

Thermoforming KYDEX® Thermoplastic Sheet

TB - 140-B

Introduction

KYDEX® sheet has excellent forming properties, which results in uniform wall thicknesses and crisp detail. KYDEX® sheet forms to deep draws with low forces when heated to the upper end of the forming temperature range. Unlike many other thermoforming sheets, KYDEX® sheet has unusually high resistance to hot tearing.

General Guidelines

- KYDEX® sheet will form differently than other thermoplastic materials.
- KYDEX® sheet is more consistent than other thermoplastics, resulting in fewer rejects.
- KYDEX® sheet will give better detail than other thermoplastics.
- KYDEX® sheet can be vacuum, drape, and pressure formed. These methods result in increased levels of detail.

Forming Guidelines

- Oven temperatures should be set differently than the settings used for ABS or FR-ABS.
- Typical heater settings (percentage timers) are 30% – 50% top heaters and 50% - 70% bottom heaters.
- The most frequent problem is trying to heat the sheet too quickly, particularly on the primary surface.
- Cycle times will vary depending on the oven conditions and grade of KYDEX® sheet being formed.
- When forming KYDEX® sheet, it is better to rely on the sheet appearance during heating than on fixed cycle times.
- Forming temperatures – Guidelines: (Sheet should not exceed 204°C (400°F).

165 - 177°C (330 - 350°F) for < 1.50mm (0.060")
 182 - 196°C (360 - 385°F) for 1.50mm to 3.20mm (0.060" to 0.125")
 196 - 204°C (385 - 400°F) for > 3.20mm (0.125")

- Ideally the core sheet temperature should be within 10°F of the surface temperature.

Additional Guidelines

Drying is generally not required except in high humidity conditions. If the material needs to be dried, it should be dried at 68°C (155°F) or about 15° below the products HDT for 10 hours for 2.00mm (0.080"), 16 hours for 3.20mm (0.125") or 24 hours for 6.40mm (0.250") thickness

Two sided (sandwich) heaters are recommended above 2.00mm (0.080") nominal thickness.

Sheet Appearance During Heating

As KYDEX® sheet is heated, the inherent stresses in the sheet will relax.

- Stage I: The heating is marked by wide undulations and softening
- Stage II: The material will start to form small ripples (known as oil canning).
- Stage III: The material will start to smooth out and sag (KYDEX® sheet will generally sag less than other thermoplastic due to its high melt strength).
- Stage IV: The ripples will have smoothed out indicating that most stresses have been removed. 10 to 30 seconds afterwards the sheet is ready to form.

SEKISUI SPI
 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@sekisui-spi.com

Technical Service
 Phone: 800.682.8758
 Fax: +1.570.387.8722
 Outside the US: +1.570.387.6997
 techservice@sekisui-spi.com

sekisui-spi.com

Thermoforming KYDEX® Thermoplastic Sheet

TB - 140-B

Thermoforming Machine Manufacturers

If you can NOT achieve Stage IV before the sheet blisters and /or smokes excessively, IT IS BEING HEATED TOO QUICKLY. Cut back on the heat and increase the dwell (cycle) time.

Thermolabels or Infrared (IR) pyrometer is ideal for determining sheet surface temperature. You should achieve (but not exceed) proper forming temperature at Stage IV.

In summary, the main thing to look for when thermoforming KYDEX® sheet, is the uniform sag and lack of rippling. At this point, the KYDEX sheet is ready to form.

Design Criteria:

- Minimum radius (vacuum forming) is generally equal to the nominal thickness (i.e. 0.71mm (0.028")) thickness.
- Mold Shrinkage for male molds is 0.4 - 0.6%; female molds, 0.5 - 0.7%; female pressure-forming molds 0.40 - 0.50%.

Brown Machine LLC
330 N Ross Street
Beaverton, MI 48612
Tel: +1.989.435.7741 or +1.877.702.4142
Fax: +1.989.435.2821
E-mail: sales@brown-machine.com
Online: www.brown-machine.com

Custom Manufacturing, Inc
330 N Ross Street, P.O. Box 434
Beaverton, MI 48612
Tel: 517.435.7741
Fax: 517.426.4049

Modern Machinery
3031 Guernsey Road, Box 423
Beaverton, MI 48612
Tel: 989.435.9071 or +1.888.649.9839
Fax: 989.435.3940
E-mail: info@modernmachineinc.com
Online: www.maodernmachineinc.com

Lamco Machine Tool, Inc
135 Industrial Drive, P.O. Box 2357
Moorehead City, NC 28557-2357
Tel: 252.247.4360
Fax: 252.247.4633
E-mail: lamco@mail.clis.com
Online: www.lamcomachine.com

MAAC Machinery Corp
801 Hilltop Drive
Itasca, IL 60143
Tel: 800.588.MAAC
Fax: 630.285.1506
E-mail: maac@maacmachinery.com
Online: www.maacsales.com

Plastimach, Inc
704 Executive Blvd.
Valley Cottage, NY 10989
Tel: 800.394.1128
Fax: 914.267.2825
E-mail: plastimach@plastimach.com
Online: www.plastimach.com

Adolf Illig
Maschinenbau GmBH
Mauerstrasse 100
D-74081 Heilbronn
Germany
Tel: +49.7131.505.0
Fax: +49.7131.505.303
Online: www.illig.de/en/index_en.html

Geiss AG
Industriestriße
2 D-96145 Seßlach
Germany
Tel: +49.9569.92.21.0
Fax: +49.9569.92.21.0
E-mail: mail@geiss-ttt.com
Online: www.geiss-ttt.com

SEKISUI SPI

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@sekisui-spi.com

Technical Service

Phone: 800.682.8758
Fax: +1.570.387.8722
Outside the US: +1.570.387.6997
techservice@sekisui-spi.com

sekisui-spi.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.