
Installation Instructions for our Smart Joint Electrofusion Couplings

Smart Joint EF couplers are produced from PE100 and can be fused with pressure pipes made of PE80, PE100, PE3608, and PE4710 resin. They cannot be fused with any other materials such as PP, PVC, etc.

Smart Joint EF Couplers can be fused at ambient temperatures of between -10°C (+15°F) and +45°C (+115°F).

Special care should be taken to provide a balanced temperature level of both pipes and fittings before the electrofusion operation.

Smart Joint EF Couplers can be fused with Smart Joints specially designed PH-3 electrofusion machine up to 32" and our I-Fuse 105 electrofusion machines up to 63". Smart Joint EF couplers can also be fused with most other major brand electrofusion machines as the process is the same with most major brand fittings and equipment.

***Note:** Most electrofusion machines will come with a universal fit, or both 4.0mm and 4.7mm pin sizes for connections to the electrofusion fittings.

**If you are unsure, please contact our Fusion Rental Department to rent one of our tested machines.*

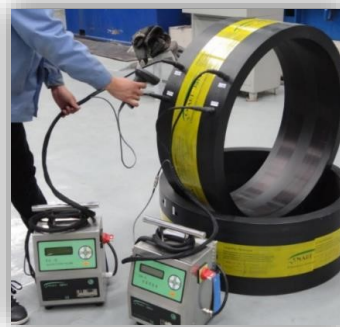
1. Introduction

In principle, the same installation methods are used for small diameter couplers, but, some steps are more work-intensive for the larger diameter couplers. Suitable equipment should be available when transporting and installing large diameter pipes in trench. Whole operation (preparation, installation, fusion etc.) has to be carried out by an experienced team and trained in the fusion process.

***Note:** For fusion training, please contact our HDPE team at ICONIX Waterworks to book a training class.

2. Tools and devices for assembling

- Pipe cutting device (suitable for PE pipe cutting)
- Peeling tool (suitable for large size pipes)
- Hand scraper
- Re-rounding tool
- Pipe alignment tool
- EF welding machine with 4.0mm pins and output of at least 39.5v.
- Suitable clean power (Commercial, minimum rated 7500 watt generator with a recommended 30amp breaker and auto idle disabled, or house power/wall socket.)
- Isopropyl alcohol
- Clean, absorbent lint-free rags
- Appropriate PPE



3. Cutting Pipe Ends

Cut the pipe ends at right angles to the pipe axis. Do not allow the use of any lubricant on the cutting tool as oil on the cutting tool will create a non-fusible barrier between the pipe and coupling which will lead to joint failure. For the pipe cutting, a suitable cutter for plastics must be used like a reciprocating saw (Sawzall) or a chainsaw with a non-lubricated chain. If the pipe is not cut at right angles to the pipe axis, this could mean that the heating coils in the EF Coupler are not in contact with pipe surface, which causes overheating and uncontrolled flow of molten HDPE material. If possible, it is recommended to saw with a right-angled guide

and if it is not possible to provide a cutting device with guide, the cutting lines should be marked on whole circumference of pipe to follow when cutting to achieve as straight as possible right-angle cut-off pipe.



4. Marking the Fusion Zone

Fusion zone is the half-length of the coupler for each end. Fusion zone must be measured and marked with a paint marker on the pipe end as shown in Figure 1.

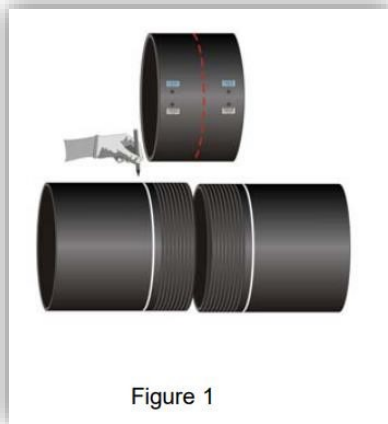


Figure 1

5. Scraping the Fusion Zone

In order to remove the oxide layer completely, the pipe/fitting ends must be scraped so that shavings are formed, large diameter shown in Figure 2 and 3, or a hand scraper can be used for small diameter. These also come with our Electrofusion Machine Rentals (Figure 4). This operation ensures removal of oxide layer, which may cause unsuitability for the joining. The oxide layer must be removed completely; otherwise it may cause cold welding which results in leakage. It must taken into account that the surface of pipe is completely smooth (i.e. without any groves, gouges, etc).

If there is any unscraped areas on pipe surface (especially due to ovality), these areas must also be scraped.

The prepared surface must be protected against dirt, grease and unfavorable weather conditions.

***Note:** *Never scrape the inside of the electrofusion fitting and inside of pipe is not required.*



Figure 2



Figure 3



Figure 4

6. Deburring/Rounding

Next, the internal end of pipe must be deburred, then round off outer edge as shown (Figure 5). Round off the internal and outer edges with a hand scraper (As per above Figure 4).

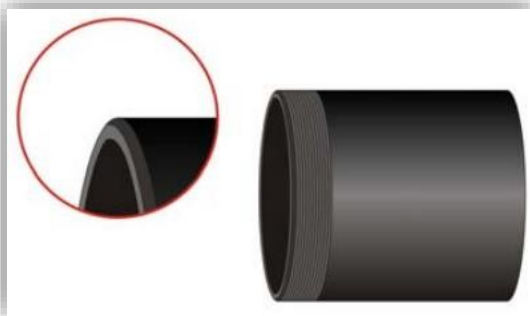


Figure 5

7. Use of Re-Round Clamps to correct Pipe Ovality

Possible ovality should be corrected using a suitable pipe re-rounding clamps (Figure 6). Check the fit of pipe into the coupler. If the pipe is considered too large, the peeling operation has to be repeated. Localized high spots can be removed with a hand scraper. But special care must be taken to ensure that the annular gap formed is as small as possible.

***Note:** Pipe Re-rounding tools and pipe scrapers can be purchased or rented through the ICONIX HDPE Equipment Rental Department.



Figure 6

8. Degrease the Fusion Zone and Remark

The prepared pipe ends and internal face of EF fitting must be degreased with the Isopropyl Alcohol and a white absorbent and non-fibrous/lint free cloth. The Isopropyl Alcohol must be completely evaporated before starting fusion operation. Remark the fusion zone with the paint pen if removed previously during the scraping step and all surfaces must be protected against dirt or unfavorable weather conditions. Operator should wear clean gloves to ensure the cleaned surfaces don't come in contact with bare hands, oils, grease, water, dirt, or any equipment/debris.



9. Insert the Pipe into the Coupler

Inserting of the pipe end into the coupler should be done without causing any tilting as shown in Figure 7. Tapping with a plastic hammer or mallet around the face of the coupler can assist with insertion. The pipe end must be inserted into the fitting up to the paint pen mark made in the previous steps. Pipe should not be inserted if the fit is too tight or too loose. In order to control bending stresses do not let the pipes support their own weight in the coupler. In order to provide unstressed assembly it is recommended to use a suitable holding device (Figure 8). This stress-free condition must be maintained during and until the cooling period.

***Note:** When inserting the EF Coupler, the contact terminals of the fitting must be easily accessible.

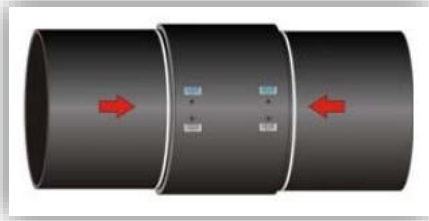


Figure 7



Figure 8

An assembly, which is stressed, can result in defective joint. Before starting fusion operation, check seating of pipe insertion by means of line marks. If necessary do corrections. The maximum allowable gap between the two pipes to be less than $> \frac{1}{2}$ ".

***Note:** Some large diameter couplers come or require ratchet straps for each end of the coupler to tighten down the coupler ends around the pipe to ensure proper contact of the coupler to the pipe during the electrofusion process. The ratchet straps are to be removed when the cooling process is complete.

10. Carrying Out the Fusion

Provided that the installation instructions are followed step by step, the fusion process can now be started. Fusion parameters are included in the barcode label on the fitting as shown in Figure 9a and 9b. The fusion parameters are transferred into the Electrofusion Processor by means of the handheld barcode reader. After reading the barcode, the data on barcode label should be compared with the data on display. Each side of bifilar couplers (coupler with two separate windings) has to be fused separately.

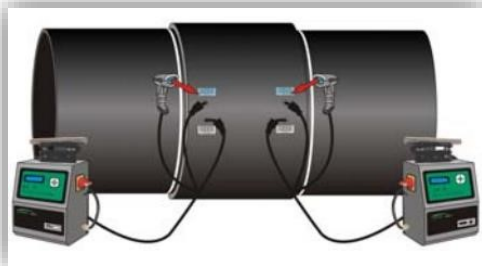


Figure 9a



Figure 9b

If the barcode scanner will not read/scan the barcode you can manually enter the code on the Electrofusion Machine and again, confirm the data on the display with the barcode label prior to starting.

***Note:** Large diameter Electrofusion Couplings may have 2 barcodes, one being a preheat process and the second, being the main fusion process and typically Yellow and White in colour.

11. Start the Fusion Process

Progress of fusion operation can be followed by the display on fusion unit to see if the process is working properly or not. As a safety precaution, be careful to stay at least 1 m (3 feet) away from the fusion area. If the fusion process is interrupted for any reason (e.g. due to power failure) the fusion process can be repeated after the joint has cooled adequately. Cooling time is indicated as CT on the barcode label. It is the time necessary to allow the joined part to cool down to a suitable temperature before you can touch or move it. If the fitting is moved prior to completion of the Cooling Time it could result in a bad weld resulting in leakage.

For any questions regarding electrofusion, butt fusion, or socket fusion of HDPE, please feel free to contact us at ICONIX Waterworks.

ICONIX is your complete source for anything HDPE related to help with your next project.

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