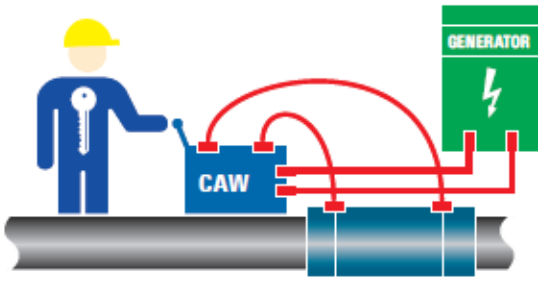
BRUGG Pipes

Rovanco Piping Systems

EWELCON

Electric Fusion Welded Joint

Installation Instructions
Ø 250 ÷ 1200 mm



These installation instructions are designed only as an aid for trained personnel and does not replace proper training.

V EN 19.05.2021 QR

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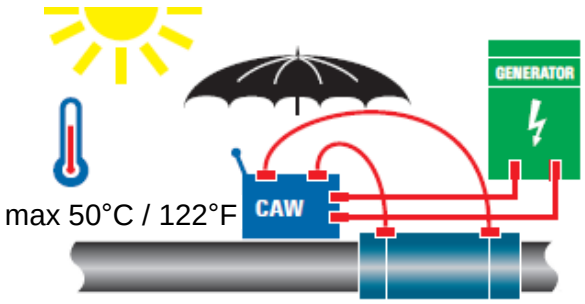
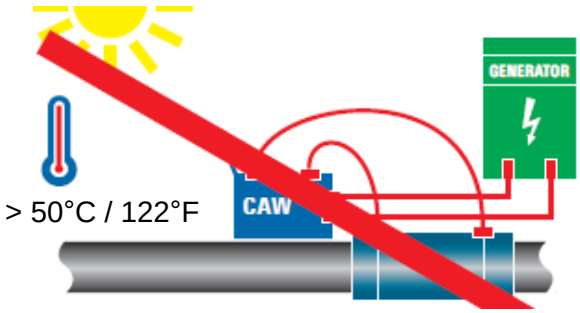
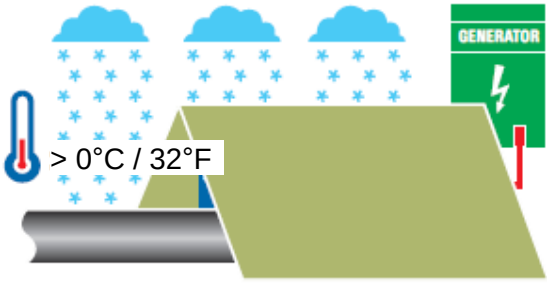
B 00 Guidelines about installation conditions



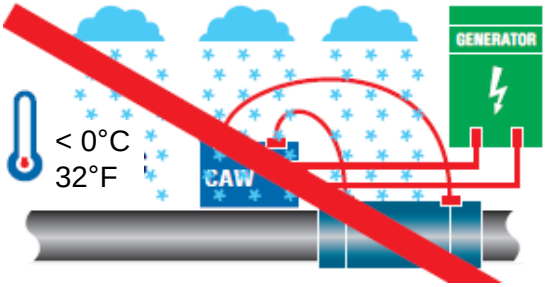
Avoid uneven heating of the casing pipe in the welding area by implementing appropriate measures (thermal insulation mats, umbrellas, tents).



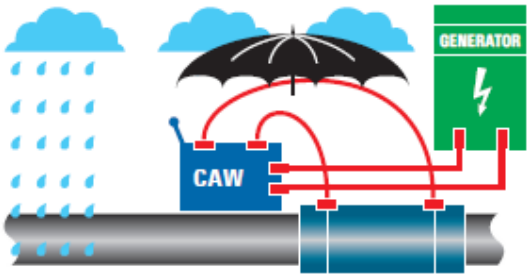
The welding unit will not start its operation if the joint/casing pipe temperature exceeds 50ºC!



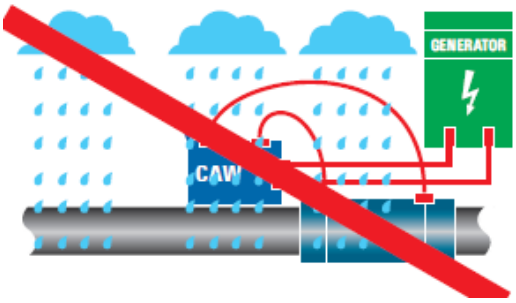
In conditions of negative temperatures, the welding area and the joint must be heated If ambient temperature drops below 0ºC / 32°F. The welding area must be protected against cold and wind in a heated tent.



Do not install EWELCON joints at temperatures below 0ºC / / 32°F!



The welding area and the joint itself must be at all times protected against moisture and precipitation.



It is forbidden to install EWELCON joints during rainfall, snowfall or hailstorm without properly securing the welding area.

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a) Cleanliness

Be careful to keep everything absolutely clean and dry when installing the joints. Always work under tents, awnings or tarpaulins.

Exception: The job site is sheltered from the wind and in the shade and the weather is dry.

b) Temperature

Take suitable precautions to prevent differences in temperature in the casing pipes in the proximity of the field joint.

The difference between lowest and highest casing pipe temperature in the area of the weld seam may not exceed 15°C.
The temperature of the casing pipe may not exceed **50°C (122°F)** at any point.

Warning: *if the temperature of EWC or casing pipe exceeds 50°C (122°F), the welding will not be possible. The CAW05 welding unit will display the note „the joint too hot". In such case one must protect the welded surfaces against further warming and retry to begin the welding process after cooling the surfaces down below 50°C (122°F).*

Stop working on the joint plate in ambient temperatures of below **0°C (32°F)**.

Exception: *The casing pipe ends and joint plate have been preheated above 0°C (32°F) and the area of the field joint is protected from cold and wind by suitable measures.*

B 01 Preliminary forming of the joint

The EWELCON joints of diameters over 250mm are supplied in forms of flat plates.
To make wrapping the joint around the pipe and fixing it easier one should preliminarily form the plate with the pretension strap.

Note: the ways of selection of joints are described in the chapter B 04

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B 02 Tools for EWC 250 ÷ 1200 mm

a) Standard tools

A. dust-free cloths

B. PE cleaning liquid

C. marker (white)

D. tape sander with P 40÷60 tape

E. P 40÷60 abrasive tape

F. scraper for plastics

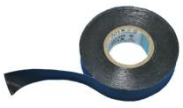
G. assembly knife

H. jigsaw

I. drill with a 10 mm bit

J. small hammer

K. rubber hammer



L. insulation tape

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b) System tools EWC 250÷1200 mm

A. CAW05 joint welding unit, complete with cable set

B. radial pressure distribution plate (2x)

C. axial pressure distribution plate (1x)

D. ratchet (2x)

E. polyester strap (2x)

F. pretension strap with a ratchet (2÷4x)

c) Additional equipment

A. 24mm curling trap

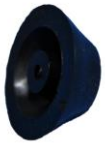
B. vent plug (min. 2x)

C. test instrument for leakage tests

D. foaming agent, leak detector

E. hole cleaning cutter

F. plug holder



G. fusible 24mm plug (min. 2x)

H. plug welder

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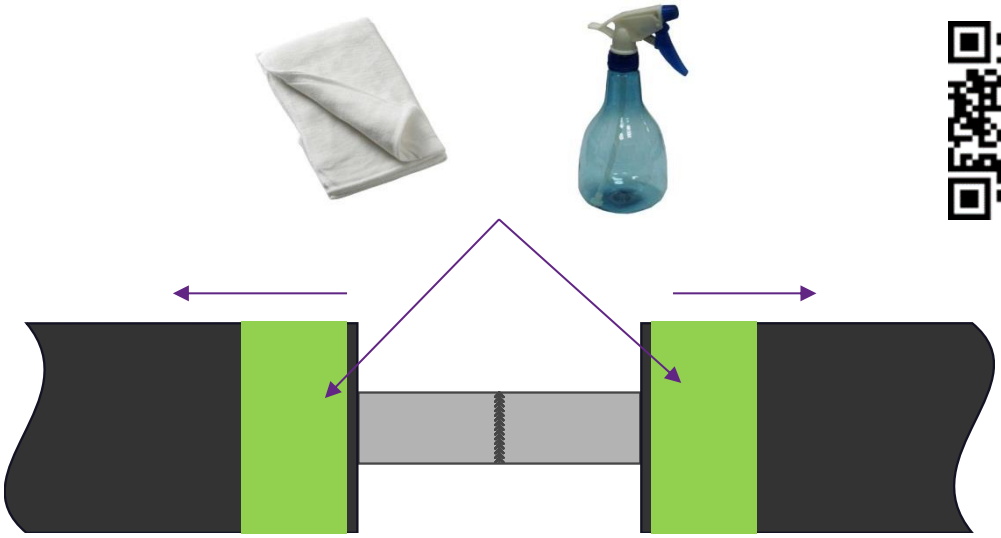
B 03 Preparing the area of joint

Protect the casing pipe ends of the field joints that are to be fitted during the day from the effects of sunshine first thing in the morning by wrapping them in aluminum foil.

Remove a layer of insulating foam ca. 30 mm deep and connect the alarm wires of the moisture monitoring system in accordance with recommended practice.

Clean and dry the field joint. The place of welding must be prepared in such a way that it is easily possible to remove any impurities (sand, mud) from the jacket pipe. One must ensure such a depth of the trench in the installation area that the full approach to the whole joint surface is possible and that no dirt may get on the EWC joint surface while being wrapped.

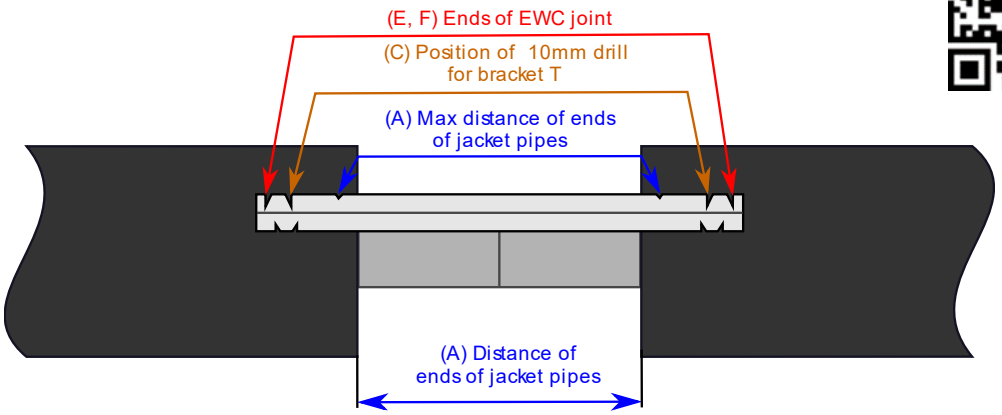


B 04 Laying out the join spot

a) Selection of the marking template and the joint

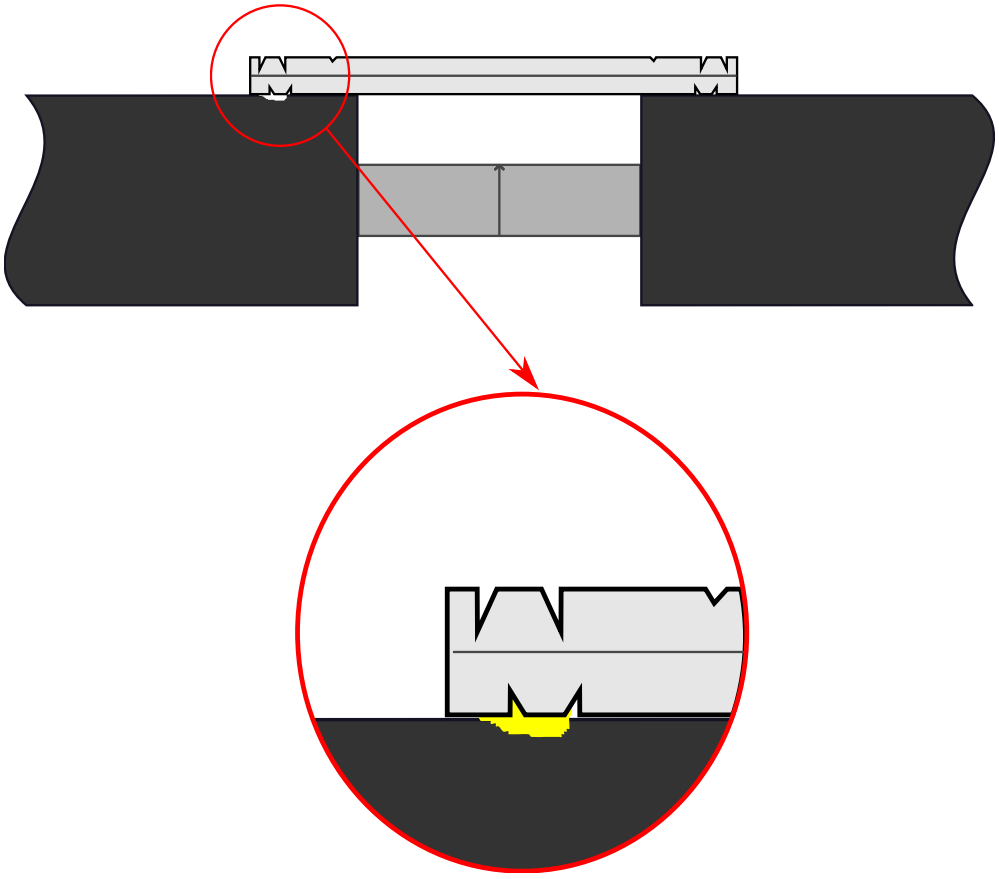
Measure the distance between the ends of the jacket pipe (A) and select the marking template AS, the joint and the bracket T, according to the table below:

Jacket distance (A)	Marking template AS	EWC width (E)
[mm] / [inch]		*[mm] / [inch]*
Up to 450 mm / 17.7 in	AS 700	700 mm / 27.6 in
Up to 600 mm / 23.6 in	AS 850	850 mm / 33.5 in
Up to 920 mm / 36.2 in	AS 1100	1100 mm/ 43.3 in



b) Jacket pipe condition checkup

Check the field joint for irregularities with the marker plate. Eliminate any irregularities if necessary. Soften deviations in the form of bent joints, eccentricity, etc. by suitable measures.



If there are any unevenness's / dents in the area of welding, that may make it impossible to stick the joint to the jacket pipe, such spots should be marked with the white. The heating coil (spiral) must not be placed in any of the marked spots.

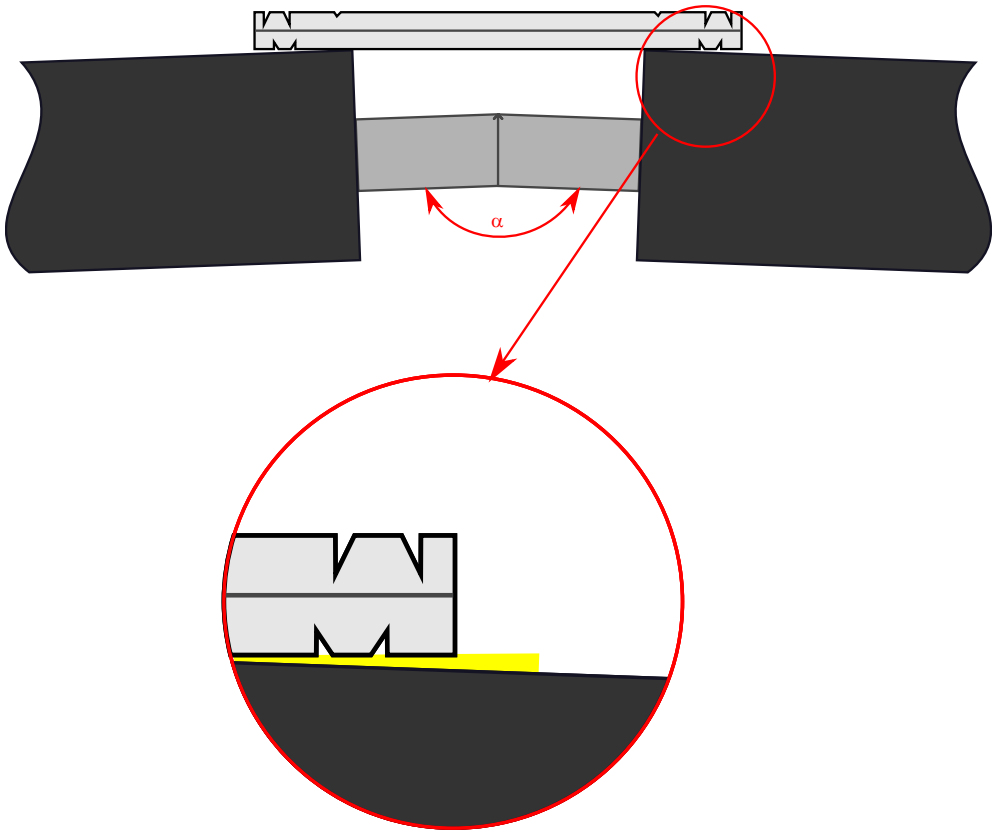
One must check additionally if the ends of jacket pipes are not narrowed (which happens from time to time) and must consider it while selecting the join spot.

c) Pipeline alignment checkup

It is allowed to install the EWELCON joints on pipes beveled up to 3°.

In case of larger pipeline beveling (3°-10°), additional operations are required. They are not described in this instruction.

Warning: If the pipeline is beveled more than 10°, EWELCON joints should not be used.

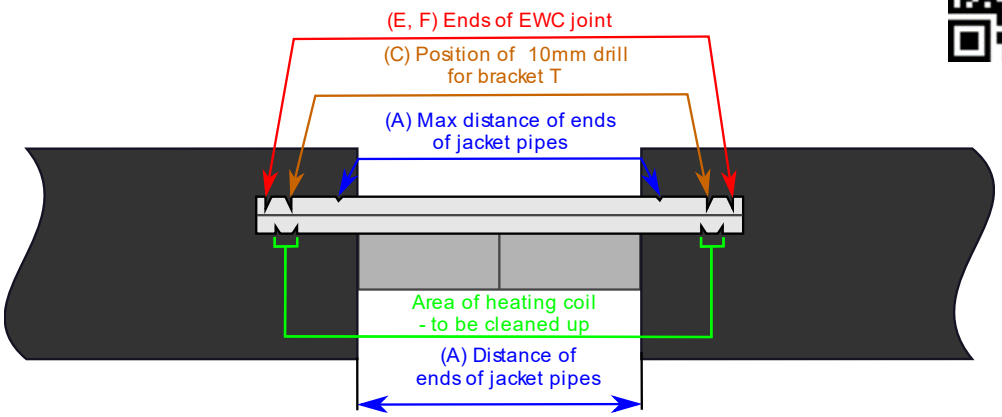


d) Determining the correct spot to weld

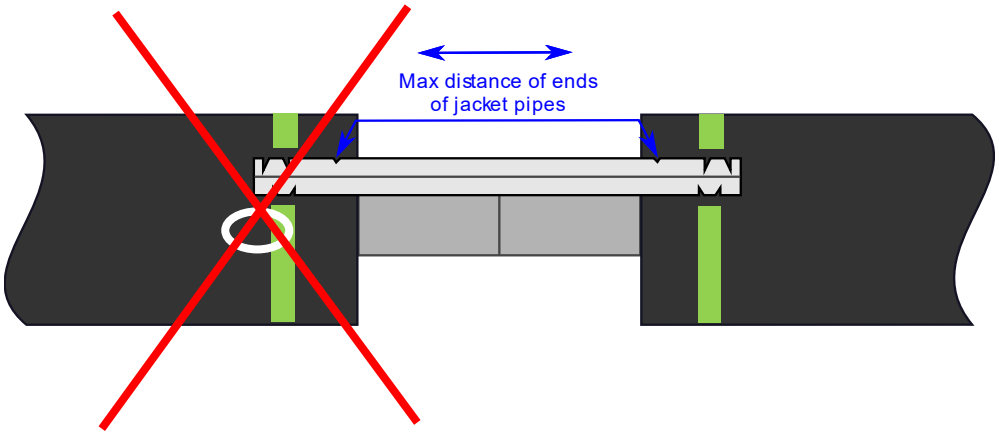
Using the marker plate and a white marker mark:

- the position of the holes that are to be drilled and mortises that are to be cut for the connecting piece (C),
- edges of the joint (E),
- centre of the axial seam (F),

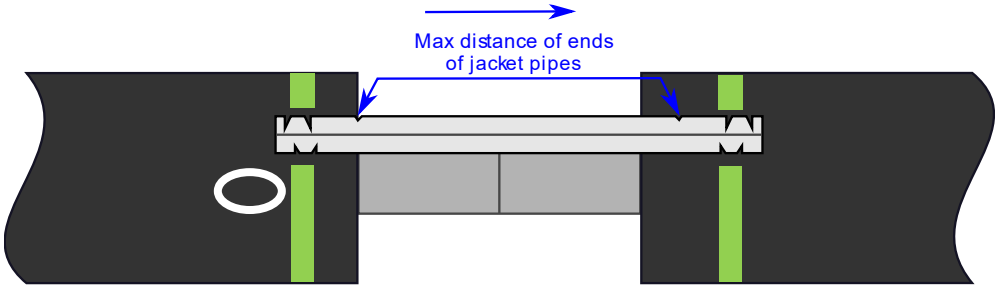
It is best to mark them between 10 and 11 o'clock positions.



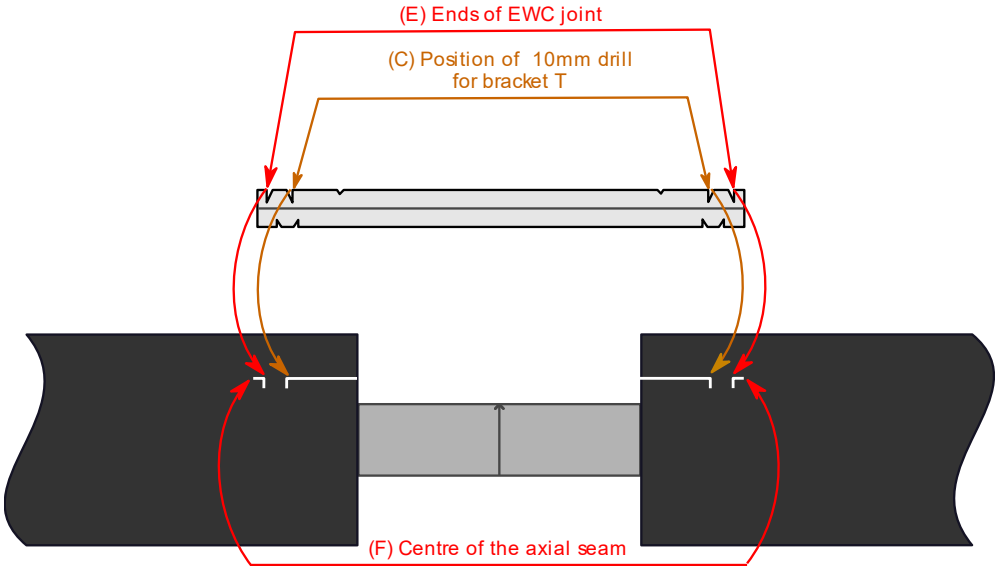
Do not position the joint so that the heating wire covers the area of the damaged jacket pipe.



In this case one should move the marking template to the right, paying attention that both cuts indicating the maximum distances of jacket pipe ends are still on jackets.



Pipes laid out with the marked points of the EWC joint ends, the placement of the bracket T (T-Profil) and center of the axial seam.



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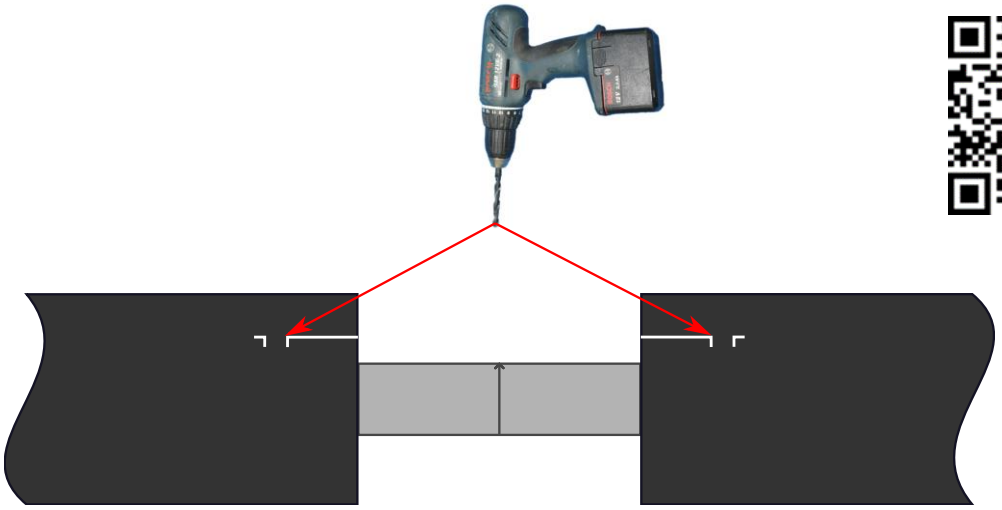
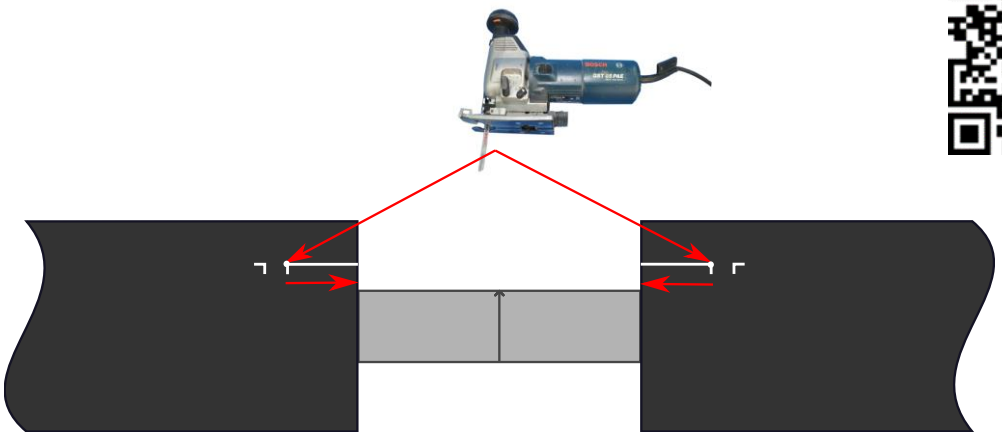
B 05 Drilling Ø10 mm / 0.39 in holes

Drill two Ø 10 mm / 0.39 in holes in the shown spots.



B 06 Cutting the jacket for the bracket T (T-Profil)

Do two cuts for the bracket with the jigsaw. Start cutting at the 10mm hole and go towards the end of the jacket pipe.
The width of the cut: 2÷3 mm / 0.079÷0.12 in



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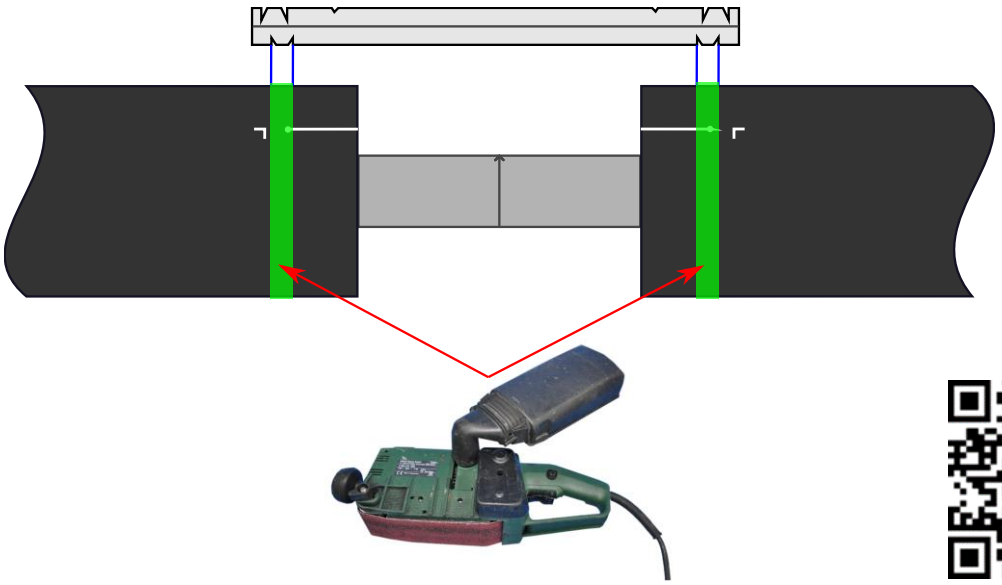
B 07 Removal of oxides from the jacket

a) Removal of oxides from the jacket pipe with the tape sander

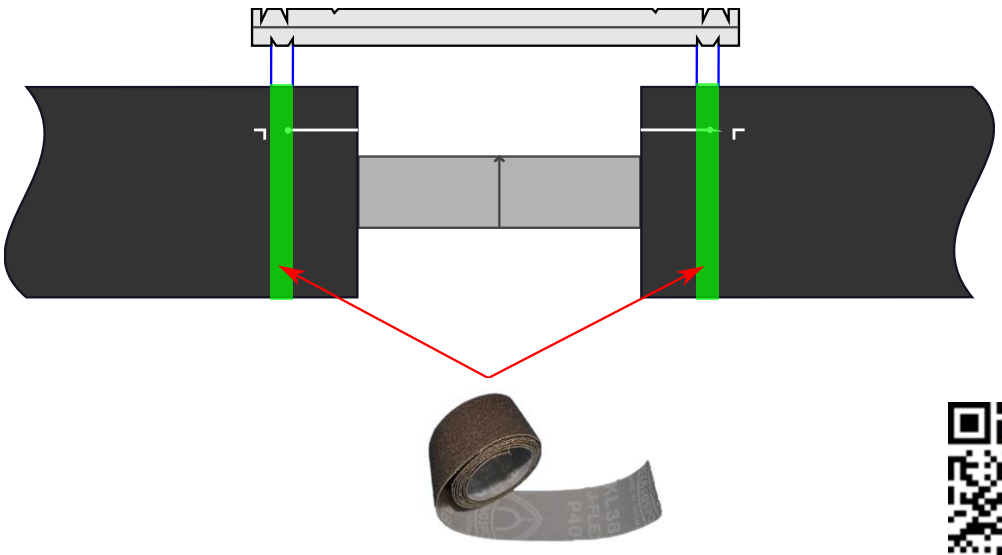
Remove ca. 0.2 to 0.3 mm of the surface of the casing pipe near the weld joint using an abrasive cloth (grain 40 to 60).

Note: Sanding is best done with a reliable make of belt sander. It is strictly prohibited to use oscillatory sanders, angular sanders, wire brushes etc.



b) Removal of oxides from the jacket pipe with abrasive tape (optionally)

Optionally, if the tape sander is not available, one can remove oxides from the jacket pipe with the abrasive tape (Grain 40÷60).



The jacket pipe surface after sanding should resemble suede.

B 08 Preparation of the EWC joint and the pipe for assembly

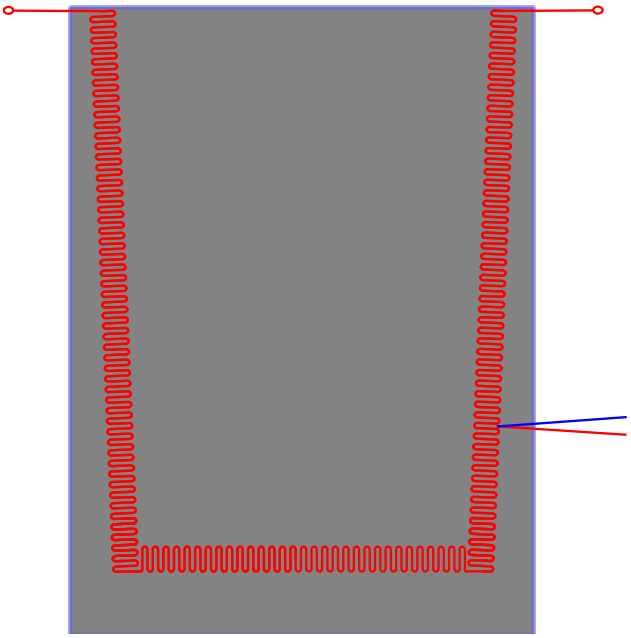
a) Checking the joint

Every joint plate is packed in foil for protection against dirt and damage. Therefore only remove the plate from the packing directly before use.

Remove the tape from the wiring points and the temperature sensor completely. Check that the plate is in order.

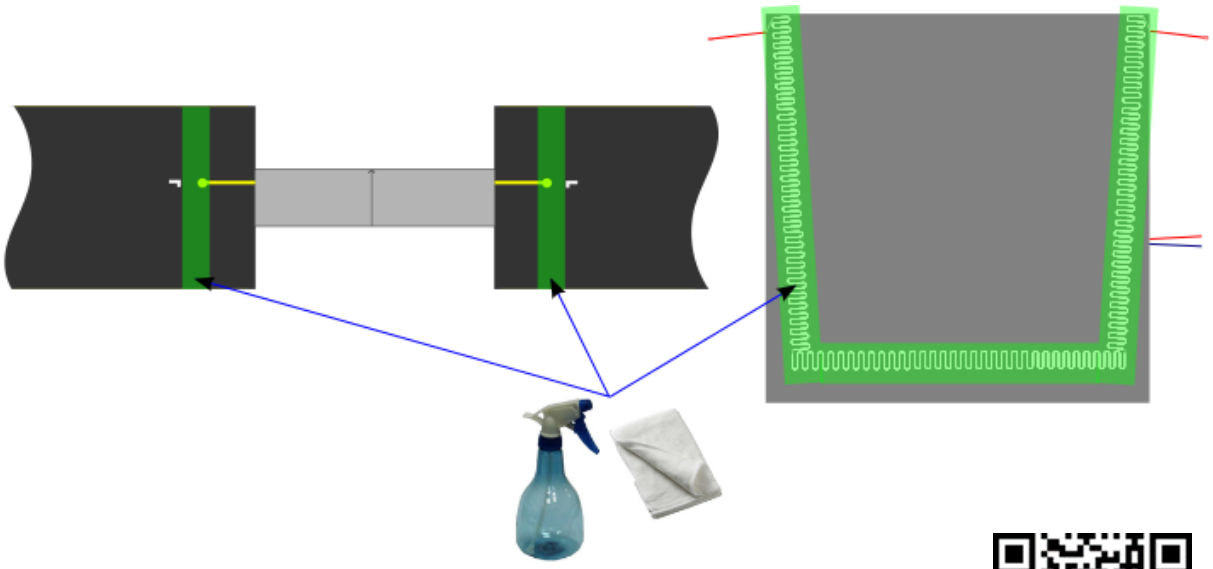
If one of the following faults is found on the joint plate, it may not be used and must be rejected. Repairs are not allowed.

- The joint plate is damaged (nicks, kinks, cracks, etc.)
- The heating element is not connected to the plate throughout.
- The heating wire loops protrude out of the plate.
- The heating wire is damaged (pinched, worn, kinked, etc.).
- The heating wire connection is faulty.
- There is no electric continuity through the heating wire.
- There is no electric continuity through the temperature sensor.



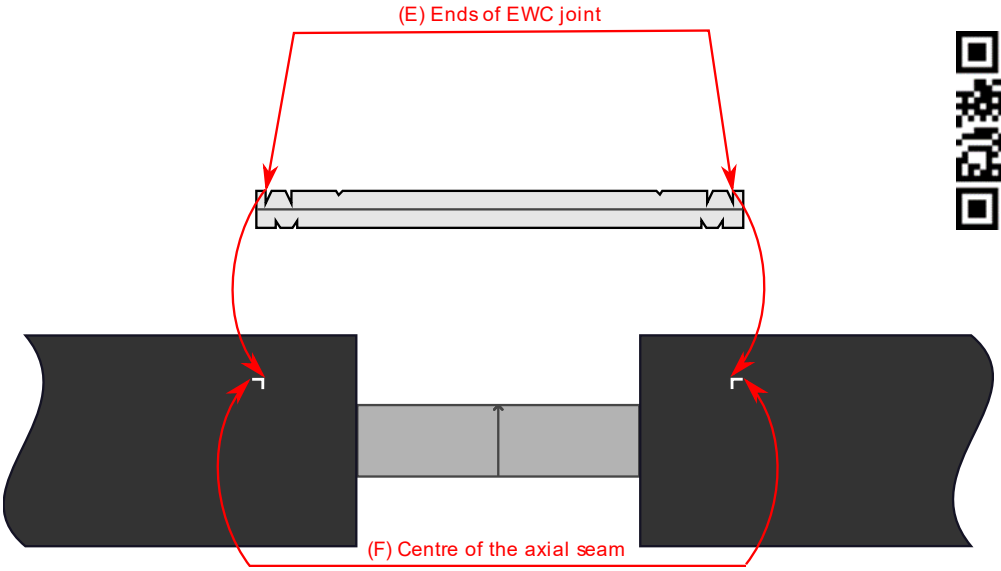
b) Degreasing the joint and jacket pipe

Remove the remnants of impurities coming from drilling and sandering and then carefully clean jacket pipe ends and the heating wire area, with the cleaning medium neutral to PE (polyethylene).
We recommend the methylated spirit (alcohol content min. 96%).



c) Correction of markings on the casing pipe

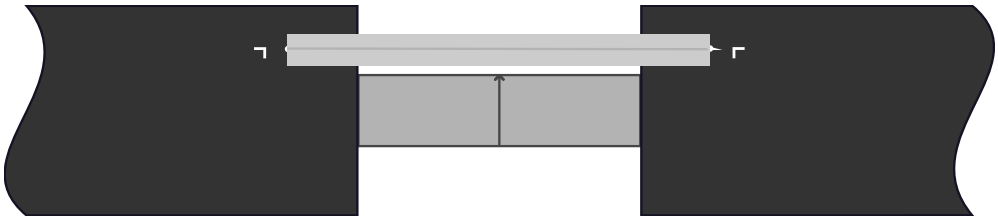
Re-mark the points of ends of the joint and centre of the axial seam that were removed during the sanding and oxides removal. Use the white marker.



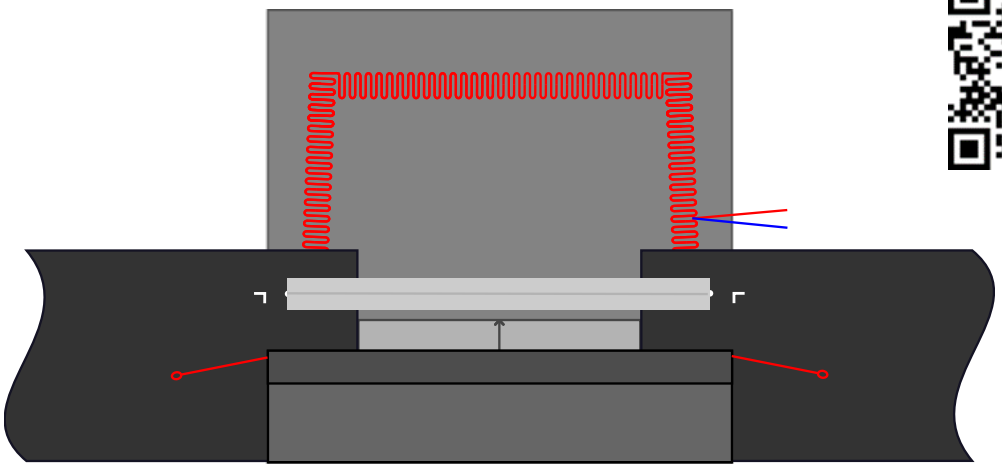
B 09 Joint asembly

a) Bending and placing the bracket

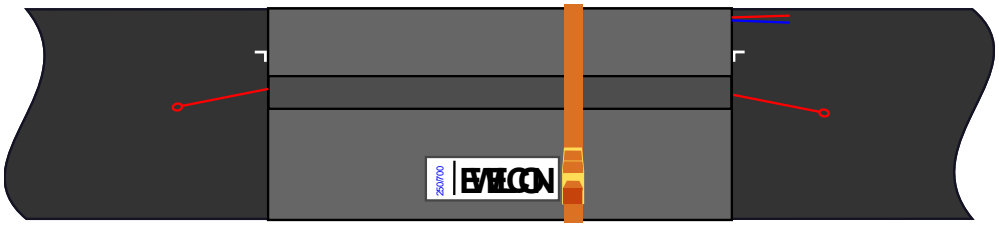
Bend the bracket’s flat end and fit it to the jacket pipe curve, then put it in the previously cut slot.



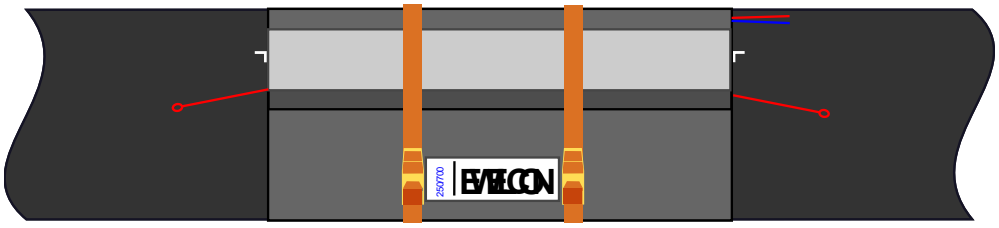
b) Wrapping and assembly of the Ewelcon joint



Wrap the joint plate around the ends of jacket pipes and fix it with pretension straps with ratchets. Remember that the heating wire must be on top at the overlap (this side of the joint is marked with white dots at its edge).

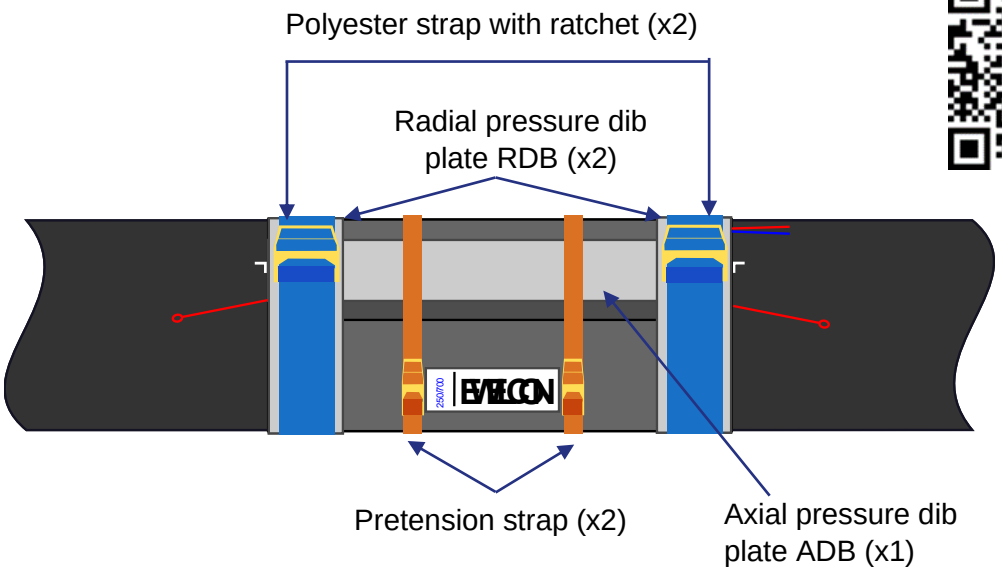


Put the second pretension strap on the joint, and insert the axial pressure distribution plate between them. Place it correctly: the centre of the axial pressure distribution plate ADB must be situated in the middle of the axial weld.

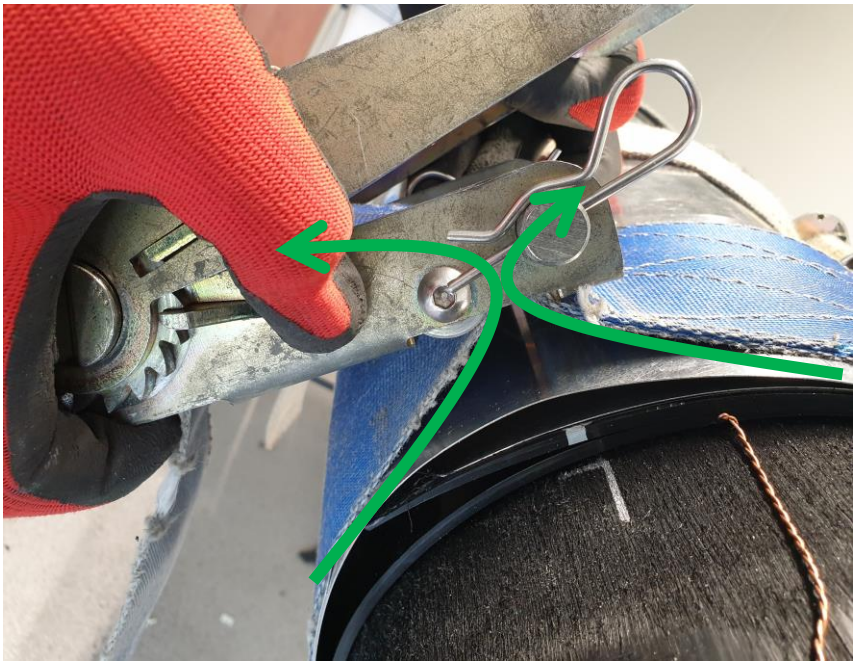


Wrap the radial pressure distribution plates (RDB) around the EWC joint with the 10mm distance and preliminarily press them down with polyester straps; then correct the positioning of all of them. The end of the RDB plate which is placed underneath must be fixed ON the axial plate ADB. Center each strap at each RDB plate and center the return rolls of ratchets in the middle of the overlap of plates.
In case of reparational or special joints you must use:

- for the 850mm wide joint -> min. 3 pretension straps with ratchets
- for the 1100mm wide joint -> min. 4 pretension straps with ratchets



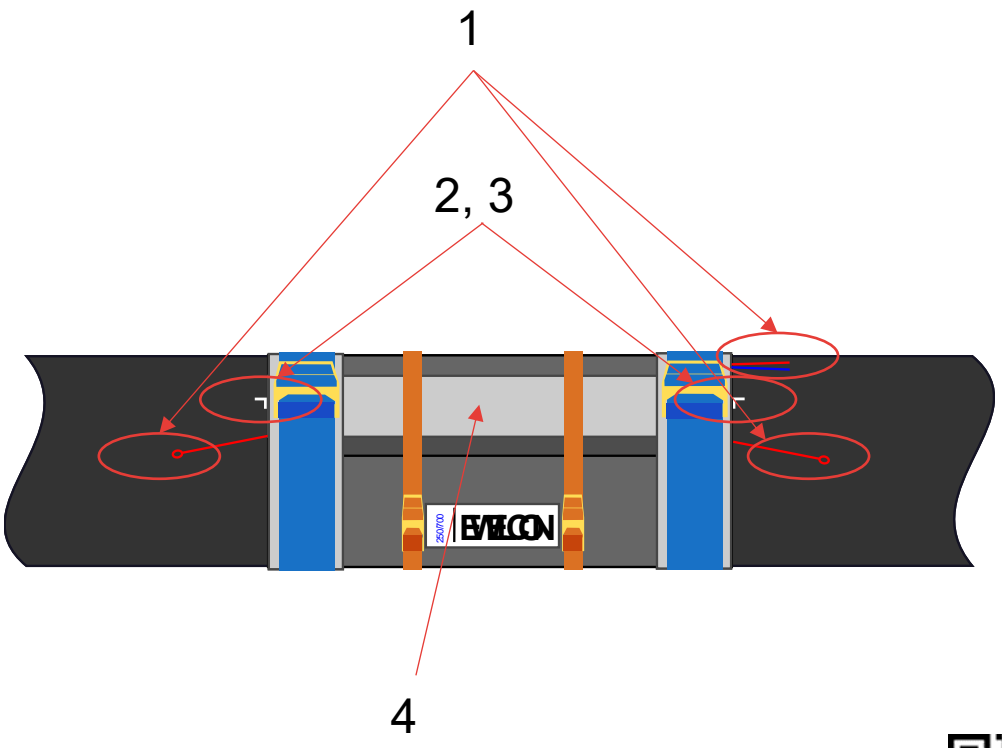
Note: pay attention how to fix the strap correctly.
Both ends of the strap must pass through the same slot of the ratchet.



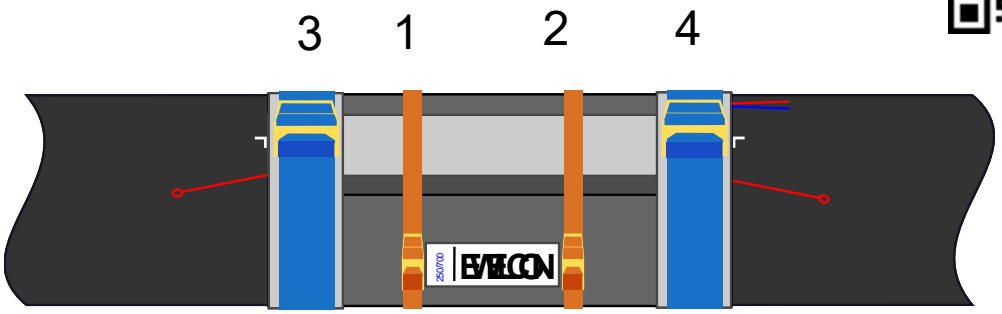
In case of unevenness's (beveling, misalignment, diameter difference) there may be necessary to use additional pretension straps.
Note: the straps should be assembled in even distances. Ratchets of these straps must be placed at least 150mm from the axial distribution plate ADB.

After installing the EWC joint check once again if all the elements are placed correctly. Pay a special attention if:

1. The connecting wires and the thermal couple connectors are positioned beyond the joint and if it is possible to connect the welding unit to them.
2. The white dot on the joint and the white dash on the jacket pipe (bracket placement) match.
3. The joint stays between the previously marked points that show its edges,
4. The axial distribution plate is situated above the axial weld.



In the end tighten straps in the order shown on the drawing.



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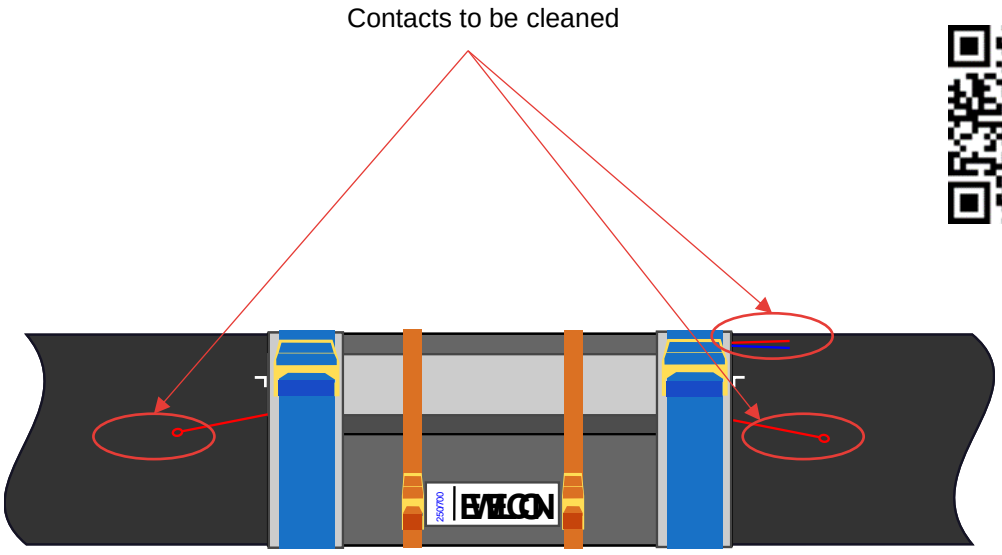
B 010 Cleaning the contacts

Clean the contacts shown on the drawing, with the abrasive tape.

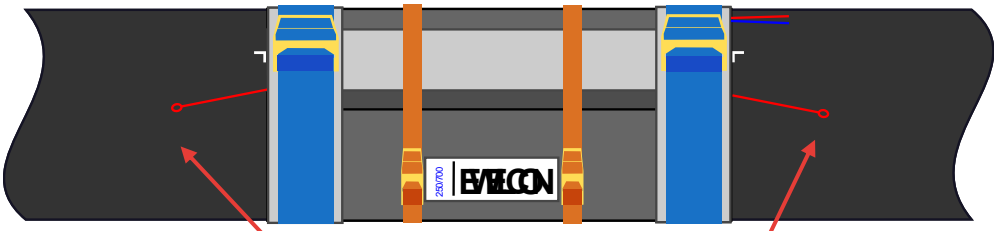


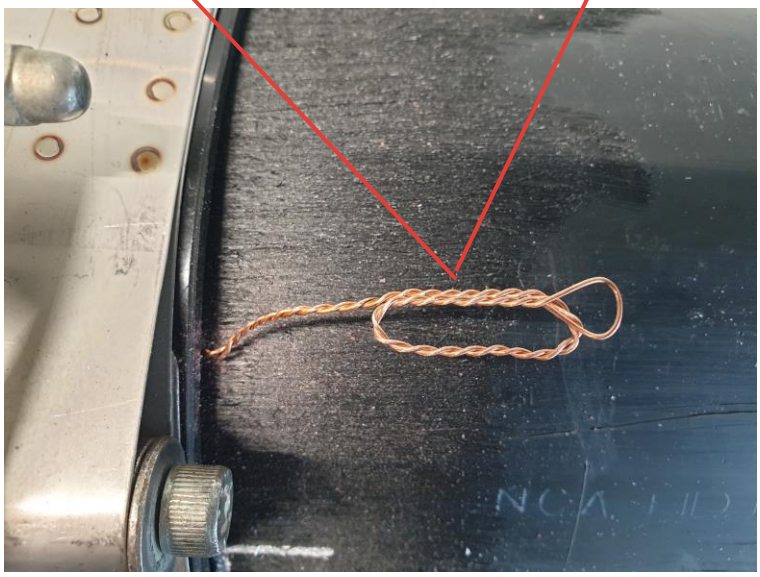
B 011 Connecting the wires to the joint

Connect the current wires and then the power supply wire to the welding machine.

Note: The supply voltage is 230 V; 50 Hz
More information in the manual of the CAW05 welding unit.

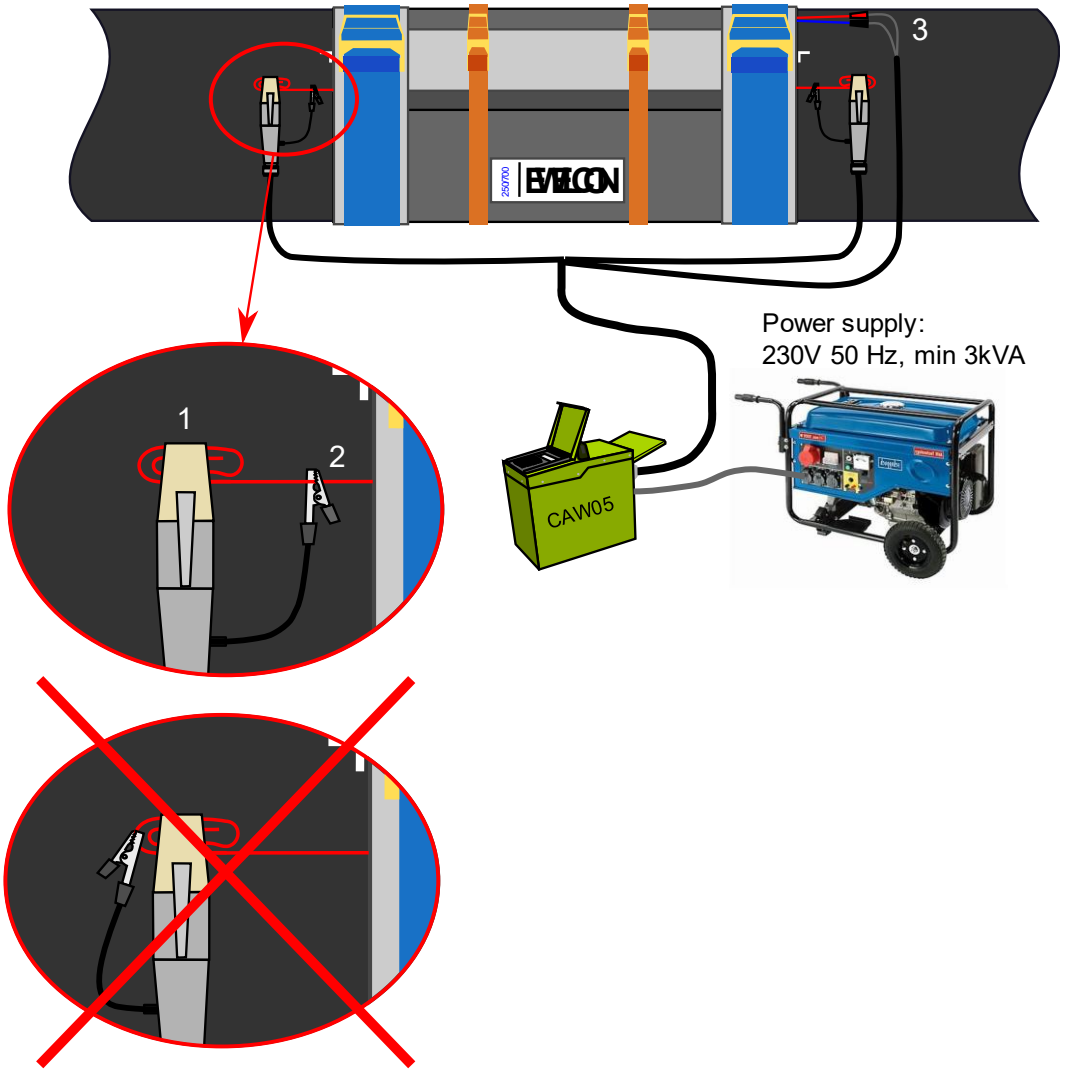
Bend the wires on the joint as it is shown, to improve the electric contact. Attach the welding machine connectors and the crocodile clips of the thermal couple. Remember that the crocodile clips must be placed on the inner side of the EWC joint.





Note:

- When connecting a thermocouple, pay attention to:
  - Red clip to the red wire
  - Black clip to the blue wire.
- The power cables must not hang on the copper connection wires of the joint. If necessary, attach them to the pipe with adhesive tape.



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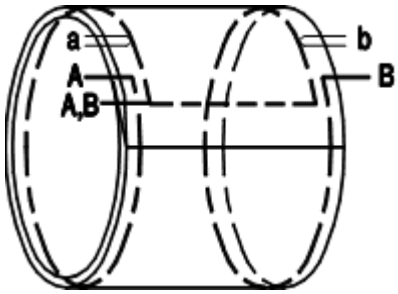
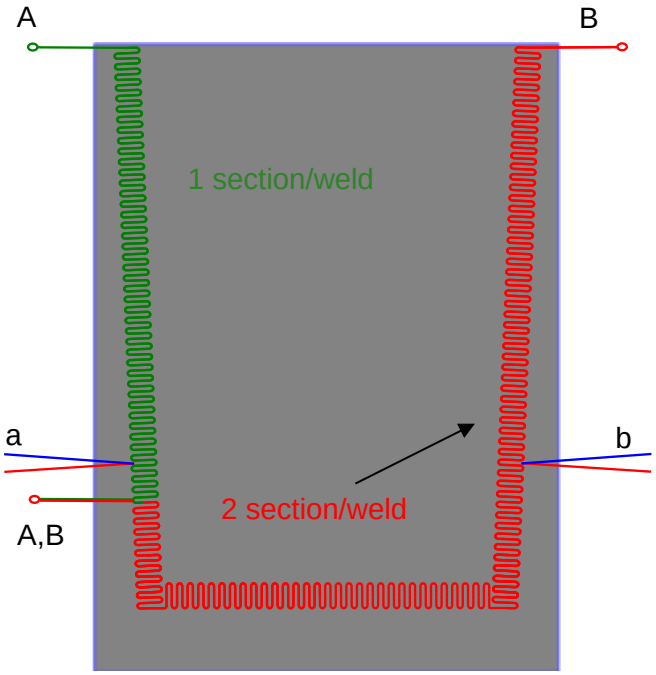
CONNECTING MULTI – SECTION JOINTS

In case of multi – section joints the CAW05 welding unit must be connected according to the sketches:

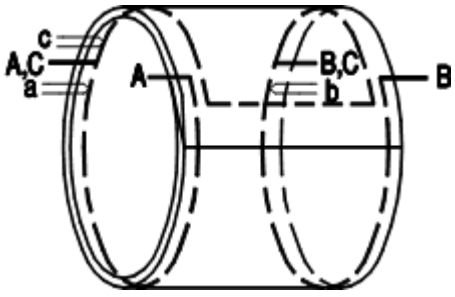
Two-section joint (D500-630 mm)



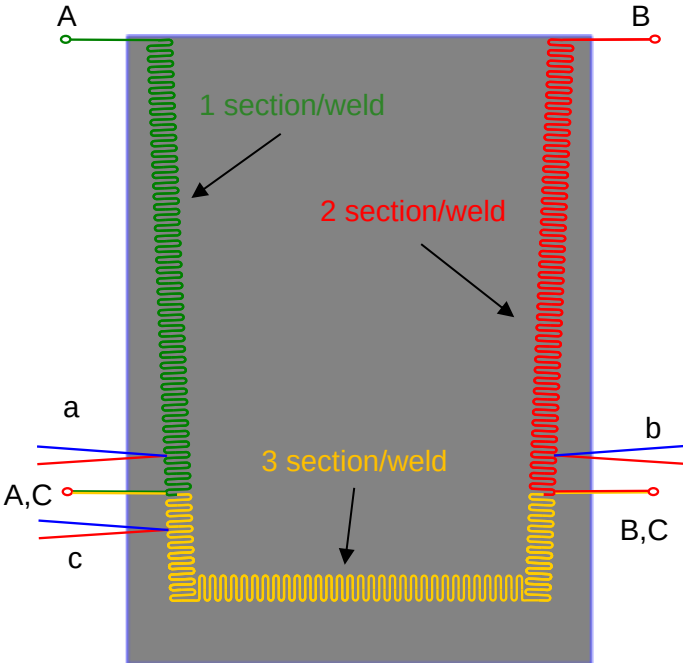
1 weld: power wires A-A and thermocouple a
2 weld: power wires B-B and thermocouple b



Three-section joint (D710-1200 mm)



1 weld: power wires A-A and thermocouple a
2 weld: power wires B-B and thermocouple b
3 weld: power wires C-C and thermocouple c



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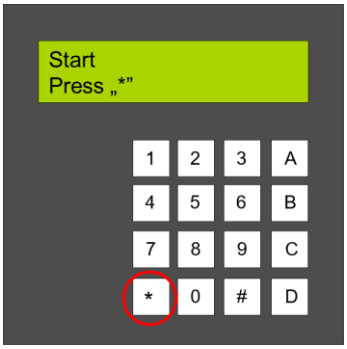
B 012 CAW05 welding unit operation. Starting the welding process up.

This installation instruction has been prepared as a technical aid for the trained personnel and it does not replace the installation course held in the real conditions.
The manual contains the description of the standard operating procedures of the welding unit and of the welding process startup only.

More information in the manual of the CAW05 welding unit.

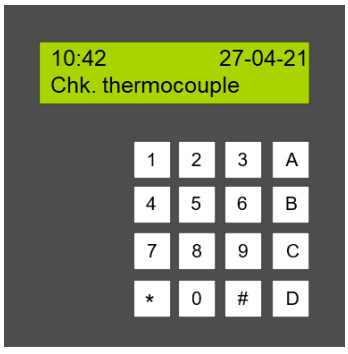
a) Starting the unit up

Press * to start the unit up



After 10 seconds from the start up, following messages may appear:

Check thermocouple



No transition between the welding unit and the thermocouple or the thermocouple is broken. Check the thermocouple connection.

Not ready

The joint temperature is below 0°C (32°F) or above 50°C (122°F).
The joint must be warmed up / coolled down.

Ready

Everything is ok. The welding process may begin.

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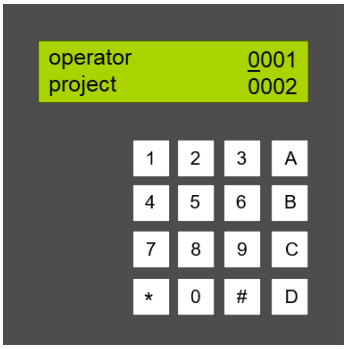
b) Entering statistical data

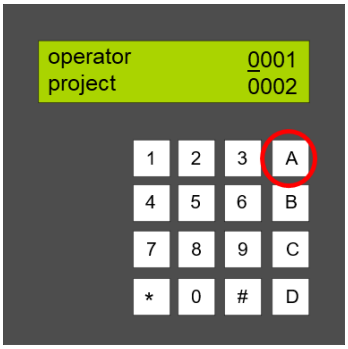
Press the button * to begin the welding process.



.

Enter the following statistical data:

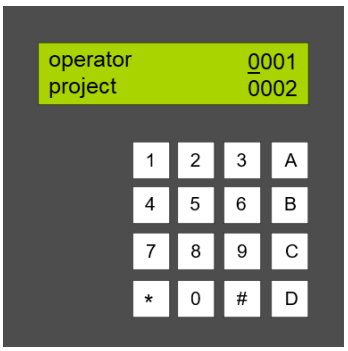
- number of the operator
- number of the project
- number of the joint
- joint dia – the joint diameter
- joint width – the joint width
- Joint section – if D>400 mm



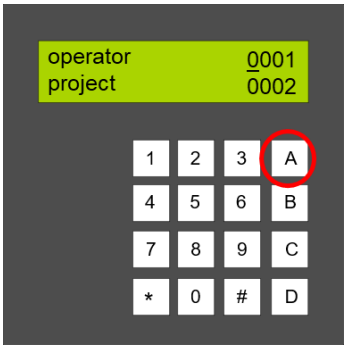
Press the button A to confirm the entered data.

c) Verifying the entered data

Note: the entered statistical data do not influence the welding process.

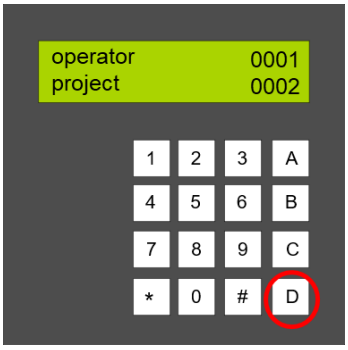


After entering all the statistical data the unit displays all of them for verifying.



.

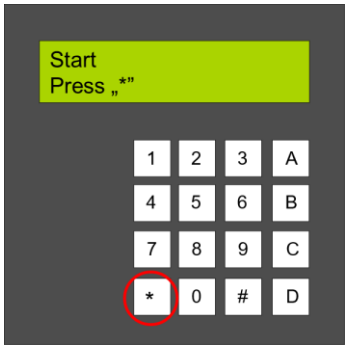
Press the button A to confirm the data.



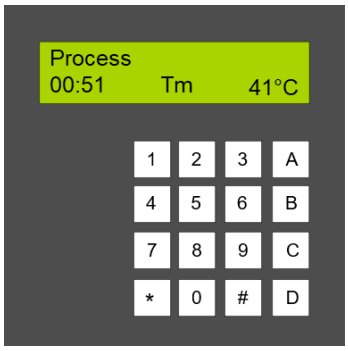
If any mistake is noticed, it can be corrected by pressing the button D.

d) Welding

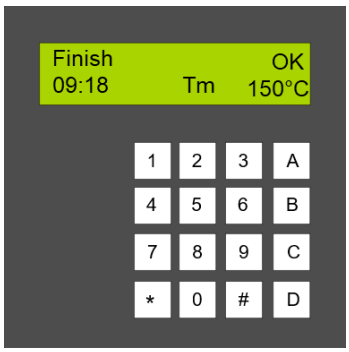
Note: if the welding process must be broken, press the button # and keep it pressed for 3 seconds.



The unit is ready for welding process. Press *



.
The process is running. One can read the time and the temperature of the joint on the display.



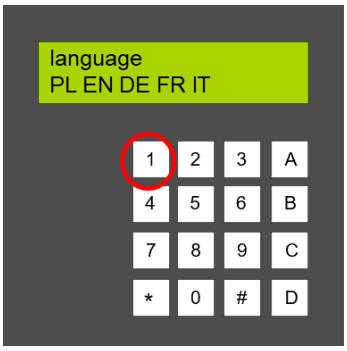
The process is finished automatically within 5 – 15 minutes.

e) Additional information

After turning the unit on one has an access to the following additional functions:

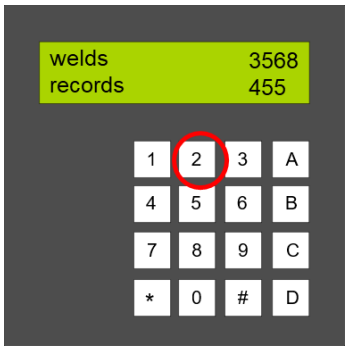
Key functions:
A – acceptance of the edition area;
B - return to previous edition area;
C - cursor to the left;
D - cursor to the right;
- cancel

Button 1:



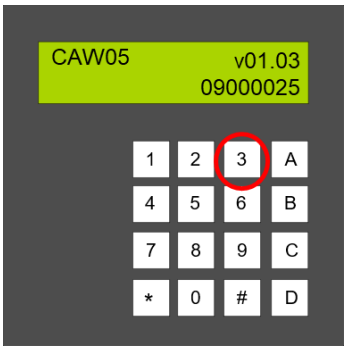
Change of language, one may select PL, EN, DE, FR, IT.

Button 2:



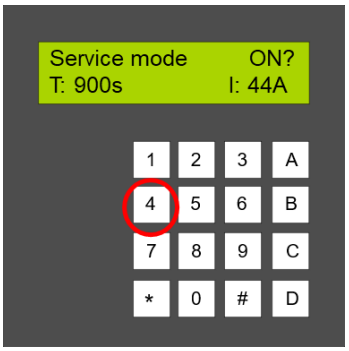
Information about number of welds done and number of records in the memory. Up to 500 records may be kept, afterwards the overwriting of the oldest begins.

Button 3:



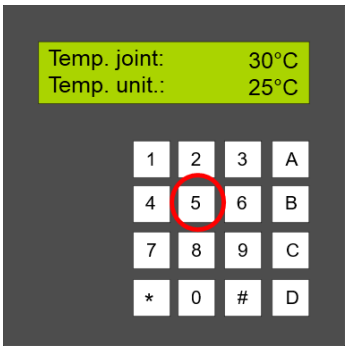
The serial number and the software version of the unit.

Button 4:



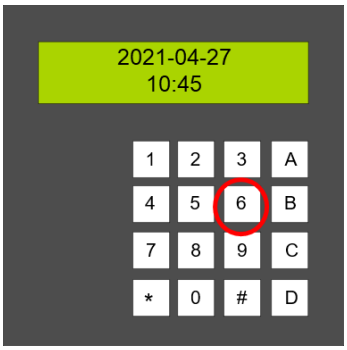
Service mode (described in the unit manual).

Button 5:



Temperature of the joint and the unit.

Button 6:



Possibility of changing date and time.

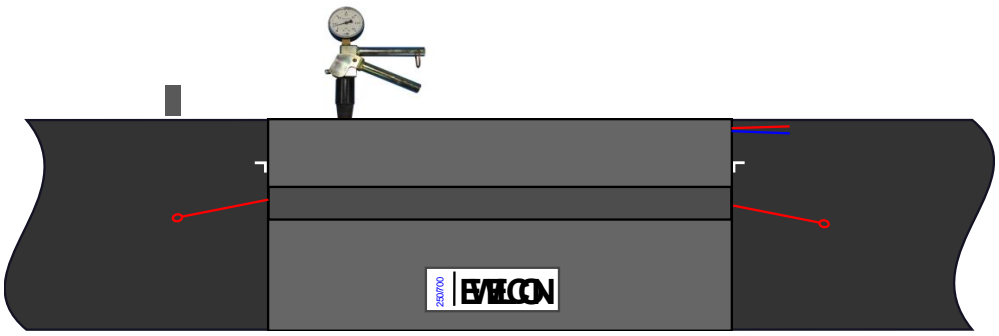
B 013 Tightness test of the joint

When the joint temperature drops below 70°C (158° F) one may dismantle the fixing and tightening equipment and check the joint visually.

Note: A radial depression along the weld, a dull, greyish discoloration of the surface over the weld, particularly in plates less than 6 mm / 0.24in thick, and partial exuding of PE are caused by heat treatment and do not represent quality defects in any way.

Drill one hole on top of the joint, for the tightness test instrument.
Position of the hole: 12 o'clock, 150 mm / 5.9in from centre to edge of joint.

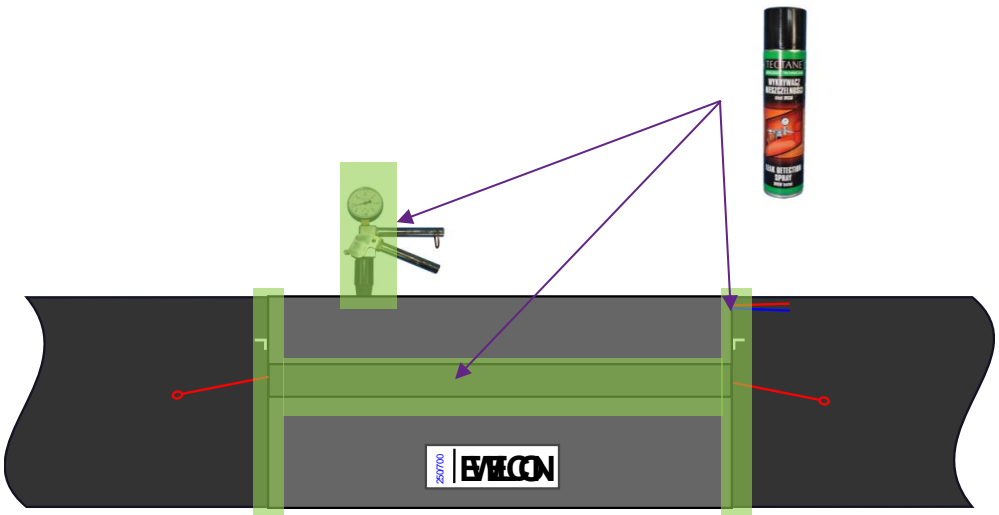
Put the test instrument into the drilled hole and check the tightness of the joint with the 0,3 bar pressure in 15 minutes.



Spray bubble-forming fluid liberally into the gap between the plate and casing pipe around the circumferential weld seam and the gap between the ends of the joint plate along the axial weld seam and check for leaks.

Important:
- Only use PE-neutral bubble-forming fluid
- Max. joint temperature: 35°C / 95°F
- Duration of pressurization: at least 15 minutes

Note: If the test pressure drops without any leaks being found, the cause of this can lie in leaks in the pressure gauge or in longitudinal leaks in the PUR foam.



Re-welding the joint

Important: Welding polyethylene damages its structure

To pay due regard to this fact, heating, and therefore also re-welding, is to be restricted to the absolute necessary.

Re-welding can be done if:

- the joint or the joint segment has not yet been re-welded,
- the weld seam is not tight,
- the welding job was interrupted for some reason.

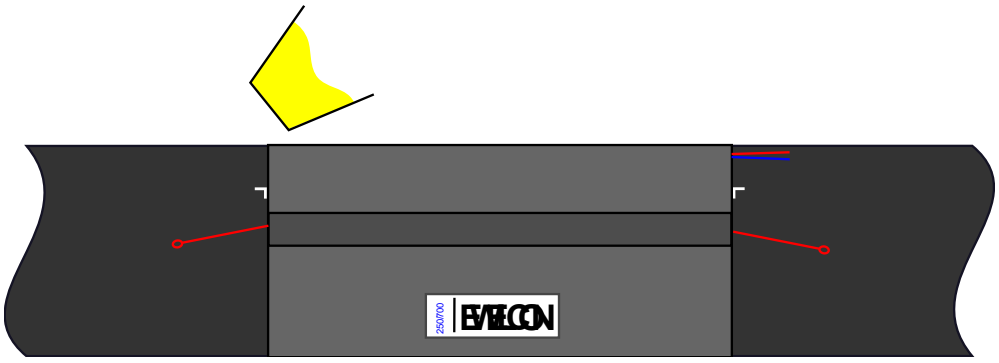
Re-welding may only be carried out when the joints have cooled down (max. joint temperature: 50°C / 122°F) and with applied tightening straps (point 4).

In the case of joints with several welding segments, only re-weld the segments that need it.

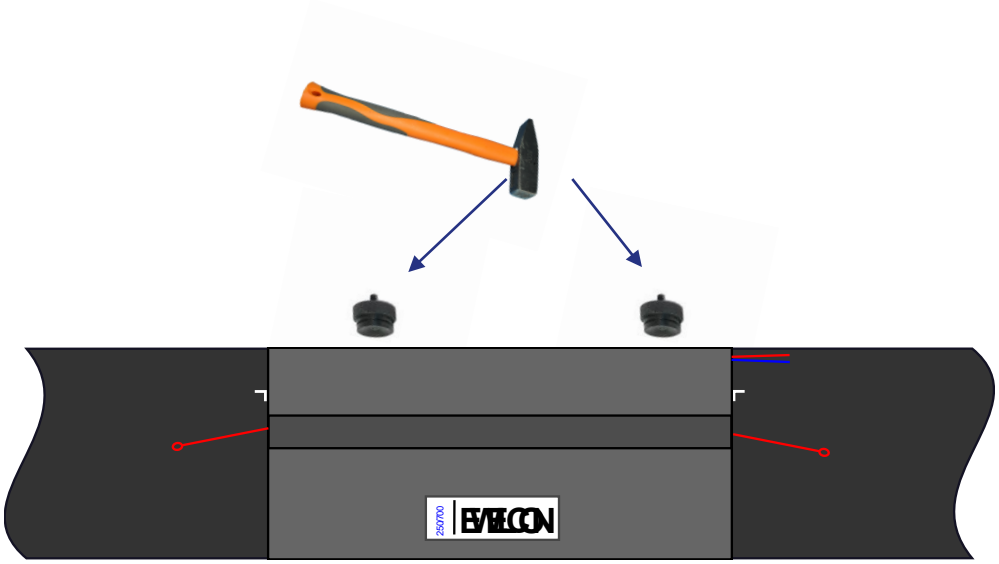
B 014 Foaming of joints and welding of plugs

Drill another one or two holes on top of the joint, following the PUR foam manufacturer's instructions.

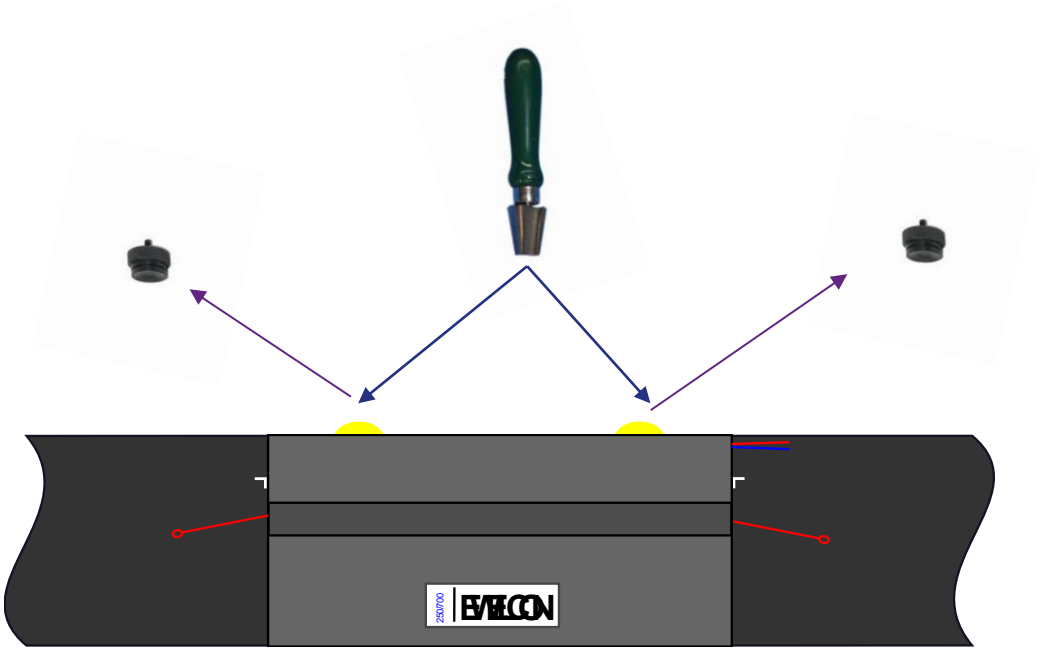
Prepare the proper amount of foam components and mix them precisely strictly according to the foam manufacturer's instructions. Pour the mixture in one of the drilled holes.



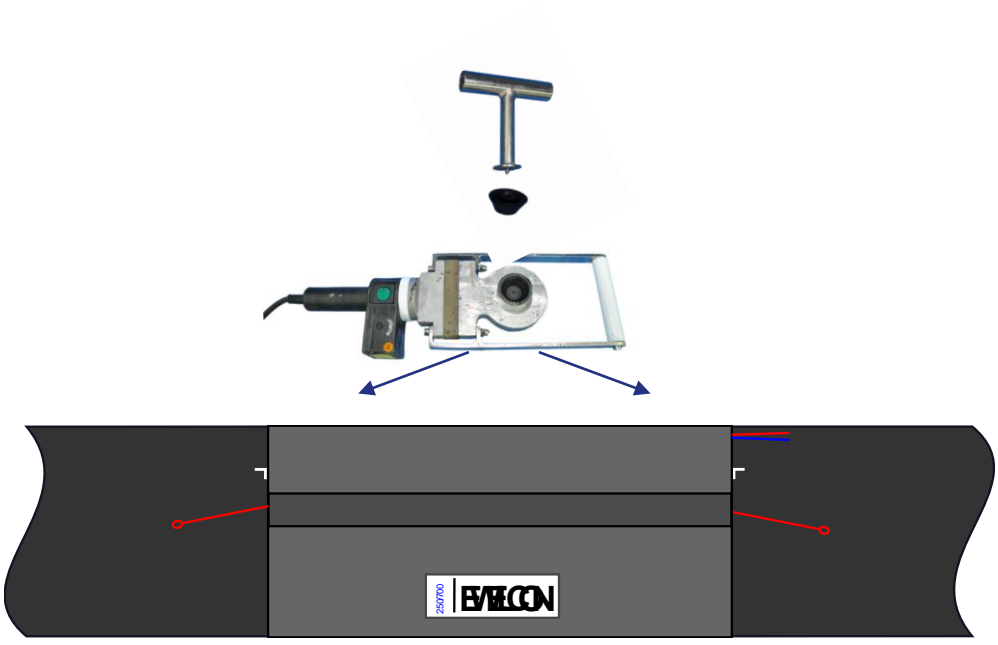
Plug the drilled holes with vents immediately after pouring the liquid foam components and wait for the growth of the foam.



Remove the vents and the foam surplus when the process of the foam growth is finished. Then clean the holes with the special cleaning cutter and prepare for welding of the plugs.



Weld the plugs with the special plug welder.



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Pipes

Appendix 1 to Installation Instructions

Specifications for Pipe Works

1 Working area - head trench

Based on UVV “Civil works” (VBG 37), DIN 4124 “Building trenches and trenches” and AGFW instruction sheet 4.3.3. “Trench widths”.

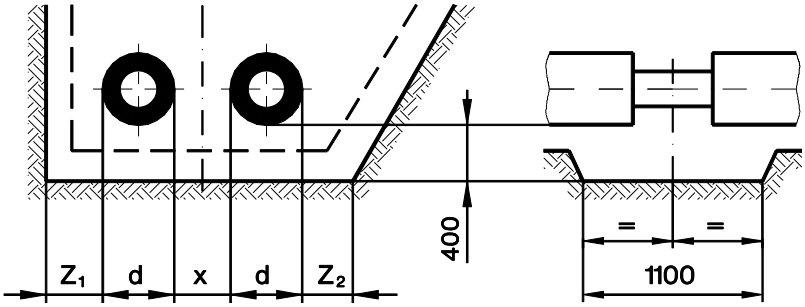

Table A1.1: Minimum dimensions, all in mm

d	x[1)]	Z_1	Z_2
250 - 630	200	350	300
710 - 1000	500	500	400

[1)] In pipes with different diameters the distance x for the larger diameter is to be used.

2 Field joint

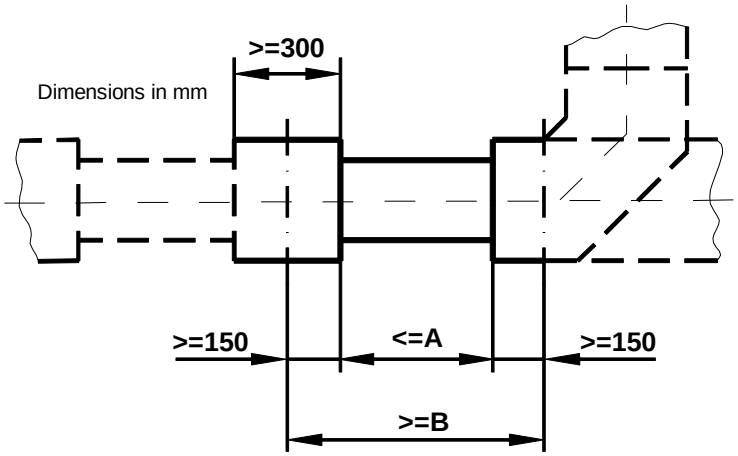

Table A1.2, all dimensions in mm

Width of joint	A[2)]	B
700	450	750
850	600	900

[2)] In casing pipe ends cylindrical throughout (no deformations!) the distance A can be 520 and 670 respectively.

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Appendix 2 Tutorial videos and QR codes

Pos	Description	QR code
B 01_01	Preliminary forming of the joint	
B 03_01	Preliminary cleaning of the jacket pipe surface	
B 04_01	Checkup of the jacket pipe and of the alignment of the pipeline	
B 04_02	Laying out the join spot	
B 05_01	Drilling Ø10 mm holes	
B 06_01	Cutting the jacket for the bracket T	
B 07_01	Removal of oxides from the jacket pipe with the tape sander	
B 07_02	Removal of oxides from the jacket pipe with abrasive tape	

Pos	Description	QR code
B 07_03	Removal of oxides from the casing pipe with a plastic scraper	
B 08_01	Preparation of EWC joint for assembly - cleaning	
B 08_02	Preparation of pipes for assembly of joint - line drawing	
B 08_03	Preparation of EWC joint for assembly - cleaning the joint	
B 09_01	bending and placing the bracket	
B 09_02	Joint aseembly - part 1	
B 09_03	Joint aseembly - part 2	
B 09_04	Joint assembly - part 3	

Pos	Description	QR code
B 09_05	Tightening the straps	
B 10_01	Cleaning the contacts	
B 11_01	Connecting the wires to the welding machine	
B 11_02	Connecting the wires to the joint	
B 11_03	Connecting thethermocouple	
B 13_01	Dismantle the fixing and tightening equipment	
B 13_02	Tightness test of the joint	

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Notes

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