Jointing methods

**Electrofusion**

Electrofusion, the most simple and rapid jointing technique, is mainly used on construction sites for a highly efficient method of assembly for pipes, fittings and prefabricated sections.

**Electrofusion couplers**

The PE range includes couplers in the diameters 40 to 315 mm. The couplers are extremely suitable for applications in waste water and rainwater drainage, with the following features:

1. Injection molded with excellent dimensional accuracy and stability.
2. One welding indicator on each welding surface for checking both welding connections.
3. Centre stops easy to remove in order to use the coupler as a slide-over coupler.
4. Resistance wires fixed to the surface for an optimal heat transfer and therefore a high quality welding connection.
5. Yellow edge surrounding the welding indicators of the diameters 200, 250 and 315 mm for better visibility.

**Electrofusion control box**

The Akafusion control box CB315 can not only weld Akatherm electrofusion couplers in the diameter range 40 to 160 mm but also the diameters 200, 250 and 315 mm. The new techniques applied in the electronics (such as integrated circuit boards) and the case material make it a solid and reliable control box.

**Multiple welding**

The CB315 is capable of welding several electrofusion couplers simultaneously in the same time that is needed for producing one electrofusion weld. The combined diameters of the couplers to be joined should not exceed 200 mm. For example in the case of a 45° 75/55 mm tee, both the diameters 75 mm and the branch 50 mm can be welded at once.

**Jointing procedure**

1. Cut the pipe square
   The pipe ends must be cut square to ensure that the heating element in the coupler is completely covered by the pipe or fitting.

2. Mark insertion depth + 10 mm
   This is to ensure that across the full welding zone the oxidized layer will be removed.

3. Scrape pipe and mark insertion depth again
   The outer surface of the pipe (approx. 0.2 mm deep) must be scraped for the full distance that will be covered by the coupler to remove any surface oxidation.
   The insertion depth should be marked again to safeguard full insertion.

4. Clean coupler
   Before assembling the pipes into the coupler ensure that all surfaces are clean and dry.

5. Insert pipe and/or fitting up to pipe stop
   Ensure that the pipe is pushed as straight as possible into the fitting.

6. Prevent joint movement during welding
   After connecting the cables of the control box the welding process can be commenced by pushing the start button. The CB315 control box adapts the welding time to the ambient temperature. When it is colder than 20°C the welding time is extended and when the ambient temperature exceeds 20°C the welding time is shortened. For welding times and cooling down time see table below. The joint assembly should not be disturbed during the fusion cycle and for the specified cooling time afterwards.

7. Prevent misalignment

8. Prevent coupler from sliding down when installed vertical pipesystem

9. Prevent load on vertical pipesystem

10. Don’t weld coupler twice

**Butt-welding**

Butt-welding is a very economical and reliable jointing technique for making welded joints, requiring only butt-welding equipment. All Akatherm pipes and fittings can be joined by this welding method. Fittings for which a k-dimension is shown in the table can be shortened by not more than this amount. Butt-welding is extremely suitable for prefabricating pipe sections and for making special fittings.

**Preparations**

The following guidelines are of importance when making a proper butt-weld:

- Establish a work space where the jointing can be done without being affected by major weather conditions.
- Check the equipment functions properly. Welding equipment used on site deserves special attention.
- The fittings and or pipes need to be aligned in the welding machine. Mis-alignment can be up to 15% of the wall thickness.
- Clean the heating element before each jointing operation with a lint-free cloth and suitable cleaner (see instructions welding machine).
- Cut the pipe and/or fitting with a pipe cutter to make the end square.
- Make sure that once the pipe and/or fitting ends have been machined, they do not get dirty. Do not touch them with your hands. The surface needs to be clean of oil, grease and dirt.
- Put the pipe parts into the welding machine to facilitate a firm hold during the jointing process.
- A digital thermometer can be used to check the temperature of the heating plate. The temperature should be checked at several points around the plate and should be between 200°C and 220°C. Maximum deviation between points is given in the table.

**Used surface of heating element for welding**

<table>
<thead>
<tr>
<th>diameter $d_1$</th>
<th>$\Delta t_{\text{max}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$d_1 = 40$-160</td>
<td>8°C</td>
</tr>
<tr>
<td>$d_1 = 200$-315</td>
<td>10°C</td>
</tr>
</tbody>
</table>

Akatherm temperature variation heating element

<table>
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<th>Used surface of heating element for welding diameter $d_1$</th>
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