, time, date, line no. Made in EU (Czech Republic)

Standards for product manufacturing and testing

FIBER BASALT PLUS pipes are produced compliance with requirements of EN ISO 15874.

5. ASSUMED MEDIA PROPERTIES IN PIPING SYSTEM

The values of pressures and temperatures present in inner water supply lines are equal to values specified in the Assembly Instructions of Ekoplastik System.

6. OPERATING PARAMETERS OF FIBER BASALT PLUS PIPES - WATER DISTRIBUTION

The operating parameters involve the maximum operating pressure, temperature, service life and relations among them. The operating parameters are summarized in table on page 6. For the calculation the safety factor (SF) of 1.5 has been used.

7. OPERATING PARAMETERS OF FIBER BASALT PLUS PIPES - HEATING

The operating parameters are summarized in table on page 6. For the calculation the safety factor (SF) of 1.5 has been used.

8. FIBER BASALT PLUS PIPES ROUTING OPTIONS

You must ensure protection from mechanical damage of pipes, especially on non-heated premises (warehouses, open halls, etc.) as pipes are fragile at temperatures below 5 °C.

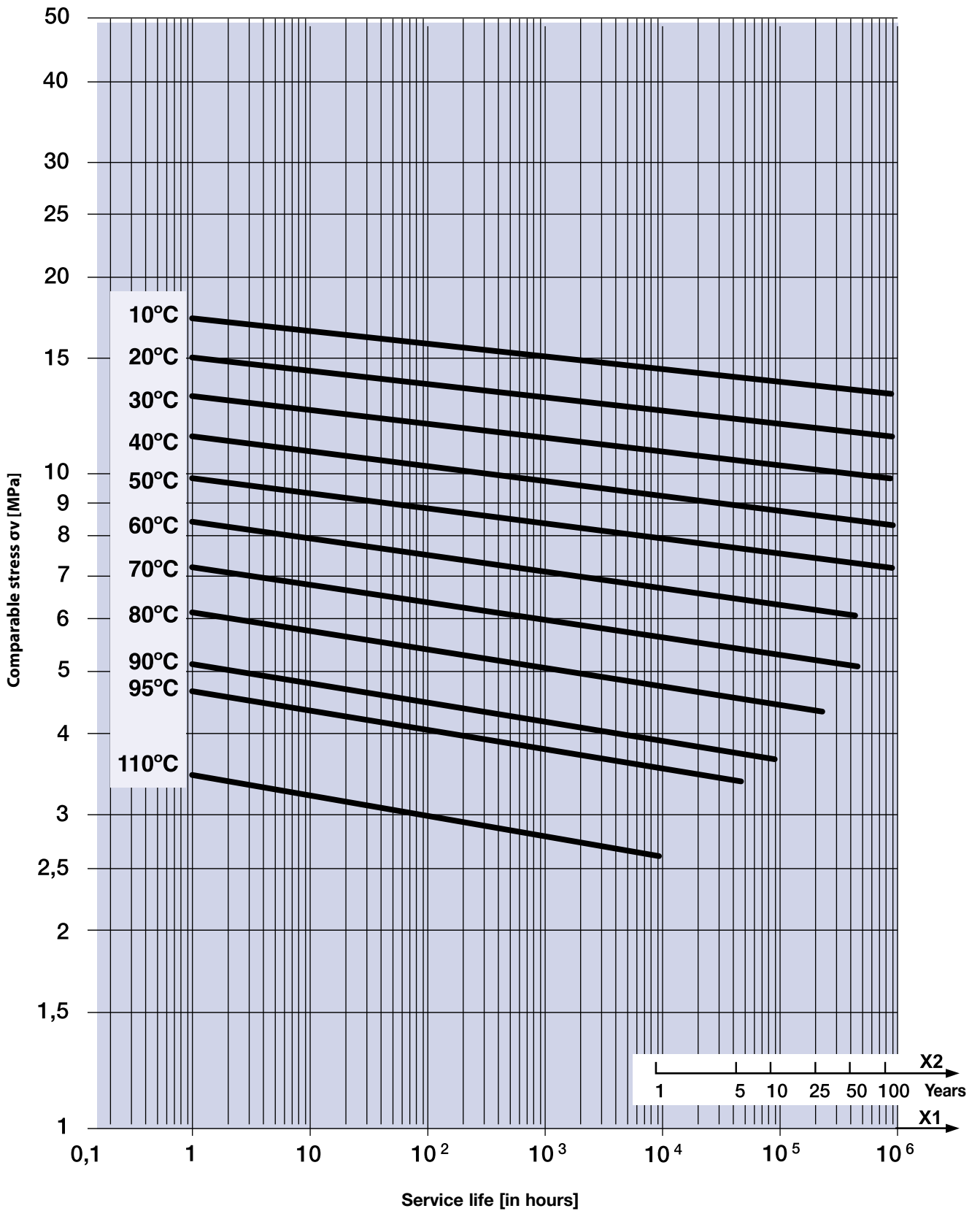
9. TABLES AND GRAPHS

Operating parameters of FIBER BASALT PLUS pipes for water and heating
(according to EN ISO 15874, DIN 8077/2007), safety factor 1,5

TEMPERATURE [°C]	TIME IN OPERATION [YEARS]	MAXIMUM ALLOWABLE OVERPRESSURE [BAR]	
		S 4	S 3,2
10	1	24,0	30,2
	5	23,2	29,3
	10	22,9	28,9
	25	22,5	28,4
	50	22,2	28,0
20	1	20,9	26,3
	5	20,2	25,4
	10	19,9	25,1
	25	19,6	24,6
	50	19,3	24,3
30	1	18,1	22,7
	5	17,4	22,0
	10	17,2	21,7
	25	16,9	21,2
	50	16,6	20,9
40	1	15,5	19,6
	5	15,0	18,9
	10	14,7	18,6
	25	14,4	18,2
	50	14,2	17,9

TEMPERATURE [°C]	TIME IN OPERATION [YEARS]	MAXIMUM ALLOWABLE OVERPRESSURE [BAR]	
		S 4	S 3,2
50	1	13,3	16,7
	5	12,8	16,1
	10	12,6	15,8
	25	12,3	15,5
	50	12,1	15,2
60	1	11,2	14,2
	5	10,8	13,6
	10	10,6	13,4
	25	10,4	13,1
	50	10,2	12,8
70	1	9,4	11,9
	5	9,1	11,4
	10	8,9	11,2
	25	8,7	10,9
	50	8,5	10,7
80	1	7,9	9,9
	5	7,5	9,5
	10	7,4	9,3
	25	7,2	9,1
95	1	5,9	7,4
	5	5,6	7,1

Mechanical strength PP-RCT isothermal lines valid for FIBER BASALT PLUS pipes



Termination of an isotherm indicates maximum servis life also at lower tension. The isotherms in the chart do not extend.

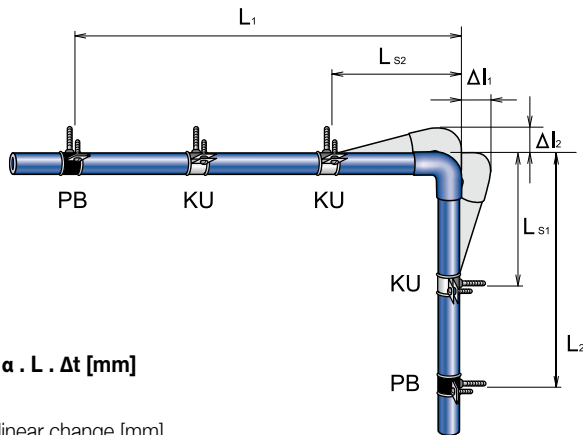
10. ASSEMBLY INSTRUCTIONS

10.1. General

Individual recommendations mentioned in the Ekoplastik Assembly Instructions are valid for FIBER BASALT PLUS pipes as well; increased attention must be paid to protection of pipes from external impacts, especially at low ambient temperatures.

10.2. Linear expansion and contraction

The difference of temperature during installation and under service conditions, i.e. a medium flows through the system at a different temperature to that prevailing during the installation period, results in linear changes - expansion or contraction (Δl).



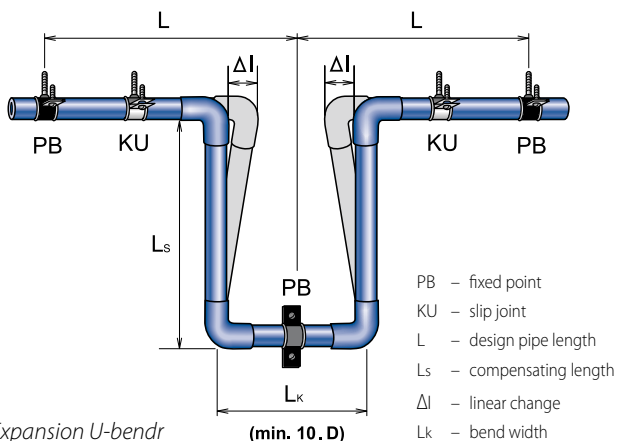
$\Delta l = \alpha \cdot L \cdot \Delta t$ [mm]

- Δl linear change [mm]
- α is thermal expansion coefficient of expansion [mm/m°C] for design of Ekoplastik FIBER BASALT PLUS $\alpha = 0,05$
- L design distance (distance of two neighbouring fixed points in the line) [m]
- Δt installation and service temperature difference [°C]

$L_s = k \cdot \sqrt{D \cdot \Delta l}$ [mm]

- L_s compensating length [mm]
- k material constant, for PPR $k = 20$
- D pipe outside diameter [mm]
- Δl linear change [mm] calculated from the formula shown above

If pipeline linear changes are not compensated in suitable way, i.e. if the pipes can not contract and expand, additional thrust and tensile forces are concentrated in the pipes shortening their service life.



Expansion U-bendr

(min. 10 · D)

$L_k = 2 \cdot \Delta l + 150$ [mm] and also $L_k \geq 10 \cdot D$

In polypropylene applications material flexibility is used for linear compensations. Pipe bends are also used for these purposes. A suitable compensation technique is the one where the pipeline is deflected perpendicularly to the original route and a free compensating length (marked as L_s) is left at the normal line.

The value of L_s compensating length will depend on calculated route extension (shortening), pipe material and diameter. The values of Δl linear change and L_s compensating length can also be taken from the graphs.

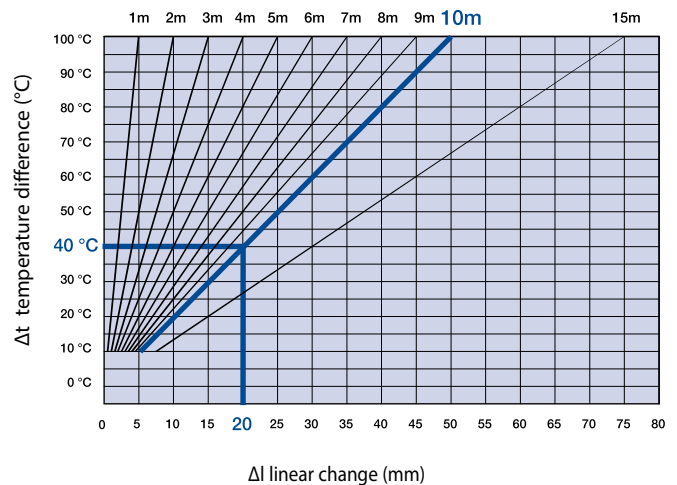
Spacing distances of supports

Ekoplastik FIBER BASALT PLUS piping

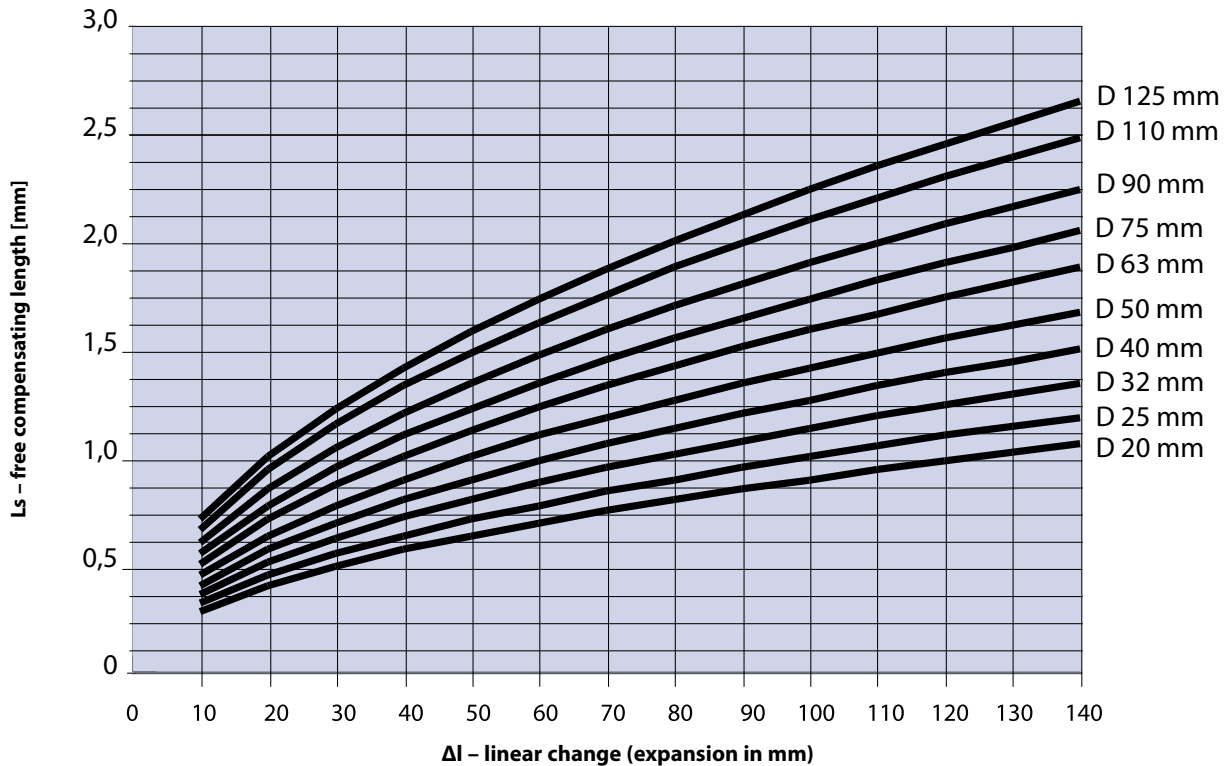
Example: $L = 10$ m, $\Delta t = 40$ °C

Pipeline lenght	Temperature difference Δt							
	10 °C	20 °C	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C
Lenght change Δl [mm]								
1 M	1	1	2	2	3	3	4	4
2 M	1	2	3	4	5	6	7	8
3 M	2	3	5	6	8	9	11	12
4 M	2	4	6	8	10	12	14	16
5 M	3	5	8	10	13	15	18	20
6 M	3	6	9	12	15	18	21	24
7 M	4	7	11	14	18	21	25	28
8 M	4	8	12	16	20	24	28	32
9 M	5	9	14	18	23	27	32	36
10 M	5	10	15	20	25	30	35	40
15 M	8	15	23	30	38	45	53	60

Calculated pipeline length L



Determination of Ls – free compensating length



Piper diameter [mm]	Linear change Δl [mm]													
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
	Deflection - free compensating length Ls [m]													
20	0,28	0,40	0,49	0,57	0,63	0,69	0,75	0,80	0,85	0,89	0,94	0,98	1,02	1,06
25	0,32	0,45	0,55	0,63	0,71	0,77	0,84	0,89	0,95	1,00	1,05	1,10	1,14	1,18
32	0,36	0,51	0,62	0,72	0,80	0,88	0,95	1,01	1,07	1,13	1,19	1,24	1,29	1,34
40	0,40	0,57	0,69	0,80	0,89	0,98	1,06	1,13	1,20	1,26	1,33	1,39	1,44	1,50
50	0,45	0,63	0,77	0,89	1,00	1,10	1,18	1,26	1,34	1,41	1,48	1,55	1,61	1,67
63	0,50	0,71	0,87	1,00	1,12	1,23	1,33	1,42	1,51	1,59	1,66	1,74	1,81	1,88
75	0,55	0,77	0,95	1,10	1,22	1,34	1,45	1,55	1,64	1,73	1,82	1,90	1,97	2,05
90	0,60	0,85	1,04	1,20	1,34	1,47	1,59	1,70	1,80	1,90	1,99	2,08	2,16	2,24
110	0,66	0,94	1,15	1,33	1,48	1,62	1,75	1,88	1,99	2,10	2,20	2,30	2,39	2,48
125	0,71	1,00	1,22	1,41	1,58	1,73	1,87	2,00	2,12	2,24	2,35	2,45	2,55	2,65

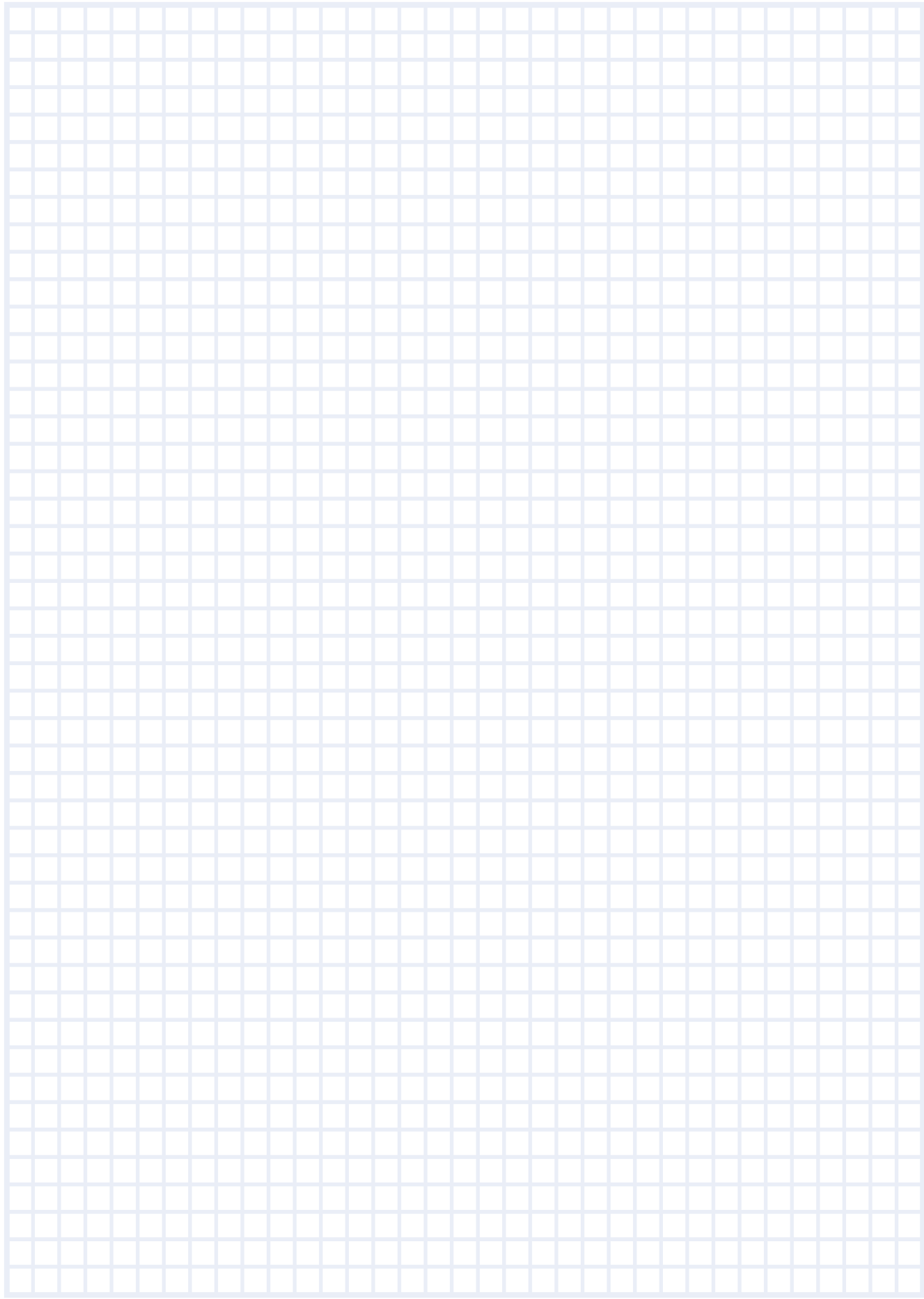
10.3. Distances of pipeline supports

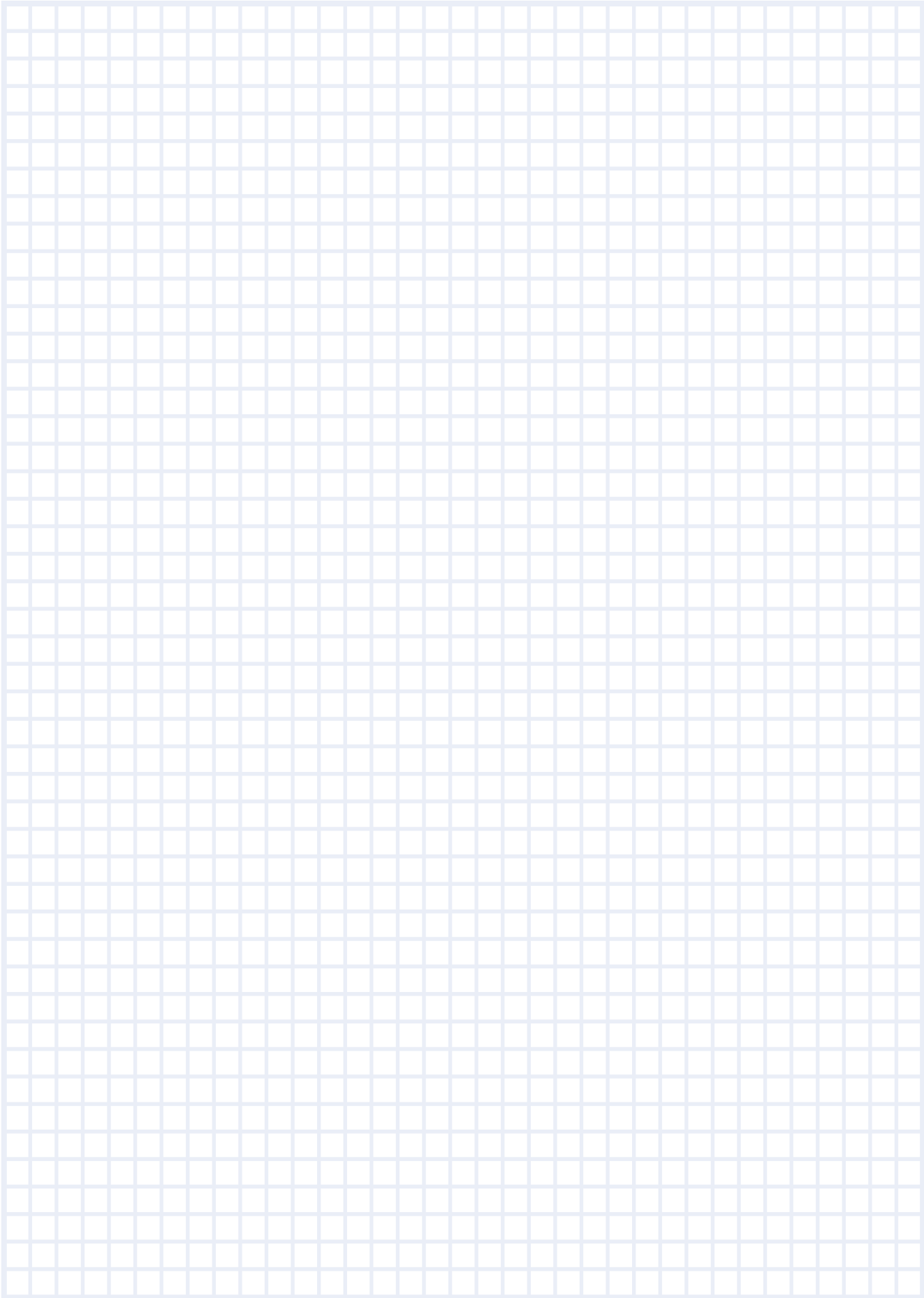
The max. distances of FIBER BASALT PLUS pipe supports are presented in the table. The values mentioned here can be used for a range of temperatures (tested for water temperature of 80 °C). For vertical pipelines the distances in the table are multiplied by the coefficient of 1.3.

Pipe diameter [mm]	20	25	32	40	50	63	75	90	110	125
Distance of supports [cm]	85	105	115	125	135	155	150	160	165	170

11. MATERIAL TRANSPORT AND STORAGE

As compared to all-plastic PPR pipes FIBER pipes are more fragile, especially at lower temperatures than 5 °C. Therefore, pipes must be protected from impacts during handling, they must not be thrown, dragged on the ground and on the loading surface of a vehicle. The pipes must be stored at a temperature of at least 5 °C.





Ekoplastik FIBER BASALT PLUS pipes**Assembly Instructions**

- Designed for potable, cold and hot water
- Suitable also for low-temperature heating, without oxygen barrier
- Pressure resistance S 3, 2; S 4
- Welding without surface treatment
- Thermal expansion 3 × lower than in the case of all-plastic PPR pipes

Expansion of pipes at temperature difference $\Delta t = 50\text{ °C}$

