



LDC Electrofusion Installation

1 Standards and regulations

Large diameter couplers can be processed with PE 100/PE 4710 and PE 80/3408 pipes according to ASTM D3261, ASTM D2513. National regulations have to be considered separately. A welding is suitable for pipes with a melt flow index (MFR 190/5) between 0.2 g/10' and 1.7 g/10'.

2 Processing information

The processing temperature between 0 °C and +35 °C are approved. The welding area has to be protected from the weather (rain, direct solar radiation, etc). The welding zones of the e-coupler and the pipe have to be dry during the entire welding process - concerning the inside as well as the outside. Welding while media leaks from the pipe is not allowed. Pipes and fittings have to be on the same temperature level during the processing (conditioning)!

3.Cutting the pipe

The pipe has to be cut rectangular with a suitable cutting tool and the insertion length has to be marked.

$$\text{Insertion length} = \text{coupler length} \times 0.5$$

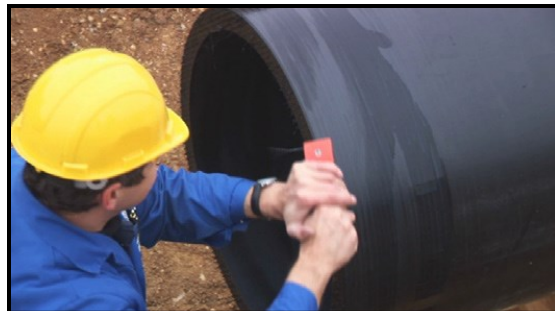
The pipe ends, which have a distinctive conical shape, need to be shortened.

4.Pre-cleaning

The pipe has to be cleaned from rough dirt in the insertion area by means of a dry cloth.

5.Removing the oxide layer

Shortly before the mounting the diameter has to be checked. Then the oxide layer has to be removed completely up to the marking by a suitable rotation scraper. The pipe has to fulfil the following requirements after scrapping:



Minimum diameter = nominal diameter - 0.4 mm

A single removal of minimum 0.2 mm, depending on the fit, may already be enough. Damages within the welding zone such as grooves or scratches are not permissible. Due to the big tolerance range of pipes it may be necessary to repeat the scrapping of the round pipe. In order to avoid multiple try-ons we recommend measuring the pipe's diameter prior to the scrapping. Local maxima, which are detected at the checking of the annular gap, can be removed with a hand scraper. During preparations it has to be taken care of to have a preferably small annular gap.

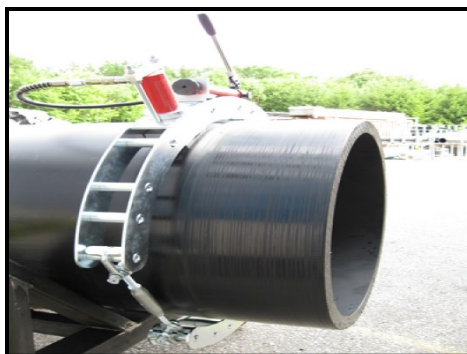
If a fitting is used instead of a pipe for welding the fitting has to be cleaned and scrapped just like a pipe. The cleaning and scrapping process is exactly the same. The prepared area has to be protected from impurities and unfavorable weather conditions (humidity effects or frost formation).

6. Chamfering raw edges

In order to ease the coupler's mounting a chamfering of the pipe's outside edge on the abutting face (5 mm × 45°) is of help. The pipe's inside edge must not be chamfered. Chips have to be removed from the pipe.

7. Levelling out ovalities

Usually pipes become oval during storage. When ovalities within the welding area (max. 3 mm) occur a re-rounding tool has to be used. Suitable are hydraulic or mechanical rounding clamps, which are mounted at the end of the coupler's insertion length.



8. Unpacking the e-coupler

The packaging of the electrofusion fitting should be removed shortly before the welding. The coupler's inside surface and the scrapped pipe ends must not be touched with bare fingers.

9. Cleaning

Prior to the mounting the welding areas of the pipe and of the e-coupler have to be cleaned with a suitable PE cleaning agent (e.g. AHK PE cleaning agent with 99.9 % Isopropyl Alcohol) and solely with an absorbent, lint-free and undyed disposable paper. Cleaning clothes are not suitable. It has to be taken care that the areas, which are to be welded, are free from any cleaning agent deposits and that the coupler stays clean and dry until the mounting. Touching the welding zone with the hands has to be avoided. If the welding zone has been touched, the cleaning has to be repeated. The insertion depth has to be marked all around the pipe's circumference for the follow-up control.

10. Mounting the e-coupler

When mounting take care of the coupler's contact plugs and that the pre-heating code as well as the welding code are easily accessible. The mounting can be supported by evenly distributed blows with a soft hammer until the marked insertion length (around the pipe's circumference) is reached. Do not wedge them when joining. In order to avoid numerous try-ons of the couple do measure the diameter in the joining zone by means of a measuring tape. Pipe and coupler have to be aligned stress free and axial. This can be achieved by a clamping system / support bar or by laying something underneath the pipeline and coupler. Pipes must not be plugged into the coupler when there is a dead load or tensile stress. This is true till the end of the cooling phase. The second pipe that needs to be welded with the coupler has to be prepared and mounted as described above.

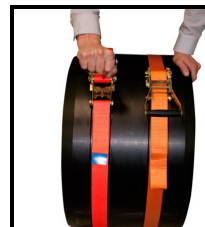


11. Mounting the tension belts

Afterwards both of the 50 mm wide tension belts have to be mounted. They have to be ordered separately (Code: SAGSPANNG01) and can be reused after the end of the cooling phase. The usage of additional tools is not allowed.

11.1 Putting on the tension belts

Both tension belts have to be put into the groove and tightened as follows. Open the ratchet lever, insert the loose end into the ratchet brace and draw it through. Tighten the belt. Tighten the belt by hand with the ratchet lever until the belt is so tight that it can not be moved by hand. Bring the ratchet lever into the closure position. After the cooling time is over pull the function slider of the ratchet lever and move it 180° into the end position in order to open the tension belt.



12. Power supply

Both contact plugs of the coupler have to be connected to the connection sockets of the welding device. It has to be taken care of a sufficient performance of the welding device and if need be of the generator.

Suitable welding machines:

- Polycontrol plus
- HST 300 pricon+
- HST 300 print+

13. Pre-heating to reduce the fusion gap

The inputting of the pre-heating parameters is done by reading in the white pre-heating bar code with a bar code pen or scanner. The pre-heating is a means to reduce the annular gap between the coupler and the pipe to a maximum clearance of <2 mm. This gap can be measure with the provided feeler gauge. Execute the pre-heating of the first coupler half with the white bar code. Execute the pre-heating of the second coupler half again with the white bar code. Check the annular gap of the first coupler half after the pre-heating - within the stated cooling time (see Table 2). If the gap is okay, start the welding of the first coupler half within the time frame of the pre-cooling. If the gap is too big, repeat the pre-heating. Check the annular gap of the second coupler half after the pre-heating - within the stated cooling time (see Table 2). If the gap is okay, start the welding of the second coupler half within the time frame of the pre-cooling. If the gap is too big, repeat the pre-heating. The open pipe ends have to be closed in order to prevent the stack-effect.

14. Executing the welding

Input the welding parameters by using a bar code pen or a scanner for the white code of the two-colored main bar code. The yellow highlighted code contains the product traceability data. The correct procedure of the welding is described in the manual of the respective welding machine. After the welding process the specified cooling time has to be met (see Table 2). If an interruption of the welding occurred (e.g. power failure) a repetition of the welding is permissible after a total cooling down (<35 °C). At which the pre-heating and checking of the annular gap have to be done again before starting the welding. After the end of the cooling down (see Table 2) the belts can be removed from the coupler.

15. Inspection & technical documentation

The actual welding time has to be compared with the target time on the machine. This, the date and the welder's name have to be written onto the coupler. A correct execution of the welding can be documented by either a hand-written log or the automated recording of the device.

16. Weldability

Dimension (inches)	SDR				
	41	33	26	17	11
24"					X
26"					X
28"					X
30"	X				
36"	X				
42"	X				
48"	X				
63"	X				

Table 1: Weldability

17. Welding Parameters

Dimension Inches	Tension Belts	Pre-Heating							
		Pre-Heating Times—Ambient Temperature(s)						Voltage (V)	Pre-Cooling (min)
		10 °C	15 °C	20 °C	25 °C	30 °C	35 °C		
24"									
26"									
28"									
30"	YES	979	970	960	950	941	931	25	15< t <60
36"	YES	2264	2242	2220	2198	2176	2153	25	15< t <60
42"	YES	2448	2424	2400	2376	2352	2328	25	15< t <60
48"	YES	3611	3575	3540	3505	3469	3434	30	15< t <60
63"									

Dimension Inches	Tension Belts	Welding							
		Welding Times—Ambient Temperature(s)						Voltage (V)	Cooling (min)
		10 °C	15 °C	20 °C	25 °C	30 °C	35 °C		
24"									
26"									
28"									
30"	YES	1530	1515	1500	1485	1470	1455	42	>90
36"	YES	2264	2242	2220	2198	2176	2153	42	>90
42"	YES	2448	2424	2400	2376	2352	2328	42	>90
48"	YES	3611	3575	3540	3505	3469	3434	46	>90
63"									

Table 2: Welding Parameters

18. Safety instructions

Non-compliance of this installation guideline as well as the following safety instructions may lead to serious accidents, damages to health and objects.

- Local standards and regulations concerning occupational health and safety have to be followed. If available the security and safety plan on the construction site must be adhered to.
- During the entire installation procedure appropriate safety shoes have to be worn.
- While working in a trench and/or the possible danger of falling objects (e.g. rockfall) an appropriate safety helmet has to be used.
- When working with knives as well as burring and scraping tools it is recommended to wear cut resistant gloves.
- PE cleaners are highly flammable. Fumes from cleaning agents can form potentially explosive mixtures. Keep away from ignition sources. Do not smoke. Avoid naked flames and sparking. Keep the container of the PE cleaner tightly closed.
- If pipes are not cut rectangular and/or not completely inserted into the e-fitting the heat generated by the resistance wire can not be passed on to the pipe. This may result in overheating, uncontrolled melt formation or self-ignition.
- In general it is recommended to keep a safety distance of at least 2 meters to the e-fitting during the welding process. If this is impossible appropriate personal protective equipment is necessary (long-sleeved clothes, gloves and sealed protective glasses).