

Aquatherm Technical Bulletin

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Title: Elbow Tolerances

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Due to the physical limitations of mitered clamps and the butt fusion process, many segmented elbows are not true 90° fittings. Even if the cuts and the machine angles are set perfectly, a variation in the bead height, heating time, or planing distance can change the angle of the fitting. This variation is often slight, but it results in the fitting being slightly more or less than a perfect 90°. This is not a defect; it is a normal part of the assembly process.

To help minimize the deflection seen in the field, Aquatherm inspects all fittings that come through the North American Logistics Center to ensure that all fittings are accurate to within 2° of 90°. Any fittings that are outside this tolerance (<88, >92) may be returned to the manufacturer for an exchange.

As Aquatherm allows several companies to assemble fittings, it is best to return non-Aquatherm elbows to their source. The source of the fitting should be stamped on the side. Distributors should know where their fittings have come from, whether the Aquatherm Logistics Center or directly from a third-party assembler.

Before installing any segmented elbow, the installer should use a level and/or square to verify the angle of the fitting and decide if it will be suitable for his application. If no variation can be tolerated, the installer may use a four-clamp butt welding machine to correct the angle.

To correct an acute angle (<90°), the installer should place a shim in bottom of the middle jaw on the fitting side before tightening the clamps down. Adjust the thickness of the shim as needed. This will lean the fitting back, making the free side 90° to the pipe being fused. The side being fused will have a slight deflection in it, but the free side of the elbow can then be fused normally.

To correct an obtuse angle (>90°), the installer should place a shim in bottom of the outer jaw on the fitting side before tightening the clamps down. This will lean the fitting forward and make the free side 90° with the pipe being fused. Again, this creates some slight deflection on the side being fused, but allows the free side of the elbow to be fused normally.

Fabric, such as the glove shown in the figures below, works well for shimming.

Alternatively, if the installer has a two-clamp machine, or a four-clamp machine with a 3-1 configuration, the planer can be used to correct the angle. The installer can hold the fitting at the proper angle while tightening the single clamp and plane it down to match the pipe. This produces a similar result to the shim, but is less steady.

These process can also be used to correct 45° elbows.

Aquatherm will continue to use segmented elbows instead of the more accurate molded elbows for large sizes, as molded elbows are much more costly to the end user and cannot be produced in large enough quantities to meet global demand.



Shimming Front Clamp



Shimming Rear Clamp