

Electrofusion Jointing Guide



CPV Ltd
Woodington Road, East Wellow
Romsey, Hampshire, SO51 6DQ
Tel: 01794 322884
Web: www.cpv.co.uk/chemflo

 **CPV-CHEMFLO**
pp & pvdf process pipe systems

Electrofusion Jointing of Chemflo PP and PVDF

Electrofusion Jointing

In this method of fusion jointing, an electrofusion fitting which contains a coil of electrically conductive coated wire, is heated by having an electrical current passed through it. This heat melts the polypropylene plastic in a controlled manner, and allows it to be fused to a section of pipe which has previously been inserted into it.

Electrical current is provided by an electrofusion welding machine & typical example of which is shown and which can be hired from CPV Ltd.

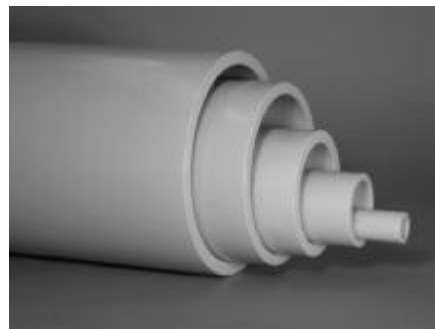
It is vitally important that the correct procedures are followed when making an electrofusion joint, and the following steps are mandatory for this process:

Step 1 - Cleanliness

Cleanliness and correct preparation are vital to a good installation. The welding surfaces of the peeled pipe and electrofusion fitting must be kept clean, dry and grease free. After cleaning never touch these surfaces with bare hands.

Step 2 – Pipe preparation

Prepare the pipe for cutting to the correct length and ensure that the end cuts are perpendicular to the centre line. Use a rotary pipe cutter rather than a hand saw as this ensures a perpendicular cut. Remove burrs, both inside and out.



Marking Pipe Ends

Use the following table to mark the pipe ends to the correct depth (mm). Do not use wax crayons for marking.

| Size | Depth | Size | Depth | Size | Depth | Size | Depth |
|------|-------|------|-------|------|-------|------|-------|
| 20 | 35 | 63 | 59 | 140 | 92 | 250 | 130 |
| 25 | 39 | 75 | 64 | 160 | 93 | 315 | 148 |
| 32 | 40 | 90 | 72 | 180 | 105 | | |
| 40 | 45 | 110 | 80 | 200 | 105 | | |
| 50 | 51 | 125 | 85 | 225 | 106 | | |

Peeling Tool

Scrape (using hand scraper) or peel (using a rotary peeling tool) the pipe ends to the marked insertion depth. ***It is vitally important that the pipe surface oxidised layer is removed otherwise good welding will not be achieved.*** Also enough pipe material must be removed to allow the pipe to fit into the electrofusion coupler without having to use excessive force.

Typical rotary peeling tool available for hire from **CPV Ltd**



Step 3 – Electrofusion Couplers

Remove the electrofusion fitting from its PE bag. Do not touch or contaminate the internal welding surfaces. The fusion and cooling times are printed on the electrofusion coupler label. Terminal pins are normally 4mm in diameter, and this is stated on the label. Older fittings may have 4.7mm pins, if so the label will not state the size.



Step 4 - Assembly of Pipes and Fittings

Insert both ends of the pipe into the electrofusion coupler to the correct marked depth. If necessary, use wipes to clean the welding surfaces. It should be just possible to rotate the pipe or fitting, indicating a good sliding fit.



Pipe Clamps: Attach the pipe clamps to prevent misalignment and linear movement during welding. Failure to clamp the joint correctly is one of the major reasons for joint failure

Step 5 – Welding Cycle

An adequate power supply is required, at least 3.5 kVA via a 110v transformer, and a proprietary electrofusion welding machine, capable of supplying the correct power and voltage (39.5v) such as that hired out by CPV Ltd.

Switch the machine on, and the screen will show a welcome message along with the software version and date. Subsequent instructions are detailed in the Manual Welding Instructions on Page 7.



Adjust fusion times as follows:

If ambient temperature is 30°C, deduct 5%
 If ambient temperature is 20°C, use fitting time
 If ambient temperature is 10°C, add 5%
 If ambient temperature is 0°C, add 10%
 If ambient temperature is -10°C, add 15%

UK electrofusion welding machine terminals are normally fitted with 4.7 mm female sockets. Adapters are supplied with CPV hire machines to allow these to fit the 4mm male pins on the electrofusion couplers.

Typical 4mm to 4.7mm adaptors
 4.7mm to 4.7mm upstands are also available in the event that other supplier welding machine connection sockets do not fit over the electrofusion fitting terminal.



Step 6 – Post Welding Cycle Operations

After the cool down time has been completed, remove the pipe clamps, ideally removing the cable terminals first. Take care when removing the cable terminals from the fitting connectors as the material in the joint may still be semi-molten and the connectors could be damaged if excessive force is used. Test pressure should not be applied until the joint has been allowed to cool naturally to ambient temperature. Artificial cooling using water or air is not recommended and will lead to a poor joint.

Step 7 – Cleanliness and Health & Safety

Cleanliness: It is evident that by definition pipelines may be laid in trenches which can become very muddy, and atmospheric conditions can also be very inclement. Nevertheless the secret of successful electrofusion welding is to keep the welding surfaces of the pipe and electrofusion couplers spotlessly clean. They must also be properly clamped and aligned to eliminate stress on the pre-welded joint. The appropriate use of tarpaulins and shelters must therefore be considered before starting the job, and used whenever conditions dictate.

Health and Safety:

See the Health and Safety COSHH guidelines for polypropylene (HS/P/ 003)

Key safety check points include:

- Take care when lifting pipe without assistance or mechanical aids.
- Do not touch the coupler during the welding cycle
- Wear appropriate protective clothing such as gloves, safety glasses and safety boots
- Molten polypropylene can burn when in contact with the skin. If this does occur, immediately flush the affected area and seek medical advice.
- **Do not attempt to pull the material from the skin.**

Note that molten material will not normally be encountered during normal, correctly set up welding cycles.

It is particularly likely to occur, however, if misalignment is induced, or undue stress is put on the pre-welded joints.