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To the attention of: To whom it may concern in
Romania

PPR PIPES AND FITTINGS SPECIFICATION

Firat PPRC Pipe and Fittings produced from PP (Polypropylene Random Copolymer) raw material according to **TS 9937, TSE EN ISO 15874, DIN 8077, DIN 8078, DIN 16962, DVGW W544** standards indispensable solution for today's indoor cold and hot water piping systems has advantages such as its lightweight and smoothness, smooth and bright internal surfaces, calcification and rust-free, hygienic, easy to assembly and takes the place of galvanized pipes. Used in any kind of indoor hot and cold water pipe systems, Firat PPRC Pipe and Fittings are produced from the Type-3 class raw material, also called as PP-R (Polypropylene Random Copolymer).

PP raw materials are grouped under three classes in terms of its thermal, pressure and chemical resistance. Type-3 raw material has higher performance and superior properties than Type-1 and Type-2 raw materials in terms of its physical and chemical properties. The most important property of this raw material is high resistance against heat and chemical effects. Thanks to this resistance, Firat PPRC Pipe and Fittings produced from PP-R raw material are used successfully in the cold and hot water piping systems. Since monomer structure of the PP-R raw material forms a random chain, it does not allow any biological substance to be present in its body and so this provides Firat PPRC Pipe and Fittings produced from PP-R raw material with superior properties of non-color, taste and smell formation.

When used under proper pressure and temperature values, the life of PPRC Pipe and Fittings is more than 50 years.

- Its useful life is 50 years under 25 atm pressure at 20°C.
- It is suitable to use between -20 °C and +95°C. (Insulation must be applied by taking the freezing point of the fluid in the pipe.)
- It has high resistance against chemical substances.
- It is corrosion resistant. Also it is calcification and rust-free.
- They do not change the color, taste and smell of the water.
- Has smooth and bright internal surfaces.
- No diameter contraction in the welding points. Has high welding performance.
- Provides a saving of 70% in assembly and do not have assembly losses.
- Maintains heat and sound insulation.
- Highly fire-proof (**Ref: DIN 19560 and DIN 4102**)
- Environment-friendly.

TECHNICAL SPECIFICATIONS

Property		Unit	Test Method	Value
Density	+23C	g/cm ³	ISO 1183	0,909
Melting Flow Rate	MFR 190/5	g/10 min	ISO 1133	0,55
	MFR 230/2,16	g/10 min	ISO 1133	0,30
	MFR 230/5	g/10 min	ISO 1133	1,20
Volume Flow Rate	MFR 230/2,16	cm ³ /10 min	ISO 1133	0,4
Tensile Strength	(50 mm/min)	MPa	ISO 527/1+2	25
Elongation Rate	(50 mm/min)	%	ISO 527/1+2	600
Shore D Rigidity	(3 sec value)		DIN 53505	65
Charpy (Resistance)	notch	+23°C	ISO 179/1eU	43
		0°C	ISO 179/1eU	43
		-30°C	ISO 179/1eU	43
Charpy Impact Resistance	Notch	+23°C	ISO 179/1eA	52
		0°C	ISO 179/1eA	7
		-30°C	ISO 179/1eA	2,5
Vicat Softening Point	VST/A/ 50	°C	ISO 306	132
		°C	ISO 306	69
Melting Interval		°C	DSC	150-160
Linear Thermal Expansion Co-efficient		1/K	DIN 53752	0,030
Thermal Conductivity		W/mK	DIN 52612	0,24
Surface Resistance		0hm	DIN 0303,T3 VDE	>1014

Standard Number TS EN ISO 15874-2

Standard Name	Plastic Piping Systems – For Hot and Cold Water – Polypropylene [PP] – Section: 2 Pipes
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Tests	1- Mechanical Properties			
	Hydrostatic Tension(MPa)	Test Temperature (°C)	Test Duration(Hour)	Test Pressure (Bar)
	16	20	1	65
	4.3	95	22	18
	3.8	95	165	15
	3.5	95	1000	14
	2- Physical and Chemical Properties			
		Requirement	Parameter	Duration (Hour)
	Dimensional Stability	<%2	135 °C	en > 8 mm →1
				8 mm < en < 16 mm → 2
				en > 16 mm → 4
	Thermal Stability with Hydrostatic Pressure Test	No bursting during the test.	110 °C - 1,9 MPa	8760
	Impact Resistance	<%10	0 °C - 10 Parça	en ≤ 8,6 mm → 1
				8,6 mm < en ≤ 14,1 mm →2
				en > 14,1 mm → 4
MFI (Raw material)	≤ 0,5 gr / 10 dk	230 °C - 2,16 kg		
MFI (Pipe)	When compared with raw material, the measured difference should be max. 30%.	230 °C - 2,16 kg		

TECHNICAL SPECIFICATIONS / SERVICE LIFE

Temperature (°C)	Service Life (Year)	Operation Pressure (Bar)
20	1	30.0
	5	28.1
	10	27.3
	25	26.5
	50	25.7
30	1	25.5
	5	23.9
	10	23.2
	25	22.3
	50	21.8
40	1	21.5
	5	20.2
	10	19.6
	25	18.8
	50	18.3
50	1	18.3
	5	17.0
	10	16.5
	25	15.9
	50	15.4
60	1	15.4
	5	14.3
	10	13.8
	25	13.3

	50	12.7
65	1	14.6
	5	13.6
	10	13.1
	25	12.6
	50	11.1
70	1	13.0
	5	11.9
	10	11.7
	25	10.1
	30	8.8
	50	8.5

TECHNICAL SPECIFICATIONS / LOAD CAPACITY

Pipe Diameter(Ø)	Load Capacity (lt/m)
20	0,137
25	0,216
32	0,353
40	0,556
50	0,876
63	1,385
75	1,963
90	2,827
110	4,231

TECHNICAL INFORMATIONS / LINEAR EXPANSION

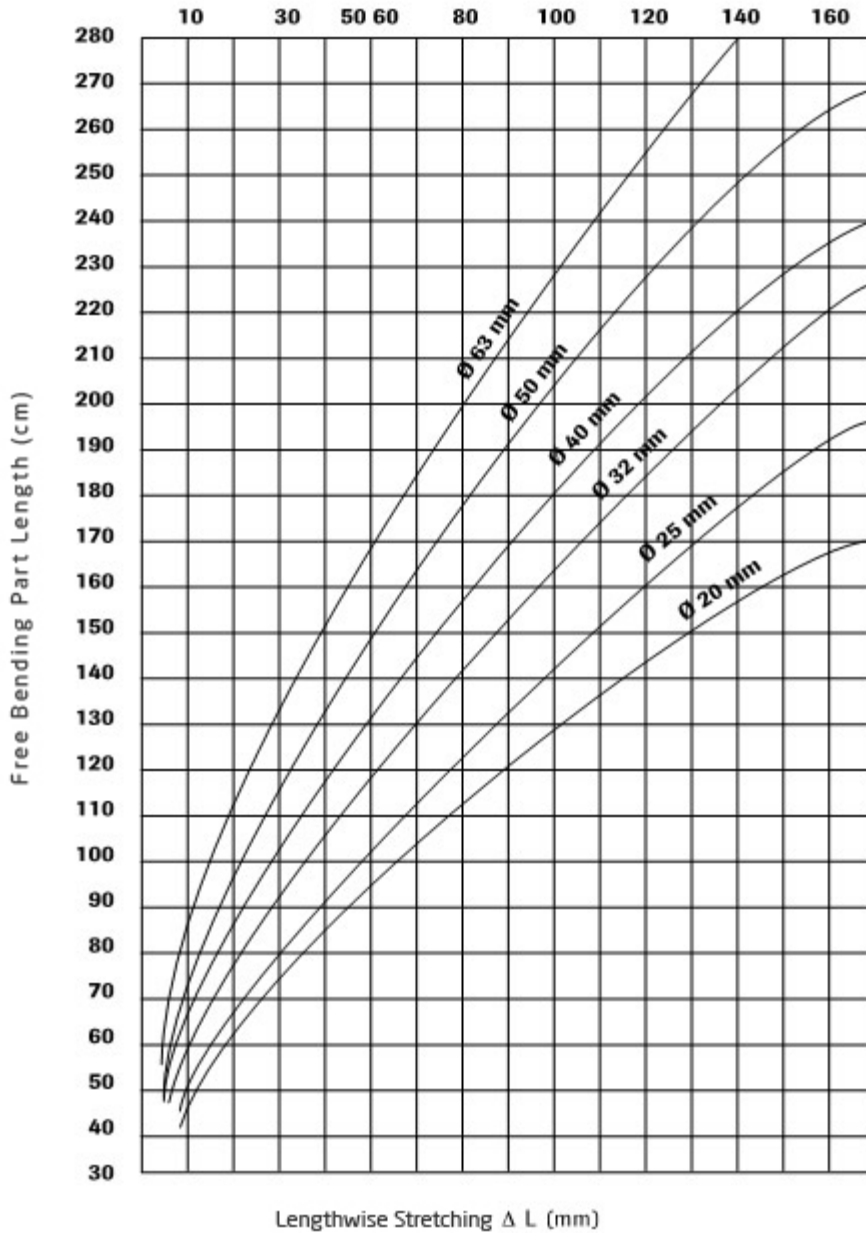
Produced from PP-R Type-3 raw material, Composite pipes stretches in hot and contracts in cold due to its physical structure. Piping systems longer than 5 m must comply with expansion rules.

LINEAR EXPANSION IS CALCULATED WITH BELOW FORMULAE:

$$\Delta l = L_0 \times a \times \Delta T$$

- Δl : Stretching Amount (mm)
- a : Linear Expansion Coefficient (a= 0,150 mm/m^{°K})
- L_0 : Initial Length of Pipe (m)
- ΔT : Temperature Difference (°C)

Pipe Length L(m)	Temperature Difference DT (°C)							
	10	20	30	40	50	60	70	80
1,0	1,50	3,00	4,50	6,00	7,50	9,00	10,50	12,00
2,0	3,00	6,00	9,00	12,00	15,00	18,00	21,00	24,00
3,0	4,50	9,00	13,50	18,00	22,50	27,00	31,50	36,00
4,0	6,00	12,00	18,00	24,00	30,00	36,00	42,00	48,00
5,0	7,50	15,00	22,50	30,00	37,50	45,00	52,50	60,00
6,0	9,00	18,00	27,00	36,00	45,00	54,00	63,00	72,00
7,0	10,50	21,00	31,50	42,00	52,50	63,00	73,50	84,00
8,0	12,00	24,00	36,00	48,00	60,00	72,00	84,00	96,00
9,0	13,50	27,00	40,50	54,00	67,50	81,00	94,50	108,00
10,0	15,00	30,00	45,00	60,00	75,00	90,00	105,00	120,00



TECHNICAL INFORMATIONS / CLAMP INTERSPACES

Fixed clamp interspaces are provided in the below table for PPRC pipes placed horizontally. Clamp interspaces in the vertical piping system must be same with the clamp interspaces in the horizontal piping system.

Fixed Points: Fixed points prevent the movements uncontrollable in the system and in addition separate all system into small expansion sections. The places of the fixed points are identified by taking into account stretching amount, weight, type of liquid inside of the pipe and other forces, if any.

Fixed points must be more robust than the pushing force of the free bending part. Fixed points must be placed in proper distances so as to enable expansion.

Fixed points are used to fasten pipes firmly on a place. Fixed points make use of the muff and fitting weld places in the terminals or double side fixing systems.

Temperature Difference AT (°C)	Pipe Diameter (mm)								
	20	25	32	40	50	63	75	90	110
0°C	85	105	125	140	165	190	205	220	250
20°C	60	75	90	100	120	140	150	160	180
30°C	60	75	90	100	120	140	150	160	180
40°C	60	70	80	90	110	130	140	150	170
50°C	60	70	80	90	110	130	140	150	170
60°C	55	65	75	85	100	115	125	140	160
70°C	50	60	75	80	95	105	115	125	140

ASSEMBLY

External Diameter	Welding Depth(mm)	Heating Duration (sec*)	Max. Idle Time (sec**)	Cooling Duration (min)
20	14	5	4	2
25	15	7	4	2
32	17	8	6	4
40	18	12	6	4
50	20	12	6	4
63	26	24	8	6
75	29	30	8	6
90	32	40	8	6
110	35	50	10	8
125	46	60	10	8

External Diameter	Welding Depth(mm)	Heating Duration (sec*)	Max. Idle Time (sec**)	Cooling Duration (min)
160	58	75	10	10

*If ambient temperature is below +5°C, heating duration must be increased at a rate of 50%.

**This duration is from removal of pipe and fittings from weld plates to jointing.

After finishing the assembly of the Composite piping system, quality control of the system must absolutely be made by following below test procedure.

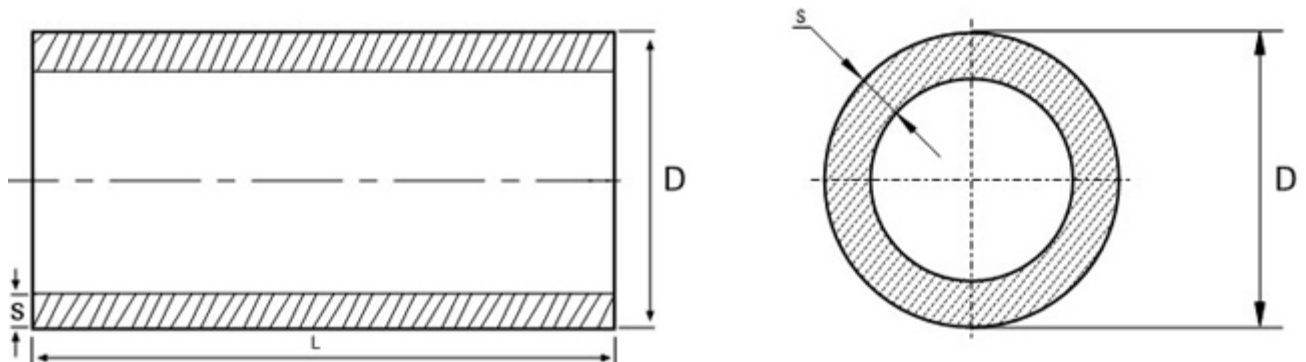
- All valves in the system must be turned off.
- While filling the system, first main valve is opened slightly. In order to avoid strong pressure impacts, pipe lines must be deflated from the utilization points at the highest and farthest sections.
- Separate tests are conducted by opening the valves of every zone.

1. Step: Entire piping system in the building is subjected to tightness test at 1,5 times of the highest pressure proposed for 30 minutes. Between 10th and 20th minutes, pressure drop and leakage is observed. Pressure is increased again. During 30 minutes, no pressure drop more than 0.6 bar and no leakage at any points should occur.

2. Step: 1.5 times more pressure is applied for 2 hours. Now, no pressure drop more than 0.2 bar and no leakage at any point of the system should occur.

- If pressure drops more than the values given above in the manometer where test is observed, then leakage occurs. Leaking pipe line must be controlled and replaced or re-tightened.
- Before using, entire system must be washed.
- Lines that will not be used must be closed off and drained to prevent freezing.

Pipes



Product Code	Nominal Diameter (dn)	s (mm)	L (m)	Weight(kg/m)
7700020020	20	3,4	4	0,198
7700020025	25	4,2	4	0,293
7700020032	32	5,4	4	0,453
7700020040	40	6,7	4	0,720
7700020050	50	8,4	4	1,105
7700020063	63	10,5	4	1,750
7700020075	75	12,5	4	2,780
7700020090	90	15	4	3,625
7700020110	110	18,4	4	5,350
7700020126	125	20,8	4	6,725
7700020127	160	26,6	4	11,033

Quality Documents

TS 9937 General Purpose PP-R Pipe Certificate
 TS 15874-2 Fırat PP Pipe Certificate
 TS 15874-3 PP Pipe Fitting Certificate
 TSEK K 28 63828 Fırat Composite Pipe Certificate
 TS 10762-2 Pex Pipe Certificate
 DVGW PPR Pipes
 TS 1254-3 Pex Metal Fitting Certificate
 TSEK 63895 Collector Certificate
 TS TS 579 Radiator Valve Certificate
 TSEK 14419 Ball Valve Certificate
 TSEK 14418 Mini Ball Valve Certificate
 General Hygiene Certificate

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