

Ultrasonic Welding

One or more thermoplastic materials are connected to one another in the joining area during timed ultrasonic welding.

Ultrasonic welding is found everywhere where thermoplastics are used and strict demands are placed on the method of joining. Compared with other welding methods, ultrasonic welding is particularly suitable where rapid process times, coupled with good process reliability are demanded or if no other fillers or solvents are to be used. Ultrasonic welding is also characterised by the quality, strength and accurate reproducibility of the welds.

The process itself is very special. Depending on the application, the welding results depend upon various parameters. In ultrasonic welding, high-frequency mechanical oscillations cause molecular and interface friction in the joining zone. This creates the heat required for welding and the material is plasticised. Following the effect of ultrasound, homogeneous stabilisation of the joining zone is achieved as a result of brief cooling times, whilst maintaining the welding pressure. In addition, both the geometry of the sonotrodes and the anvil, as well as the shape in the welding zone itself, affect the welding result. The essential characteristics and advantages of ultrasonic welding are as follows:

- Welding different thermoplastics according to their polymer compatibility, such as PP, PVC, PE, PET, ABS, composites, fabrics, fleece or or films
- Very rapid process times
- Very good process control and reliability by monitoring the welding parameters
- Selective energy supply by digital control of the welding process
- Consistent welding quality with visually perfect, stable and reproducible welds
- Visually appealing weld shape through individual anvil impression
- Environmentally-friendly technology
 - Low energy consumption during welding
 - No solvents and fillers for welding
 - Type-specific recycling of the welded workpieces
- Cold welding tools
 - No machine warming up times
 - No damage to the workpieces when the machine is stopped
 - No damage or folds in the welded material
 - No heating of the goods being packaged, for example in the packaging industry
 - Welding tools quick and simple to change
- Air and liquid-tight welds
 - Water impermeable welding of areas, which are contaminated by fat, oil or natural fibres
 - Ideal for sealing, for example, packaging.

As experts in the field of ultrasonic technologies, SONOTRONIC designs and builds standard and special machines with ultrasonic welding attachments to cater for widely different applications in various sectors. For example, in the automotive industry, it is mainly interior or exterior components, which are welded, whilst in the packaging industry, packaging is sealed by ultrasound. In the textile industry, textiles made from thermoplastic fabrics can be joined with absolutely tight seams by fusing the materials, thanks to ultrasonic technology. Other plastics industries, such as domestic appliances, electronics and electrical engineering or medical engineering, make use of the advantages of ultrasonic welding for appropriate applications.