

9.2.3 Electrofusion

Description

The electrofusion coupling underlying the process is employed to connect pipe components in pressure pipe installations for gas and water supply networks, industrial facilities and pressurised drainage systems. The process is suitable for connecting pipe components of the series:

ISO-S pipe series number / SDR

- S 5 / SDR 11 (PE100)
- S 8 / SDR 17 (PE100)



Figure 9.10 Electrofusion coupling

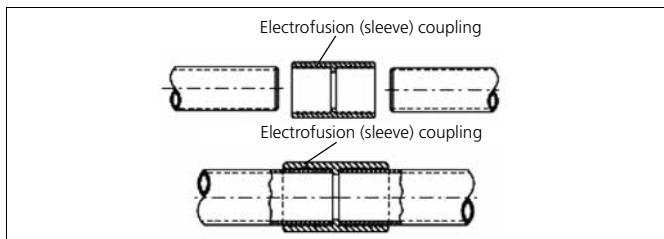


Figure 9.11 Electrofusion

Like butt welding, electrofusion is a widespread welding technique in PE pipe construction.

Applications have the following advantages:

- simple procedure throughout the entire welding process
- uncomplicated operation of the welding apparatus
- regular quality of the welded joint due to reproducible equipment settings
- longitudinally rigid joint
- no excess or weld bead inside pipe
- welding made possible for hard to access locations

Welding occurs in an overlapping form which means that the pipes and/or fittings are joined to each other through an electrofusion coupling. The resistance coil (heating coil) integrated into the electrofusion coupling are heated by an electrical welding unit, causing the surfaces of the pipes and the coupling (in immediate contact with the heating coil) to be plasticised. The thermal expansion of the plastic creates welding pressure so that the effects of these two parameters result in a homogeneous connection between coupling and pipe or fitting at the end of the welding time. The VM 102 guideline for welding practice applies to electrofusion on pressure pipe installations. The guideline also makes recommendations about quality assurance and describes possible testing methods.

Electrofusion process

The execution of the electrofusion process is described in the welding recommendation 'Electrofusion sleeve welding of thermoplastics'.

Preparation

- Inspect pipe and fitting for damage and proper sizing
- Check state and function of welding unit
- Take protective measures if weather conditions make it necessary
- Pipes, fittings and welding equipment are to be kept at a constant ambient temperature between -10°C and +45°C
- Do not weld when medium is being discharged

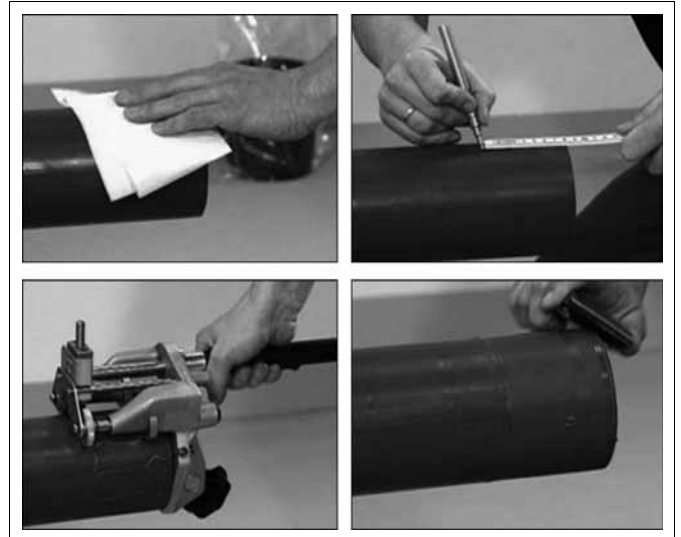


Figure 9.12 to 9.15

Pretreatment

1. Cut the pipe square
 - slanting cuts can result in inadequate melting, overheating or burning
2. Clean the pipe
3. Mark the welding zone
4. Remove oxidation layer
 - scrape off a long even continuous chip (min 0.15 mm thick)
 - an excessively thick chip will prevent the gap between coupling and pipe from being filled
 - scraping 5 mm extra in width is a sign of good workmanship
 - filing or sanding is not permitted
5. Debur the pipe
6. Make oval pipe round, be careful with pipes on cylinders and drums
 - use rounding clamps if ovality >1.5% diam. or >1.5 mm



Figure 9.16 to 9.18

Cleaning

1. Mark the welding zone again
2. Clean the welding surface of the pipe
 - welding surfaces must be absolutely clean
 - use PE cleaning agent and absorbent, non-fraying uncoloured paper
3. Clean inside of coupling
 - take fitting out of packaging just before use
 - prevent rubbing contaminants from untreated surfaces from entering the welding zone

Welding polyolefins

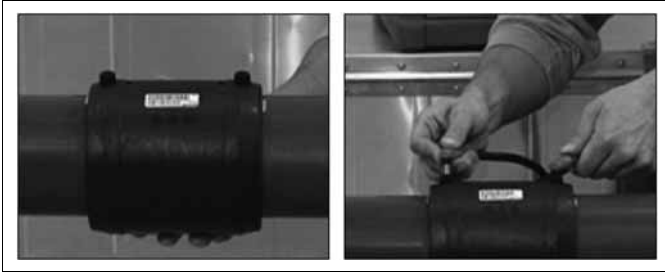


Figure 9.19 and 9.20

Positioning

1. Push the pipe into the fitting up to the mark
2. Connect contact plugs to fitting: pay attention to tension free assembly
 - shove pipe straight into coupling
 - do not rotate
 - coupling should be movable by hand
3. Guideline VM 102 prescribes: use clamps for tension-free assembly



Figure 9.21

Welding

1. Scan barcode with hand reader
2. Start welding process: electrofusion unit automatically regulates the amount of energy and welding time
 - safe distance to welding location is 1 m
3. Compare actual with required welding time
4. Note actual welding time on the pipe
 - welding indicator provides an impression of the completed weld, correctness is also indicated by the welding unit



Figure 9.22 to 9.25

Cooling

1. Adhere to the cooling time (CT) on the barcode before moving the connection
2. Cooling time prior to testing or operation pressure is indicated in the tables of the FRIALEN assembly manual



Figure 9.26