



SoluForce®



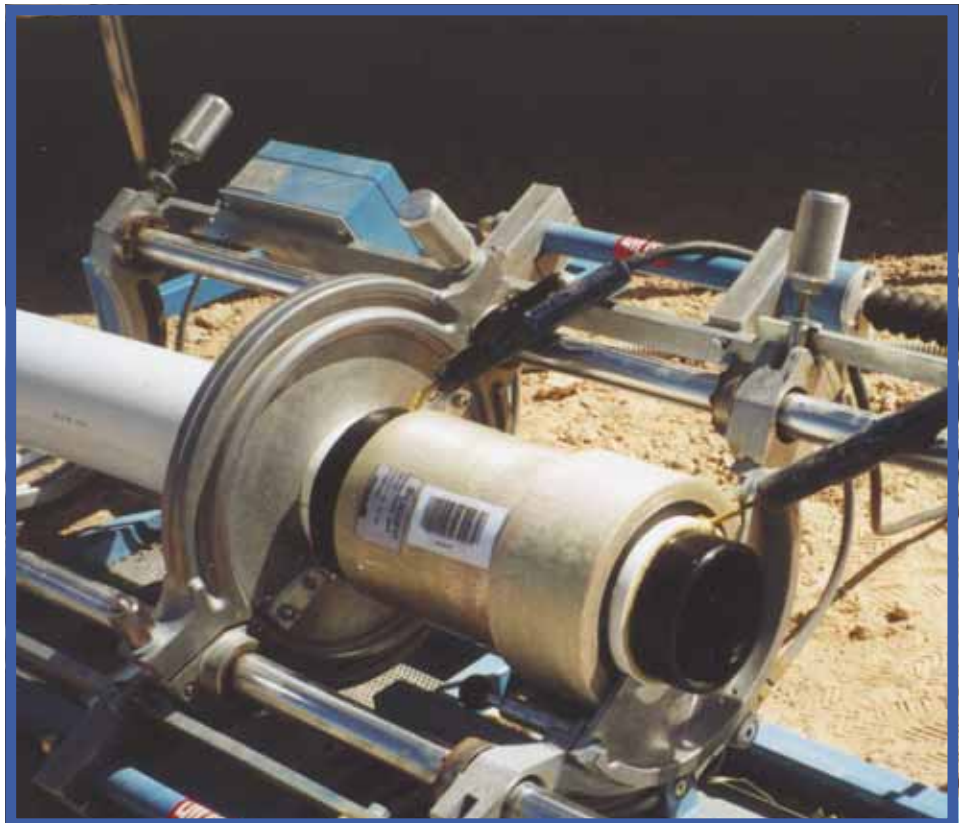
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Connection system

PIPELIFE 

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I N T R O D U C T I O N

1.1) Introduction

To connect Soluforce® pipes and hook-up the Soluforce® pipeline to existing pipe work, PipeLife manufactures two special patented couplers: end-fitting and In-liner coupler. Both couplers are based on the electrofusion principle.

Pipelife provides just one type of coupler and end-fitting for each nominal pipe diameter. The couplers are stronger than the highest available pipe rating, and therefore do not need any special engineering attention.



Photo 1: Soluforce® in-line coupler

1.2) Soluforce pipe to pipe connection concept

To connect two Soluforce® pipes the Soluforce in-line coupler is used. The in-line connection technique is a 2 step process consisting of: a) butt-weld of the liner pipe for a 100% leak free connection; b) electrofusion of the centrally placed in-line coupler for strengthening the connection.

After welding the pipe-ends form a fully integrated plastic connection.

The Soluforce® electrofusion in-line coupler basically consists of a GRE-reinforced plastic sleeve, with an integrated copper heating-coil (photo 1). Photo 2 shows the pipe to pipe connection after welding.



Photo 2: Soluforce® pipe to pipe connection

PIPE CONNECTION

1.3) Soluforce® pipe to pipe connection in 8 steps

The complete process is computer controlled with no possible human error.



Photo 3: Reading the barcode with the "light pen"



Photo 4: Scraping the pipe cover layer



Photo 5: Pipe-ends loaded in fusion frame



Photo 6: Trimming the pipe-ends

1 Reading the coupler data

Running the "light pen" over the barcode of the in-line coupler will identify the coupling and initiate the welding procedure (photo 3). After the in-line coupler condition is tested by the CNC-unit the preparations can start.

2 Scraping the pipe surface

The pipe-end cover layers are scraped to get a fresh PE-surface to weld the in-line coupler electrofusion sleeve (photo 4)

3 Loading pipe into the welding frame

The in-line electrofusion sleeve is cleaned and slid over one pipe-end. The pipe-end with the in-line coupler and the second pipe-end are loaded into the welding frame (photo 5).

4 Trimming the pipe ends

By means of one of the trimming tools both pipe-end faces are trimmed resulting in a small length of free liner pipe necessary for butt-welding (photo 6).

PIPE CONNECTION

Time Required: 45 min. approximately

5 Butt-welding the liners

After removing the burrs a heating-plate is inserted for around 60 seconds to heat both pipe-ends (photo 7).



Photo 7: Heating the liner-pipe ends by means of the heating-plate

6 Butt-weld cooling

The heating-plate is automatically removed and the pipe-ends pressed together (photo 8). The butt-weld procedure is **fully controlled** by the CNC-unit.



Photo 8: butt-welding of the pipe-ends.

7 Welding of the electrofusion sleeve

After a cooling time of approx. 8 minutes the in-line coupler electrofusion sleeve is slid back centrally on the butt-weld and fused to the pipe connection by energizing the copper heating-coil for about 4 minutes (photo 9). When the electrofusion is finished the coupler must be cooled for about 30 minutes.



Photo 9: In-line coupler electrofusion sleeve centrally placed over the pipe-ends and connected

8 Cooling of the connection

After expiry of the cooling time, the welding parameters are checked by the CNC-unit.

If the welding parameters are within the specifications, the connection is approved ("Parameters OK" is displayed).

Now the pipe to pipe connection can be removed from the welding frame and the pipe put in place.



Photo 10: After cooling the in-line connection is ready

END - FITTING

1.4) Soluforce® end-fitting concept (flange)



Photo 11: Soluforce® flanged end-fitting

In order to hook-up the Soluforce® pipeline to existing pipe work the Soluforce® end-fitting is used. The end-fitting is a combination of an electrofusion end-fitting sleeve and several steel parts (photo 11). The Soluforce® electrofusion end-fitting sleeve basically consists of a GRE-reinforced plastic sleeve, with an integrated copper heating-coil (figure 10). To make the connection the plastic sleeve is electrofused on the pipe-end. After electrofusion the end-fitting and the pipe-end are fully integrated. To connect the pipe-end to the existing pipe work the steel parts are put in place. The steel parts mechanically interlock on the plastic sleeve and can be bolted to the existing pipe works by means of a standard flange (See photo 11).

For all pipe sizes the Soluforce standard end-fitting product has a SS316L 6" 600 pounds ANSI RF flange, which easily can be bolted to the existing pipe works (photo 11 and 12).



Photo 12: Soluforce® electrofusion end-fitting sleeve



Photo 12: Installed Soluforce® end-fitting

END - FITTING

1.5) Soluforce® end-fitting in 5 steps

The complete process is computer controlled with no possible human error.

Time Required: 25 min. approximately

1 Reading the coupler data

The CNC-unit will lead the operator through the welding procedure. By running the "light pen" over the barcode the end-fitting is identified and the end-fitting welding procedure started (photo 13).



Photo 13: Reading the barcode with the "light pen"

2 Scraping the pipe surface

By using the pipe-end scraping tool the top-layer of the pipe-cover is removed over the entire pipe surface and length of the end-fitting (photo 14).



Photo 14: Scraping of the pipe outer surface

3 Trimming the pipe end

After loading the pipe-end into the welding frame the trimming tool is put in place to trim the pipe-end (photo 15)



Photo 15: End-fitting trimming in progress

END - FITTING

4 Welding of the electrofusion sleeve



Photo 16: The actual welding of an end-fitting

The cleaned end-fitting sleeve is pushed over the cleaned pipe-end and fixed between the clamps. The fusion leads are connected to the end-fitting terminals and the electrofusion started (photo 16). The CNC-unit will check the connection and when the connection is approved electrofusion is started by energizing the copper heating-coil for about 4 minutes.

When the electrofusion is finished the fitting must be cooled for about 30 minutes. After expiry of the cooling time, the welding parameters are checked by the CNC-unit. If the welding parameters are within the specifications, the connection is approved ("Parameters OK" is displayed).

5 Assembly of the steel parts



Photo 17: Installing the steel parts

Now the end-fitting connection can be taken out off the welding frame. After installation of the steel parts (photo 17) the pipe can be connected to the existing steel pipeline.

END - FITTING

1.6) Soluforce® end-fitting (Weld stub)

For the gas transport and distribution pipe systems flanged connections are not allowed. For the connection of Soluforce pipes to the existing gas steel works modified end-fitting steel parts can be delivered having a weld stub. The end-fitting welding procedure is the same as for the flange type connection, only the flange steel part is redesigned into a weld stub. The weld stub can be steel welded on the existing pipe works. On ordering the material type must be specified (photo 18).



Photo 18: Soluforce® end-fitting with weld stub

WELDING EQUIPMENT



Photo 20: Pipe-end trimmer for butt- weld preparations

2 SOLUFORCE® WELDING EQUIPMENT KIT

The Soluforce® welding kit contains all the necessary tools to weld the Soluforce® fitting system. The kit is packed in a 20 ft container.

The main part is the Soluforce® welding tool, which is based on standard available equipment modified for the welding of the Soluforce® fitting system. The equipment is fully automatic and CNC controlled. The welding system consists of (photo 19):

- CNC unit to make computer controlled welds, data acquisition of the welding parameters and driving the hydraulic system ;
- Welding generator for delivery of the electrical power for electrofusion ;
- Heating plate for heating up the pipe-ends necessary for making the liner butt-weld ;
- Welding frame for fixing the pipes and a weld controlled welding process ;
- Pipe trimmers to prepare the pipe-end face before welding ;



Photo 19: Soluforce® welding kit.



Photo 21: Soluforce® Coil loaded in the trailer and ready for uncoiling.

3 UNCOILING OF SOLUFORCE® PIPE

The Soluforce® pipes are delivered on coils of 400 meter packed in a wooden disposable reel. The wooden reel can be loaded directly into the Soluforce installation trailer preferably by means of a crane or by reverse driving the trailer. When the trailer is driven to the installation spot the pipe end is loosened and fixed to a fixed point. By driving the trailer along the pipe track the reel rotates and lays down the pipe on the ground. The Soluforce® trailer can be pulled by a 4WD land cruiser or a mechanical shovel depending on the local soil condition (see photo 21).

WELDING EQUIPMENT

4 RENTAL OF INSTALLATION EQUIPMENT

Pipelife Nederland BV can offer the following installation related services:

1. Rental of the installation equipment ;
2. Supervision by qualified welder ;
3. Training in Soluforce® welding and installation ;

For more information please contact the Soluforce Installation Manager

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Soluforce®

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The logo for Soluforce, featuring the word 'Soluforce' in a stylized font. 'Solu' is in a light blue, outlined font, and 'Force' is in a dark blue, solid font. A registered trademark symbol (®) is located at the top right of the word.

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The logo for PipeLife, featuring the word 'PIPELIFE' in a bold, sans-serif font. 'PIPE' is in grey and 'LIFE' is in blue. To the right of the text is a stylized icon of a pipe cross-section, consisting of a grey square with a blue circle inside, representing the pipe's interior.

PIPELIFE 

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