

aquatherm Australia Pty Ltd

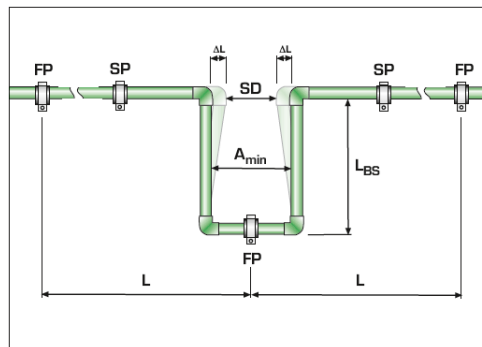
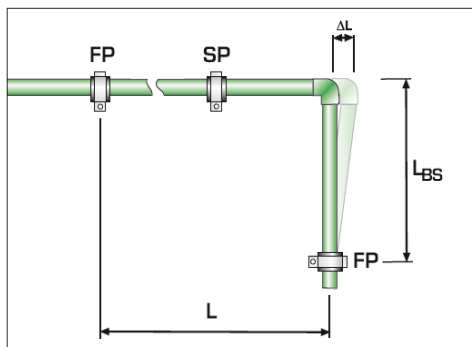
Edition: 1.02.2014

Installation advice / linear expansion / fixed point constructions in aquatherm green pipe SDR7,4 MF (former: Fusiotherm PP-R Faser SDR7,4 pipe) (hot water systems) (mixed) installations

Linear expansion / bending sides / expansion loops:

There has been some misunderstanding about the interpretation of the graphs under chapter “Installation Principles, Bending side / Expansion loop” on page 70 of **aquatherm green pipe** brochure (NZ10101 01.2014), page 62 of Aquatherm pipesystems brochure (AUS NZ 10101 Edition: 01/2011 and E 10101 Edition 07/08), page 62 of Aquatherm Installation Manual (E11130 Edition: 08/2010) and page 28 of Aquatherm Pipe Systems Training Manual (version 2 Edition 11/11).

Please refer this document to the above mentioned sector in all previous Aquatherm catalogues.



The FP (fixed point) before (left of) the bending side or expansion loop is not the 2nd pipe clip before the bending side or expansion loop. This FP is the fixed point from where we start to calculate the linear expansion over straight pipe length (“L”). This straight pipe length (L) shouldn’t be more than 40 meter. If L is more than 40 meter, we recommend an expansion loop in the middle of the pipe, instead of a bending side.

The interruption in the pipe, at the left of these graphs, means there is more pipe length between the “FP” and the adjacent “GL” (= ”SP”) (sliding point). All the clips between the “FP” and “SP” should be sliding points (SP). This way you direct the linear expansion towards the bending side and/or expansion loop.



Fixed point clip (FP)



Sliding point clip (SP)

The linear expansion (ΔL) is calculated according to the formula:

$$\Delta L = \alpha \times L \times \Delta T \quad (L = \text{total straight pipe length; max. 40 meter})$$

The bending side length (L_{BS}) is calculated according to the formula:

$$L_{BS} = K \times \sqrt{d \times \Delta L}$$

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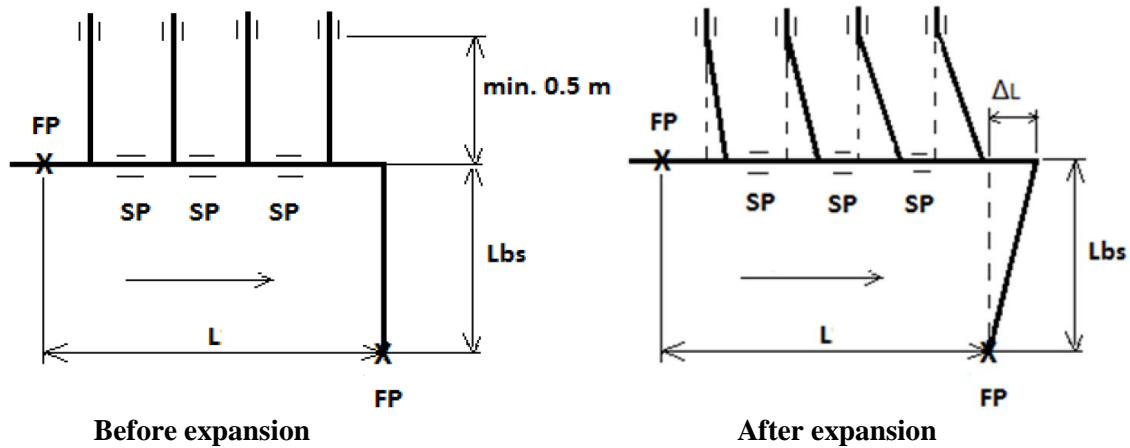
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Branch-off pipes:

If you allow the (horizontal) **aquatherm PP-R pipe** expand into an expansion loop or bending side, make sure the branch-off pipes are flexible and have the possibility to flex (bending sides). Metal (copper) branch-off pipes are not recommended and shouldn't be used as they are very rigid and have no flexibility. Plastic pipes, like spaghetti tubes (ie. Rehau PE-X), are recommended.

If the branch-off pipes (Ø20 or Ø25) are made of a flexible material, like PP-R or PE-X, install the first (fixed point) pipe clip min. 0.5 metre away from the (reducing) tee or weld-in saddle. For larger branch-off pipe sizes it will be more than 0.5 metre (to be calculated). This way you create flexibility in the plastic branch-off pipe.



If the branch-off pipes go through a masonry wall, they should be able to expand (SP) straight through the masonry wall, via an adequate large pipe liner (see below graphs no.1 & 2).

Fixed points in the masonry wall are unacceptable.

If the branch-off pipes are made of copper, please install an expansion loop in the copper pipes (see ** in the below graph no.2), to de-stress the copper pipes and therefore they won't cause any reaction force onto the **aquatherm PP-R** reducing tee or weld-in saddle.

It all comes down to de-stressing the **aquatherm PP-R pipe** system.

aquatherm proprietary pipe clips:

The only pipe clips Aquatherm Australia Pty Ltd would advise, in combination with **aquatherm PP-R** pipes, are the green rubber lined aquatherm pipe clips, with distance rings.

These pipe clips do not mechanically damage the surface of the pipe or causing external stress to the PP-R pipe due to the fact that they are especially dimensioned for PP-R pipe (OD) sizes. Other (metal) pipe clips can/will cause external stress, especially in combination with hot water PP-R pipes, since they are not dimensioned for the Outside Diameter (OD) of the PP-R pipes.



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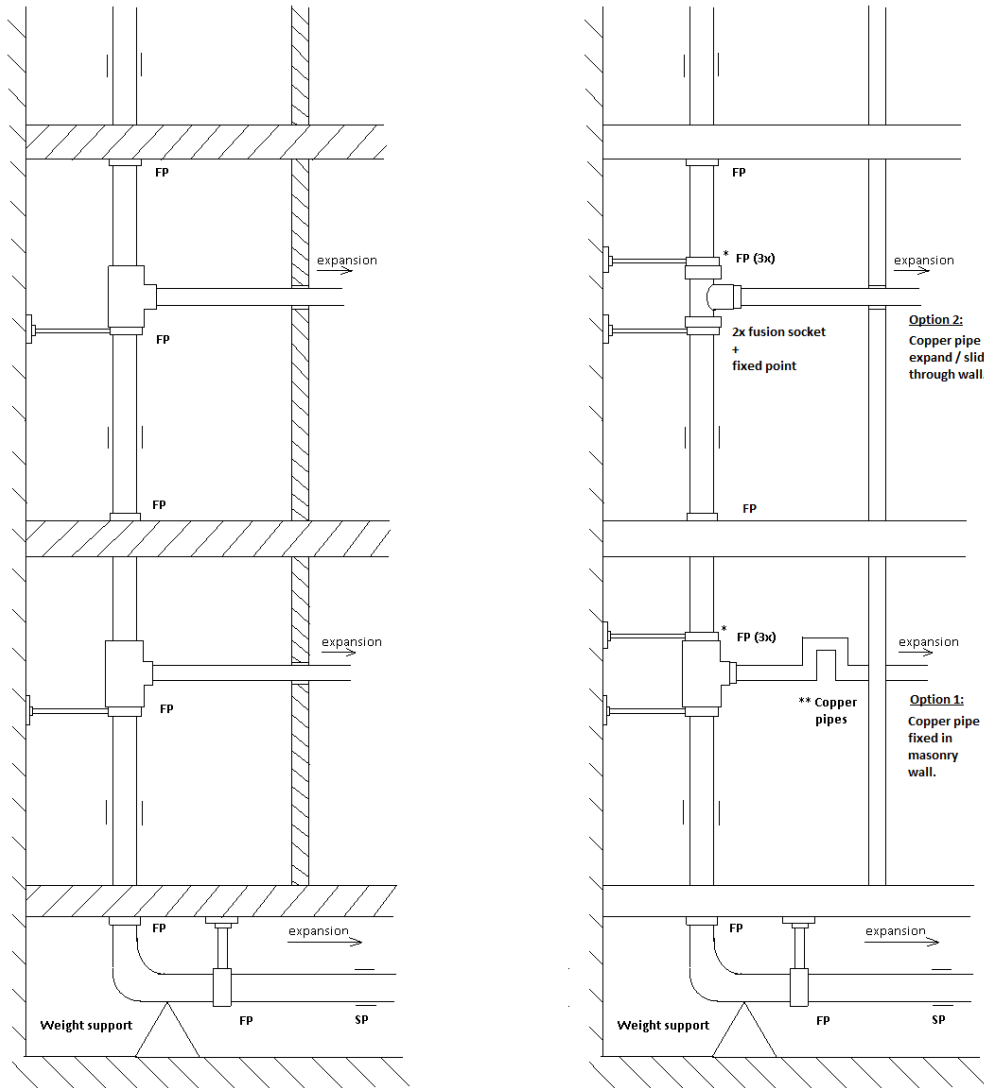
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Installation in ducts:

It is critical to install a fixed point under the (reducing) tee. If you are using weld-in saddles, please don't install the fixed point directly against the weld-in saddle but use the nearest adjacent **aquatherm PP-R** sockets. This way the whole (reducing) tee or weld-in saddle will be free from stress.

If the branch-off pipes are made of copper, because of the large expansion forces of copper (metal) pipes, please install a fixed point on all (3) sides of the (reducing) tees or weld-in saddles.

- 1) Branch-off pipes made of **aquatherm PP-R**: 2) Branch-off pipes made of metal (**Copper**):



FP = Fixed Point (the first one under the floor, the next one above the next floor, or vice versa)
SP = Sliding Point (take notice of the support intervals, mentioned in the aquatherm brochures).

In risers we have to take the linear expansion/contraction forces and the weight of the pipe + weight of the water in consideration. This weight + forces can run up to 100's of kilos!
 See the Excel sheet "Linear expansion forces".

To prevent the aquatherm pipes from moving/sliding vertically, we have to support the riser vertically by making a correct fixed point construction under the lowest elbow. A fixed point construction is more than just a fixed point pipe clip!