



Large Diameter Electrofusion Branch Saddle Installation Manual



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1. Introduction to Full Electrofusion Branch Saddles

Full electrofusion branch saddles provide an optimal solution for connecting large-diameter HDPE branch pipes to main pipelines. These fittings utilize electrofusion technology at both the interface of the branch end and the branch pipe, ensuring a secure and reliable connection.

Advantages of Full Electrofusion Branch Saddles:

A. Flexible Placement:

There is no need to pre-determine the branch location during main pipeline construction. The main pipeline design remains unrestricted, and the electrofusion saddle branch can be installed at any required location once the main line is in place. (Note: avoid placing the saddle over existing welded joints on the main pipe.)

B. Ease of Installation:

Branch connections can also be made using electrofusion, which simplifies installation and eliminates the need to switch welding equipment.

C. Cost Efficiency:

This method helps reduce overall costs related to both fittings and construction.

SP1 Fittings Inc. currently offers full electrofusion saddle fittings for branch pipe diameters up to 36 inches, and main pipe diameters up to 100 inches upon special order.

2. Installation Requirements

2.1 Trained Operators

Installation must be carried out by trained and certified personnel who are fully familiar with the procedures for installing large-diameter electrofusion fittings, and saddles, and who are proficient in the use of electrofusion machines. Failure to provide proof of installers credentials for large-diameter electrofusion, or machine capable of fusing the diameter installed, will void the limited warranty.

2.2 Environmental Conditions

- **2.2.1** Avoid installation when ambient temperatures are below -5°C.
 - **2.2.2** When ambient temperatures exceed 20°C, protective measures must be taken to shield the area where the saddle contacts the pipe from direct sunlight, which can elevate temperatures and potentially result in a failed fusion joint or fire.
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3. Installation Procedures for Full Electrofusion Saddles

3.1 Preparation and Equipment

Before welding, ensure that the electrofusion equipment complies with ISO 12176-2:2008 standards and includes a barcode reading function. Check the machine's output voltage and power to confirm they meet the specifications of the electrofusion saddle fittings and have a current and valid calibration. For best results, use the electrofusion welder recommended by the SP1 Fittings Inc. team.

1.1 Required Accessories

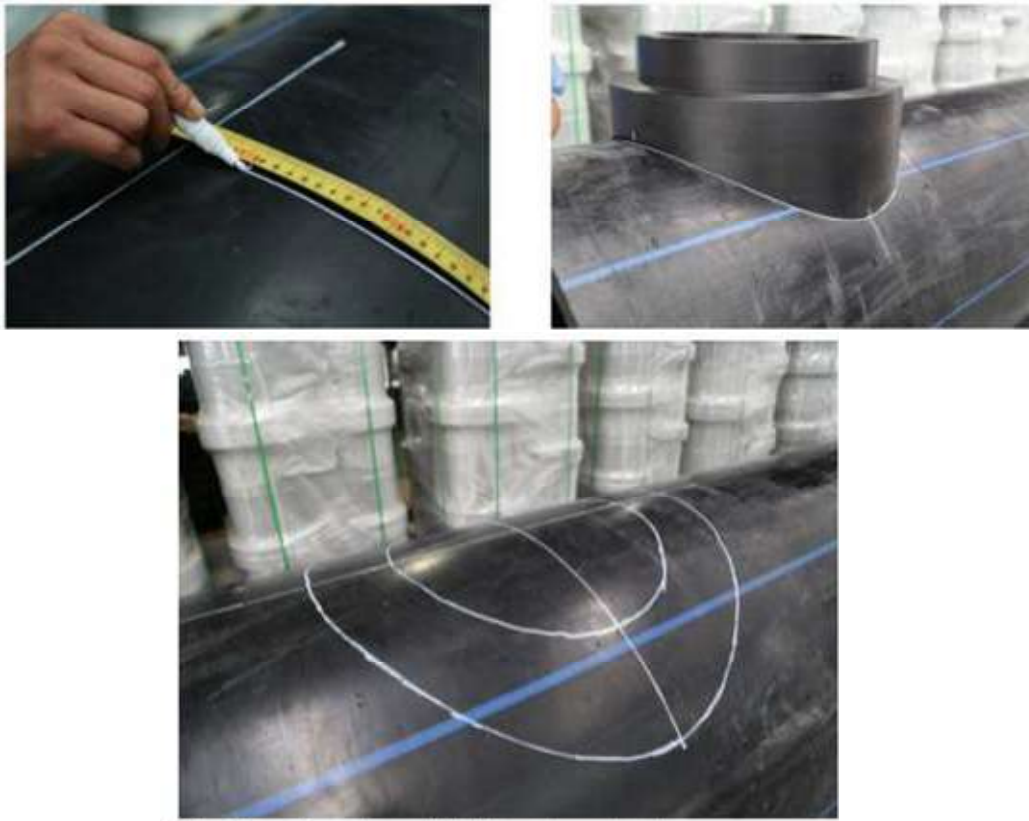
- 1) Holding Strap 2) Strap with at least 5t load
- 3) Chain blocks with at least 1~2t load 4) White marker pen
- 5) Scraper 6) Hole Cutting Tools
- 7) Lint Free Rags 8) Isopropyl Alcohol

Note: When conditions permit, a tension sensor can be used to detect the tension value, which can make the pressure on the welding mating area more consistent.



1.2 Full Electrofusion Saddle Installation Procedures

1.2.1 Mark the welding position of the full electric fusion branch saddle, and use a white pen to mark the intersection lines of the outside and inside of the fitting on the main line pipe.



Full Electrofusion Saddle has two Hole opening methods:

1.2.2 Manual Opening

In order not to affect the weld quality of full Electrofusion saddle and to facilitate the drilling operation of the main pipe, manual drilling should be performed before scraping the oxide layer on the welding surface side.

Preparation tools



Electric drill



Electric jig saw

Hole opening steps:

- (1) Drill holes with an electric drill along the internal circle mark and make the hole distances even.



- (2) After drilling the holes, use an electric jig saw to cut out the hole along the inside of your inner circle mark (the inner paint line should be kept).



- (3)** After drilling, use the drill, jigsaw, or a die grinder, to clean up the edge of the hole cut.



- 1.2.3** Re-mark the fusion weld area again with a white paint pen if required, across the surface area to be welded. This will assist in determining if enough material has been scraped off and not missed by the disappearance of the paint lines.

- 1.2.4** Scrape the fusion zone (the depth must be within 0.2 to 0.3mm), then clean the fusion zone with lint free rag and Isopropyl alcohol.

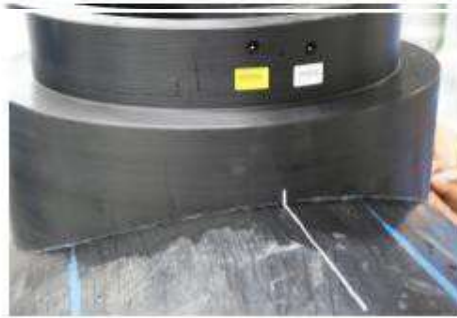


- * We suggest scrapping the fusion zone with Scraper and handheld electric planer to remove the oxidized surface. This is a very important step!

- 1.2.5** Use the dust/lint-free rags and Isopropyl alcohol, and wipe the welding face of the saddle fitting to remove all dust and impurities from the surface of both welding surfaces.



1.2.6 Mark the intersection lines of the inside and outside again on the scraped welding area.



1.2.7 Place the full electrofusion saddle on the main pipe within the marked lines, and install the binding straps according to the method shown in the figure below.



(1) Install the bonding strap on the branch end of the saddle fitting.

(2) Put the chain blocks on the bonding straps hoops.





3) Adjust the chain strap to the proper length, and chain the two hoops at both ends of the strap, then through the hoops at both ends

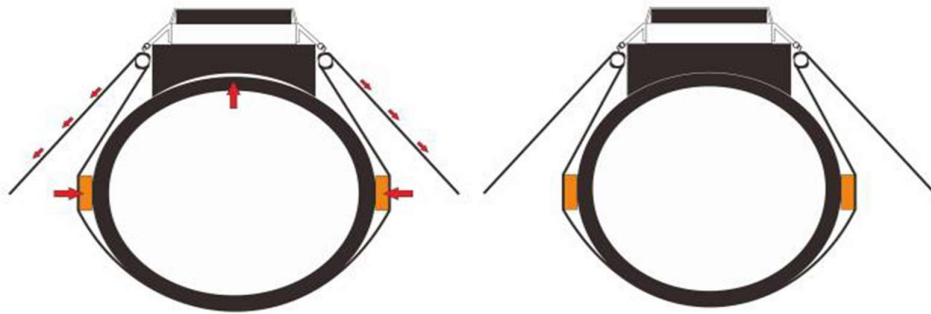
of the strap. It is linked with the two force gauge respectively. The pin plug at the other end of the force gauge is connected to the pin socket behind the indicator.

(4) Connect the hook of the chain blocks at both ends of the full electric fusion saddle to the force gauge ring with straps.



(5) Tighten the block chains until the gap between the saddle and pipe is less than 2.0mm. Observe the numbers on the force gauge and determine the minimum tension value.

Special attention: Due to the possible deformation of the main pipe, the arched surface of the saddle fitting might not completely meet with the arched surface of the main pipe. Take the following measures as per the detailed image on the next page, or use a re-rounding tool.



Put two wooden blocks between the chain and the main pipe on each side 180 degrees apart from each other. When you pull the chain blocks, the chains will push the wooden block inwards to adjust the ovality of the main pipe.

1.3 Welding

1.3.1 Lay out and turn on the Electrofusion machine, insert the cables into the bottom conductive pins of the electrofusion saddle fitting. (Pins for the base weld)



2. Preheat Weld. After scanning the barcode or manually inputting (**yellow labels welding barcode**), The preheat weld can be performed. Follow the welding and cooling times on your machine.



3. Main Weld. After scanning the barcode or manually inputting (**White labels main welding barcode**), welding parameters, the main weld can be performed following the welding and cooling times on your machine.



Note: When the main pipe is larger than 40 inches, the value displayed is not the specification parameter of the main pipe. This is because these specifications have exceeded the specification range limited by the existing barcode coding rules. The corresponding relationship between the value displayed by the electric fusion welding machine and the actual diameter of the main pipe is shown in the table below.

The welding machine display value and the main pipes actual diameter.

The main pipe actual diameter (Inches)	Diameter code point display value
40"	010
48"	012
54"	014
65"	016
72"	018
78"	020
90"	022
102"	025

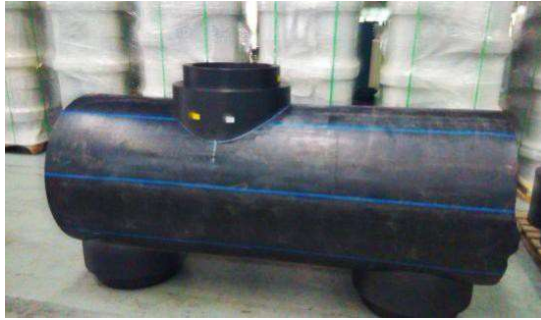
2.1 Cooling

Keep the binding straps tight until the cooling time is over.

Timetable for the release of binding status

Branch specification(dn)	Strap release time(h)
8 - 12"	2h
14 - 24"	3h
28" - 36"	4h

2.2 Strap Release



2.3 Branch ends welding

After the welding of the large end of the electrofusion saddle to the main pipe is completed, the branch pipe should be welded on the same horizontal axis during the welding process to avoid welding failure.

Note: For this you can use the standard electrofusion welding procedure of a coupler for example.

3. Installation Procedures for Full Electrofusion Saddles

3.1 Preparation and Equipment

Before starting any welding procedures, ensure that the electrofusion equipment:

- Complies with **ISO 12176-2:2008** standards
- Includes a **barcode reader**
- Has a valid **calibration certificate**
- Meets the **output voltage and power requirements** of the saddle fitting

For optimal results, use the electrofusion welder recommended by **SP1 Fittings Inc.**

3.1.1 Required Accessories

- Holding strap
- Load strap (minimum 5-ton capacity)
- Chain blocks (minimum 1–2-ton capacity)
- White marker pen
- Scraper
- Hole cutting tools
- Lint-free rags
- Isopropyl alcohol

Tip: When available, use a **tension sensor** to monitor applied pressure and ensure consistent welding surface contact.

3.2 Full Electrofusion Saddle Installation

3.2.1 Marking the Welding Area

- Identify the welding location on the main pipe.
 - Use a white marker to draw the **intersection lines** (inside and outside edges of the saddle footprint).
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3.2.2 Hole Preparation Methods

There are two approved hole-cutting methods:

A. Manual Opening (Recommended)

Manual hole cutting should be done **before** scraping the oxidation layer to avoid compromising the weld quality.

Required Tools

- Electric drill
- Electric jigsaw or die grinder

Steps:

1. Drill evenly spaced pilot holes along the **inner circle mark**.
 2. Cut out the hole with a jigsaw, following the inside of the inner paint line.
 3. Clean the cut edges with a drill, jigsaw, or die grinder.
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3.2.3 Surface Preparation

1. If needed, **re-mark** the welding area with white paint to guide scraping.
 2. **Scrape** the fusion zone to a depth of **0.2 – 0.3 mm** using a scraper or handheld electric planer.
 3. **Clean** the fusion zone with a lint-free rag and **Isopropyl alcohol**.
 Proper scraping and cleaning are critical to ensuring weld integrity.
 4. Clean the **welding face of the saddle fitting** as well, ensuring both surfaces are free of dust and contaminants.
 5. Re-mark intersection lines after scraping if needed.
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3.2.4 Saddle Positioning and Binding

1. Position the saddle on the main pipe within the marked boundaries.
2. Install the **binding strap** on the saddle's branch end.
3. Attach **chain blocks** to the binding strap hoops.
4. Adjust chain length and attach both ends to **force gauges**, connected to the indicator.
5. Hook the chain block ends to the **force gauge rings** using straps.
6. Tighten the chains until the gap between saddle and pipe is **less than 2.0 mm**.

Note: If the saddle doesn't fully contact the pipe surface due to pipe deformation, use **re-rounding tools** or insert **wooden blocks** between the chains and pipe (180° apart) to correct ovality.

3.3 Welding Procedure

3.3.1 Base (Preheat) Weld

1. Turn on the electrofusion machine.
2. Connect cables to the **bottom conductive pins** of the saddle (for base weld).
3. Scan the **yellow barcode** or input parameters manually.
4. Perform the **preheat weld** as per the welder's instructions and observe the cooling time.

3.3.2 Main Weld

1. Scan the **white barcode** or enter the main weld parameters manually.
2. Perform the main weld and follow the prescribed **cooling cycle**.

Note: For pipes larger than 40", the barcode may not reflect actual diameter. Refer to the conversion chart below.

Main Pipe Diameter (inches)	Machine Display Code
40"	010
48"	012
54"	014
65"	016
72"	018
78"	020
90"	022
102"	025

3.4 Cooling and Final Procedures

3.4.1 Cooling Time

Keep binding straps tightened throughout the cooling phase.

Branch Size (dn)	Strap Release Time
8" – 12"	2 hours
14" – 24"	3 hours

Branch Size (dn)**Strap Release Time**

28" – 36"

4 hours

3.4.2 Releasing Straps

After the designated cooling time, you may safely release the binding straps.

3.4.3 Branch Pipe Welding

Once the saddle is securely welded:

- Weld the **branch pipe** to the saddle outlet.
- Ensure that the branch pipe is aligned **horizontally** with the saddle axis during welding.

Follow the **standard electrofusion welding procedure** for couplers when joining the branch pipe.

And you are done!

- **Note/Disclaimer:** Only to be installed by a fusion technician who has been trained and certified in large diameter electrofusion. SP1 Fittings Inc's. 1 year manufacturer's warranty will be completely void if proof of weld/certificate, and weld logs, cannot be provided. In the event of a failure, SP1 Fittings Inc. will require the fitting returned for inspection along with all weld documentation listed above, to determine cause. Please also refer to SP1 Fittings Inc. "Warranty and Returns" page, also posted on our website at <https://sp1fittings.com>