

## Ultrasonic Welding KYDEX® Thermoplastic Sheet

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

### TB - 151-B

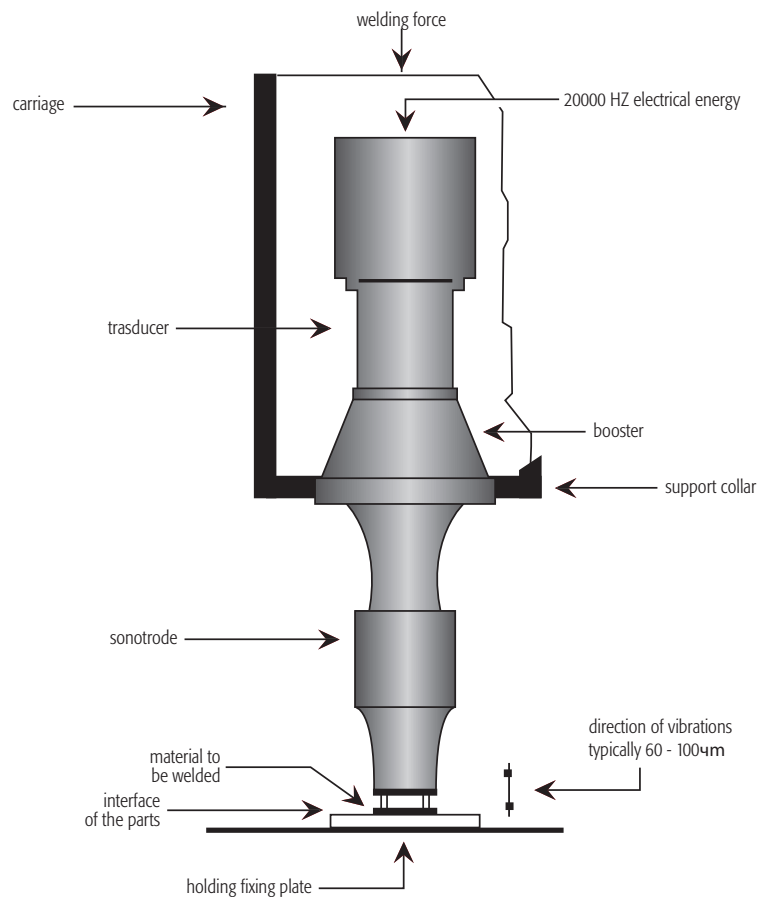
#### General Information

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**  
6685 Low St, Bloomsburg, PA 17815 USA  
Phone: 800.325.3133, +1.570.389.5810  
Outside the US: +1.570.389.5814  
Fax: 800.452.0155, +1.570.387.7786  
Email: info@kydex.com

**Technical Service**  
Phone: 800.682.8758  
Fax: +1.570.387.8722  
Outside the US: +1.570.387.6997  
Email: techservice@kydex.com

[www.kydex.com](http://www.kydex.com)

## Ultrasonic Welding KYDEX® Thermoplastic Sheet

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

### TB - 151-B

#### 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, LLC Technical Service for information on hot-gas welding or adhesives.

More information about ultrasonic welding is available at [www.twi.co.uk](http://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.

#### KYDEX, LLC

ISO 9001 and 14001 Certified

#### Customer Service

6685 Low St, Bloomsburg, PA 17815 USA  
 Phone: 800.325.3133, +1.570.389.5810  
 Outside the US: +1.570.389.5814  
 Fax: 800.452.0155, +1.570.387.7786  
 Email: [info@kydex.com](mailto:info@kydex.com)

#### Technical Service

Phone: 800.682.8758  
 Fax: +1.570.387.8722  
 Outside the US: +1.570.387.6997  
 Email: [techservice@kydex.com](mailto:techservice@kydex.com)

[www.kydex.com](http://www.kydex.com)

Because we cannot anticipate or control the many different conditions under which this information and our products may be used, we do not guarantee the applicability of the accuracy of this information or the suitability of our products in any given situation. Users should conduct their own tests to determine the suitability of each product for their particular purposes. Data in the physical property table represents typical values and are to serve only as a guide for engineering design. Results are obtained from specimens under ideal laboratory conditions. Right to change physical properties as a result of technical progress is reserved. THE PRODUCTS DISCUSSED ARE SOLD WITHOUT WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, EITHER EXPRESSED OR IMPLIED, EXCEPT AS PROVIDED IN OUR STANDARD TERMS AND CONDITIONS OF SALE. Buyer assumes all responsibility for loss or damage arising from the handling and use of our products, whether done in accordance with directions or not. In no event shall the supplier or the manufacturer be liable for incidental or consequential damages. Also, statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent. Consult local code and regulatory agencies for specific requirements regarding code compliance, transporting, processing, recycling and disposal of our product. Product not intended for use as a heat resistant surface. Texture, product grade and other conditions may cause variations in appearance.

This information supersedes all previously published data.