



STRONG PIPES

Translation from Romanian

Prelungirea Ghencea 65, Bragadiru, Ilfov

Tel.: 031 436 78 02; Fax: 031 436 78 01 – E-mail: office@te-ma.ro

Mounting stages for PPR-G installations

1. Mounting and connecting the welding device to the electricity mains

Before starting work on welding the pipes for the PPR-G installations, the following operations shall be carried out:

- The welding device shall be taken out of its box;
- One must ensure that the electrical installation can withstand the energy consumption, in accordance with the power of the welding device;
- The matrixes and thermal plate shall be cleaned with a dry cotton rag;
- The matrixes adequate for the size of the pipe shall be mounted on the device's thermal plate. In order to carry out a correct mounting, the matrixed must be well fitted;
- The welding device is connected to the electricity mains, usually a 230 V, 50 Hz main;
- The working temperature is tested by turning the thermostat to the value of the polyfusion temperature indicated by the fittings manufacturer (in most cases, it is 260°C);
- The device is ready to be used (within parameters) when the light indicator goes out.
- The polyfusion welding parameters, at ambient temperatures exceeding +5°C, are as presented in the table below:

Diameter	Heating time	Welding time	Cooling time
20 mm	5 sec	4 sec	4 min
25 mm	7 sec	4 sec	4 min
32 mm	8 sec	6 sec	4 min
40 mm	12 sec	6 sec	4 min
50 mm	18 sec	6 sec	4 min
63 mm	24 sec	8 sec	6 min



STRONG PIPES

Translation from Romanian

CAUTION!

- Usually, between the heating plate and the device body, there is an insulating material that, upon first heating, produces smoke and releases an unpleasant smell; it is recommended that, before its first use, the device be heated in a free space approximately 30 minutes before use, after which it should be allowed to cool.
- The aspects described above are valid for certain types of devices. It is recommended that the instructions of use be read carefully before first using the new equipment, and that said instructions be strictly observed.
- Cutting: the pipe shall be cut to the desired length; the cut must be done perpendicular to the pipe's axis. The resulted pipe's surface shall be deburred/cleaned.
- Marking: The maximum insertion length of the pipe into the fitting shall be marked on the pipe.
- Heating: the pipe and the fitting shall be inserted into the matrixes at the same time, without turning them.

CAUTION!!! Respect the welding times set in the table above.

- Connecting/welding/cooling: after the expiration of the heating time, the heated pipe and fitting shall be removed without turning the welding device off and shall be immediately inserted into each other without turning them and kept pressed throughout the entire duration of the welding. Afterwards, they shall be allowed to cool in accordance with the recommended time.

CAUTION!!!

Do not push the pipe into the connection too much, as there is a risk of reducing the pipe's diameter and blocking the pipe.

Installation pressure test

After having mounted the PPR-G pipe installation and before handing over the works, it is necessary to perform a pressure test so as to see if the mounting was done correctly and there are no losses in the system.

- Pressure test: 1.5 x operating pressure;
- Start of test – at least 1 hour after having vented the installation;
- Test duration – about 60 minutes;
- Maximum pressure drop – 0.02 MPa (0.2 bar).

STRONG PIPES

Translation from Romanian

The installation for which the pressure test is carried out must be mounted according to the project, must be visible, and clean. Enforcements may be mounted, but they must be capable of withstanding the test pressure to which they are subjected. Obturators are usually used when this pressure test is carried out.

When the pipe is filled (at least 2 hours after having performed the last welding procedure), the test is carried out from the lowest place as follows: all places through which the pipe can be vented are opened and then closed gradually as soon as water flows through them without air bubbles. The length of the tested pipe depends on the local conditions; however, the maximum recommended length is of 100 m. Usually, the pressure test is performed 24 hours after filling the pipe with water. We then raise the pressure inside the filled pipe up to the test value. The pressure test can be performed at least one hour after the venting and sealing of the system. The pressure test takes 60 minutes and a pressure drop of 0.02 MPa is allowed during this test. In the case in which there is a drop in pressure greater than 0.02 MPa, that means that there is a defect (water loss) and it requires fixing.

Thermal distillation of the system

Measures must be taken from the design phase in the case of PP-R pipes which are not mounted underground in a protective tubing (where dilatations take place in the tubing), and pipes with large diameters, so as to compensate for dilatations. The PPR pipes have a dilatation coefficient of:

- PP-R $\alpha = 0.15$ mm/m
- PP-R/FIBER $\alpha = 0.088$ mm/m

Upon the visible mounting of the installation, it needs to be secured so as to prevent the uncontrolled movement of the pipes. The linear dilatation is compensated by means of two fixed points. The system's fixed points are positioned near ramifications, taps, or places where the pipe passes through walls.

The variation of the pipe's length depending on the length of the pipe, and the temperature variation are calculated using the following formula:

$$\Delta L = \alpha \times \Delta T \times L \quad \Delta L = L - L_0$$

$$\Delta T = T - T_0$$

STRONG PIPES

Translation from Romanian

Of which:

ΔL = total variation of the pipe's length [mm]

ΔT = total temperature variation

α = linear dilatation coefficient [mm/m K]

T = working temperature

T₀ = installation temperature

L = pipe length at T₁ temperature [m]

L₀ = pipe length at T₀ temperature [m]

The gliding points must be well secured so as to ensure the installation's alignment, axial support and movement, preventing vibrations and distribution of noises.

The calculation of the length of the "L" dilatation compensator:

$L_b = c \times d \times \Delta L$ [mm]

Where:

L_b = length of the expansion arm [mm]

d = exterior diameter of the pipe [mm]

ΔL = total variation of the pipe length [mm]

C = dimensionless material constant (C = 30 for PP-R)

PF = securing point; PM = sliding point

The calculation of the "U" compensator

The U compensator is the ensemble of 2 L compensators, the length of which is calculated with the aforementioned formula, and the minimum width is calculated as follows:

$L_c = 2 \times \Delta L + m_s$,

L_c = minimum compensator width;

m_s = safety width = 150 mm.

Example:

d = 40 mm, PPR

L = 5 m

STRONG PIPES

Translation from Romanian

$T = 60^{\circ}\text{C}$ (working temperature) $\Delta T = T - T_o = 40^{\circ}\text{C}$; $L = 0.15 \times 5 \times 40 = 30 \text{ mm}$

$L_b = 30 \times 40 \times 30 = 1039 \text{ mm}$

$L_c = 2 \times 30 + 150 = 210 \text{ mm}$

The distance between the holders for the PPR pipe that was mounted horizontally [cm]

Diameter [mm]	ΔT [$^{\circ}\text{C}$]		
	20 $^{\circ}\text{C}$	50 $^{\circ}\text{C}$	80 $^{\circ}\text{C}$
	Distance between holders [cm]		
20	60	60	50
25	75	70	60
32	90	85	70
40	110	100	85
50	125	110	90
63	140	125	105

The distance between the holders for the **PPR/FIBER** [cm]

Diameter [mm]	ΔT [$^{\circ}\text{C}$]		
	20 $^{\circ}\text{C}$	50 $^{\circ}\text{C}$	80 $^{\circ}\text{C}$
20	75	70	60
25	85	80	70
32	100	95	80
40	120	110	95
50	135	120	100
63	150	135	125

For the pipe mounted vertically, the maximum distance between the holders is represented by the distances in the tables multiplied by a coefficient of 1.3.

Take care with regards to the derivations of installations in the column, these connections must compensate the dilatations as well, which can be done by means of the adequate placement of the vertical column against the place where the pipe passes through the wall.

STRONG PIPES

Translation from Romanian

Thermal insulation for PP-R pipes for cold and hot water

The thermal insulation for pipes is done in accordance with the DIN 1988 standard in order to avoid condensation on the installations for cold water and the heat losses in the case of installations for hot water and heating.

The thickness of the insulation shall be sized depending on the difference between the environment's temperature and the temperature of the water flowing through the pipe, the air humidity in the receding space of the pipe, and the resistance of the thermal insulation desired to be used.

The minimum thickness of the insulation layer, depending on the application, can be appreciated in accordance with the following tables.

Manner of mounting the PP-R pipes with a 20 mm diameter, <i>cold water</i>	Insulation layer thickness λ = 0.040 W/(m · K)
Pipe visibly mounted in an unheated room (for ex. - basement)	4 mm
Pipe visibly mounted in a heated room	9 mm
Pipe mounted in a canal without hot water	4 mm
Pipes in a canal alongside hot water pipes	13 mm
Pipes buried in concrete	4 mm

Item no.	Nominal diameter (Dn) of pipes/fittings (mm), <i>hot water</i>	Minimal insulation layer Thickness in relation to thermal conductivity 0.035W/m·K
1	DN 20	20 mm
2	DN 25, DN 32	30 mm
Item no.	Nominal diameter (Dn) of pipes/fittings (mm), hot water	Minimal insulation layer Thickness in relation to thermal conductivity 0.035W/m·K
3	DN 40 ÷ 100	Equal to the nominal diameter
4	Nominal diameter > 100	100mm



STRONG PIPES

Translation from Romanian

5	Pipes and fitting at items 1-4, buried in ceilings and walls, central distribution pipelines, pipes connected to radiators with maximum lengths of 8 m	At ½ of the requirements under items 1 - 4
---	--	--