

Ultrasonic Welding KYDEX® Thermoplastic Sheet

For information applicable to KYDEX® FST please refer to 300 series technical briefs.

TB - 112

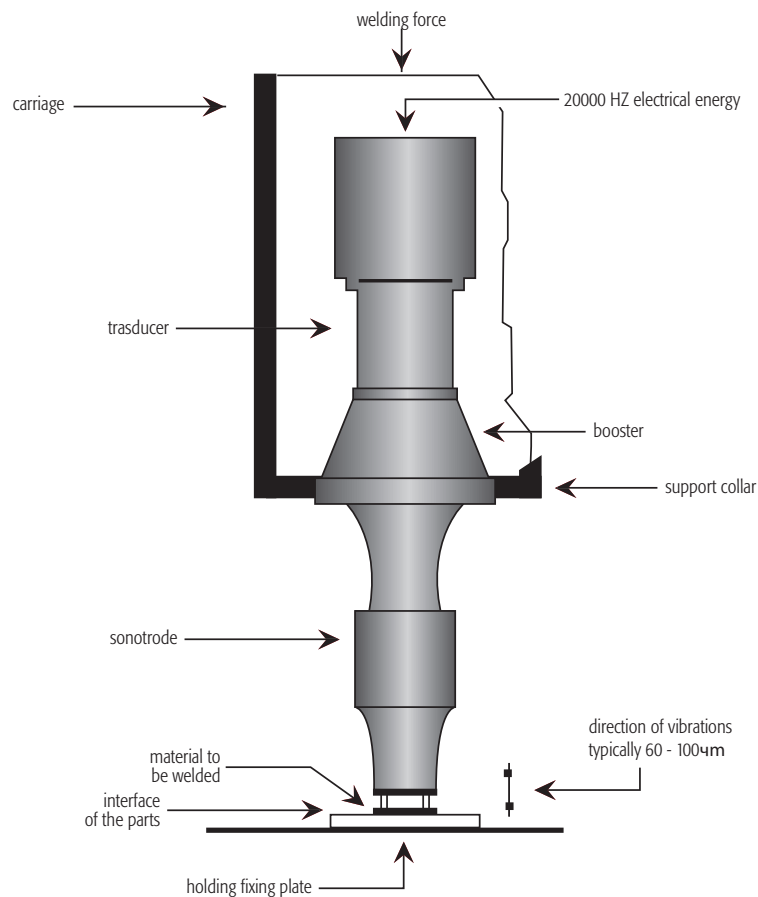
General Information

Ultrasonic spot welding is a practical assembly method for joining KYDEX® sheet parts in all thicknesses. Properly made joints, with the welder tip, known as the horn, applied to the rear surface, will produce strong joints with the front or finished surface free of any blemishes. Ultrasonic welding times are typically less than one second; this makes it very suitable for assembly purposes in a mass production environment.

Since no adhesives, solvents, or mechanical fasteners are used, ultrasonically welded thermoplastic parts can be readily identified as being recyclable. The process eliminates employee health risks and added costs associated with the use of adhesives and solvents as well.

In ultrasonic welding, high frequency electrical energy, usually 20, 30, or 40 kHz, is converted to mechanical vibration. This mechanical vibration is transmitted through one of the components being joined to the interface. The touching surfaces are heated and melted, due to the very high frequency vibration, together as pressure is applied. Pressure is maintained for a short time after the parts are joined to allow solidifying of the melted material.

The following is a basic set-up of an ultrasonic welder:



KYDEX, LLC

ISO 9001 and 14001 Certified

Customer Service

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www.kydex.com

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Ultrasonic Welding

Good joints are represented by high weld strength without degradation or burning. The conditions that produce good joints involve controlling the weld time, the pressure and the voltage supplied to the ultrasonic welding transducer. The thicknesses of the materials being joined influence the time and pressure needed to produce optimum joints. As a guide to determining the best conditions for a specific application, the following test results may be used.

KYDEX® Sheet Thicknesses	Weld Time	Pressure
3.18 mm (0.125")	2.0 sec	551 kPa (80 psi)
2.00 mm (0.080")	0.7 sec	345 kPa (50 psi)

Some experimentation is to be expected to suit a particular part design and material thickness. Keep in mind that clean surfaces yield optimum strength and excessive weld times can result in degradation. Ultrasonic spot welding can be done in a welding stand or on-site by using a portable hand held unit. When using the portable unit, it is especially important to work on a clean, smooth, hard surface with the parts rigidly supported to avoid slippage, since slippage could result in a weakening of the bond. If you wish to produce another form of continuous bond, contact KYDEX Technical Service for information on hot-gas welding or adhesives.

More information about ultrasonic welding is available at www.twi.co.uk.

Health and Safety Precautions:

All thermoplastic materials release some vapors or gases at high temperatures. Ultrasonic welding KYDEX® sheet in accordance with the techniques and procedures recommended herein should not result in harmful concentrations of gases or vapors when handled in areas with adequate ventilation. Use care in keeping the temperature of the KYDEX® sheet below 204°C (400°F) at which point KYDEX® sheet will start to burn and degrade.

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