

Welding PUR-coated floors with Leister

Products can change quickly no matter what the sector. The trend towards a wide variety of different products does not stop at the flooring sector. New products such as PUR (polyurethane) coated floors promise customers greater benefits. For the floor layer though, they entail greater care and, above all, the right choice of tool!

Plastic floors – tried-and-tested technology

Plastic floors have successfully been welded using hot air (hot-gas extrusion welding) for several decades now. This technology has become established around the world, from residential and business premises, railways, trams and elevators through to hospitals. Numerous alternatives have been tested, though usually without success.

Frequent error scenarios for PUR-coated floors

Floor layers who did not have any problems with conventional floor coverings have been confronted with new materials without prior warning, materials that cannot be worked with so easily as the established «classics». As the result, the following errors have been encountered when incorrectly welding PUR-coated plastic floors:

a) PUR-surface is destroyed or totally melted off.

Possible cause: Preheating air applied to widely.

b) PUR-surface looks like orange skin in the seam areas.

Possible cause: Preheating air applied to widely.

c) Floor has risen on both sides of the seam area.

The side areas beside the groove have been softened too much. These side areas then rise too high as a result of the subsequent pressure in the groove (caused by applying the welding seam). These rises are then scraped off excessively when smoothing down with the quarter-moon knife.

d) Inadequate quality of the weld.

The weld exhibits an unsatisfactory visual quality in the transition area between the PUR surface and filled groove. Small notches can occur.

e) Poorly prepared groove.

The groove edges are not milled neatly, which means they are slightly frayed.

The effects of b and c alter the contamination behaviour in the seam area which, although not always noticed straightaway, often results in complaints later. Scenario d can have a negative effect on the long-term behaviour. A notch acts like a predetermined fracture point.

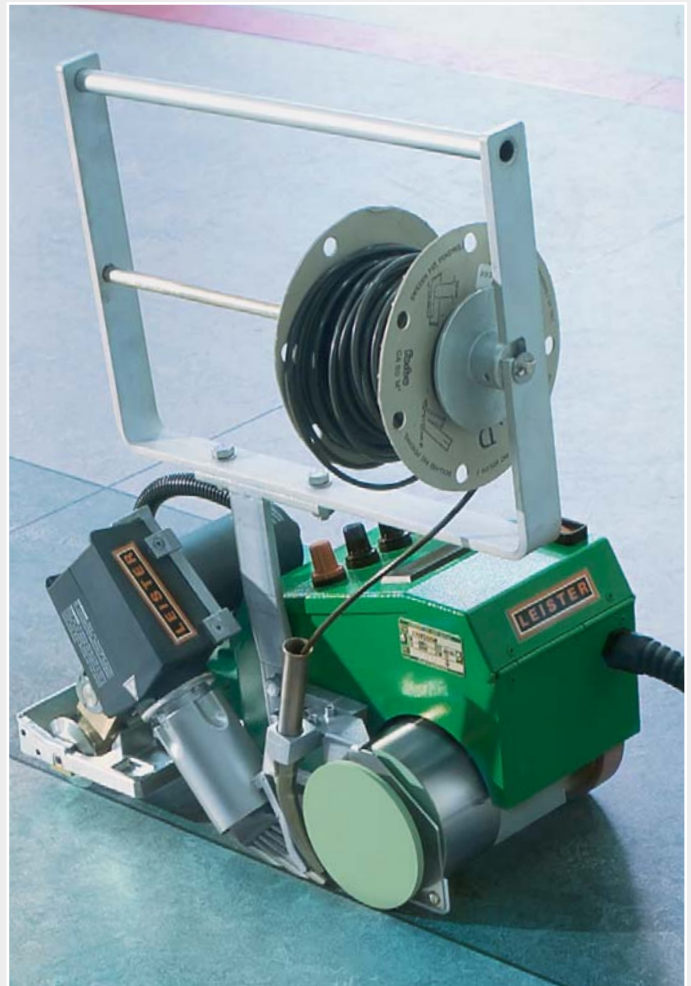
The basics of plastic welding

Whether in plastic container construction or for plastic flooring: The physics behind welding remains the same. This means the following principles always have to be observed:

- Only thermoplastic plastics can be welded
- Only the same materials can be welded to one another
- The parameters of heat, pressure, time and speed are the main influencing factors
- Different plastics have different application and processing temperatures

Challenge of welding floor covers with PUR surface

PUR has different thermal properties than PVC. In concrete terms, this means lower plasticizing and decomposition temperatures. The PUR surface is already destroyed at processing temperatures which would be regarded as normal for PVC.



Tried-and-tested processing technology with hot air.

The elemental significance of heat

Several more or less creative solutions have meanwhile been published or fished out from lists of handy tricks. As previously mentioned, the parameters of heat, pressure, time and speed have to be overcome. The welding areas (filler rod and complete groove) need to be brought to the welding temperature, without

damaging the PUR surface. Applying the heat at the right location poses the major challenge for these new floor covers. In other words, it is necessary to work in a very narrow process window between «well welded» and «surface not yet damaged».

The Leister solution

In order not to destroy the surface, a very narrow, hot jet of air has to be directed right to the centre of the groove and the air flowing backwards must heat up the side flanks. Plastic needs time in order to absorb the heat. In order to attain reliable welding speeds, the heat should have an effect not only on one point but over a longer section. The magic word is air-knife technology: a knife-sharp jet of air, which is directed into the centre of the groove with great precision. This jet of air makes it possible to heat the inner areas of the groove up to the welding temperature without destroying the PUR surface. Of course, this not only works for manual extrusion welding, but also for welding machines. As the preheating air can act over several millimetres with the rapid welding nozzle or several centimetres with the welding machine, viable welding speeds are possible.



The new air-knife-nozzle for the UNIFLOOR E provides a jet of air as sharp as a knife.

Manual welding

A manual device with controlled temperature setting, as with the Leister TRIAC PID, is a must for accurate work. The rapid welding nozzle with small air slit also enables floor covers with a PUR surface to be processed without any problem.

- Clean welding quality
- High welding speed
- With linoleum, the 5mm nozzle can be used for the 4 mm cord
- No melting/adhesion problems when welding linoleum, as is the case for solutions with an integrated pressure roller.



Rapid welding nozzle on Leister TRIAC PID for accurate work.

Welding with Leister welding machine

A professional welding machine like the Leister UNIFLOOR E is naturally used for welding larger sections. A special nozzle with air-knife technology has been developed for floor covers with a PUR surface.

- Infinite adjustment options for all parameters such as air temperature, air volume and speed
- Reproducible settings for all parameters thanks to display
- Monitoring of all parameters
- Economically more efficient laying thanks to high welding speed
- Optimum welding quality also for PUR surfaces
- Proven solution with established Leister quality



Hot air welding machine Leister UNIFLOOR E

Milling grooves

Precisely milled welding grooves and neat edges are a must for high-quality and visually flawless weld joints. Special attention must be paid to this for PUR surfaces in particular. Even hard floor covers can be processed optimally with the Leister GROOVER. A wide range of milling tools are available to meet all requirements.



Joint milling tool Leister GROOVER

Leister accessories:

Welding nozzle with air-knife technology for PUR-coated floor covering suitable for Leister UNIFLOOR E: Art. no. 103.394

Rapid welding nozzles with narrow air slit:

- Art. no. 105.431 3 mm
- Art. no. 105.432 4 mm
- Art. no. 105.433 5 mm