

buttfusion jointing

UNI 10520 is the correct reference standard for the carrying out of the buttfusion jointing.

With this process the surfaces to be welded are heated by contact with an heating element and subsequently joined together using a special buttfusion machine.

compatibility

The buttfusion jointing is used to weld pipes and/or fittings with the **same thickness and diameter**. For nominal diameter lower than 63 mm the buttfusion jointing is not advisable. Pipes and fittings to be welded must respect the compatibility of melt flow index and density. In details the MFI value of both elements to be welded must be inside the range:

0,2 - 1,4 g/10 min (190°C – 5 Kg)

ambient conditions

Welding must take place in a dry and protect site. Suitable measures must be taken to protect the welding operation from adverse ambient conditions (rain, high humidity, wind). Ambient temperature must be between

-5°C and +40°C

welding operations

It is good practice, before carrying out the welding, to check the materials integrity, efficiency and safety of the equipment. The Operator must have the total visual control over all procedures and have enough space to work without restrictions, in a dry and on a level ground, if possible.

Preparation of welding surfaces is of main importance for the quality of the jointing, as per the following operations:



cleaning and facing

The ends of the pipes/fittings must be cleaned of dirt, mud or similar residuals, using a wet strong soft cloth and then must be clamped in the welding machine jaws. Subsequently they must be faced using a facer tool, which is part of the welding machine.

Bring pipe ends near to the electric facer tool, only after starting up, set gradual pressure avoiding the motor stops during operation. If that, slightly release pressure and quickly separate pipe ends avoiding to damage the facer tool motor.

Facing is completed when the shavings are continuous and of equal size on both ends.

In the way to protect the facer knives life, sharpen or replace them whenever there are problems or faulty conditions during the facing cycle.

inspections

When facing is completed, remove the facer tool and bring the faced ends together, checking that:

- the **mismatch does not exceed 10%** of the thickness of the elements to be welded with a maximum of 2 mm, on the contrary it is possible to adjust on the fixing system of the jaws or rotate the pipes up to the best connection condition, then repeat the facing cycle.
- the possible detachment between the ends is lower than the values reported in the following table. Facing must be repeated when these values are not achieved.

Outside diameter	max distance
up to d_n 200 mm	0,3 mm
over d_n 200 up to d_n 400 mm	0,5 mm
over d_n 400 mm	1,0 mm

The ends must be cleaned with proper detergent (alcohol isopropyl) to remove traces of grease, dust or polyethylene residuals.

heating plate temperature

The heating plate must guarantee the reaching of the **working temperature within 20 minutes** from its start-up. Temperature over the whole surface must be inside $\pm 10^\circ\text{C}$ tolerance with respect to the value set on the thermostat and measured with a digital thermometer.

Temperature values depend on the thickness e_n of the elements to be welded:

$210^\circ \pm 10^\circ\text{C}$ for $e_n \leq 12 \text{ mm}$
 $200^\circ \pm 10^\circ\text{C}$ for $e_n > 12 \text{ mm}$

cautions

The Operator must make sure no external troubles interfere with correct execution of the joint during the welding.

Frequently it could happen that the heating plate is cooled because of air channeled inside the pipelines. We recommend to close the pipeline ends with protective caps, taking them off only when welding is completed.

The heating plate must always be placed in its special support to prevent damages on the teflon coating. This one must be periodically reconditioned according to its use. It must be cleaned, when cold with alcohol isopropyl whenever it presents traces of grease, dust or PE residuals.

welding pressure

Polyethylene material requires a welding pressure value of **0,15 N/mm²**.

The welding machine manufacturer will supply special tables reporting the pressure values necessary for welding different diameters and thickness, in accordance to the section of the pressure cylinder which drives the movement of the jaws.

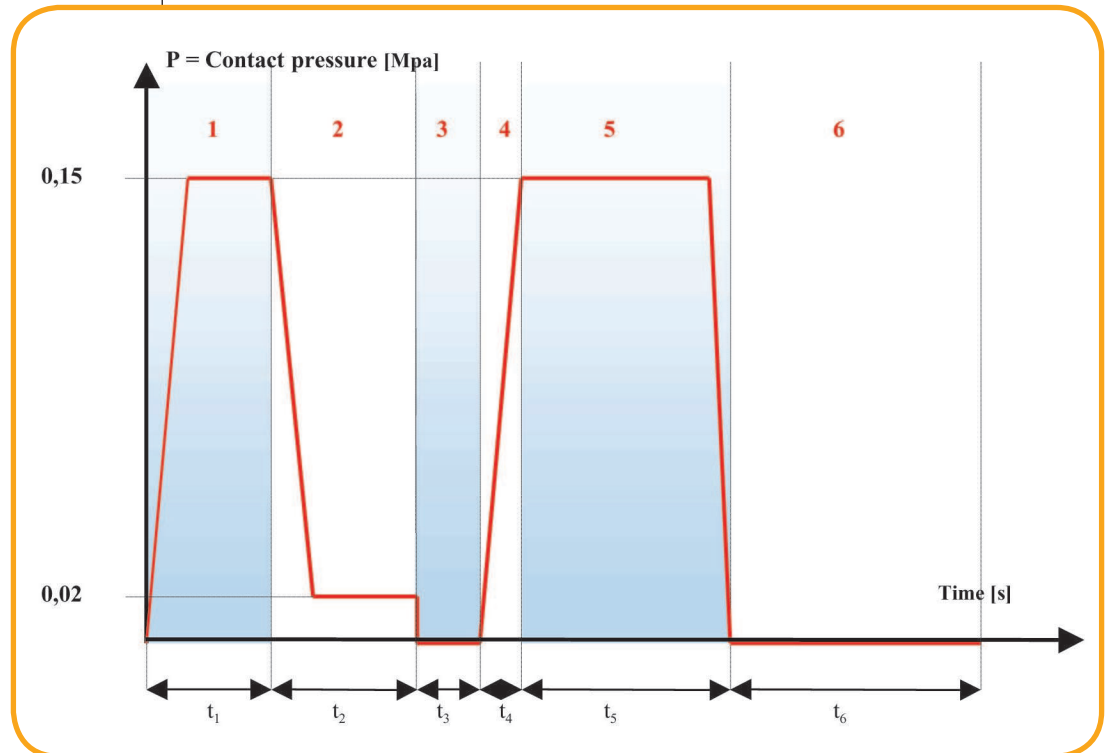
Pressure monitored by the pressure gauge is adjusted using the specific device.

drag pressure

Drag pressure is the pressure value necessary to move the jaws of the welding machine carrying the pipe. Its value mainly depends on the weight of the pipes to be welded, but it also depends on the oil temperature in the hydraulic circuit and on the jaws clamping force. This value must be **always verified** for each welding and added to the welding and heating pressures reported in the tables.



welding cycle



phase 1

hauling and pre-heating (with pressure)

The two ends to be welded are pushed against the heating plate with a pressure P_1 which is the sum of P (from table) and P_t (drag pressure). The “pre-heating with pressure” ends after a t_1 time as long as it forms on both ends to be welded a **ring** of fused material, whose **width A** depends on the pipe thickness and is shown on the welding tables supplied with the machine.

The following formula allows to estimate the A value:

$$A = 0,5 + 0,1 \cdot e_n \quad [\text{mm}]$$

