



## THERMOFORMABLES

As more and more types of plastics became available some are made up by actually blending two or more types together to create a new material. Many of these "blends" help to make up a group of plastics commonly referred to as thermoformables. This label refers more so to the process that is used to reach their final shape as a finished part. Many plastics can be shaped by means of thermoforming although here are a select few plastics known first as thermoformables.

### Kydex

High performance thermoplastic sheet for thermoforming, membrane pressing, laminating and fabrication of damage resistant components. KYDEX sheet products are extremely durable thermoplastic alloys extruded in a range of colors, patterns, textures, thicknesses and grades.

### ABS

ABS resins are terpolymers of acrylonitrile, butadiene and styrene. These medium-priced, amorphous thermoplastics are hard, rigid and tough, even at low temperatures. Various grades offer different levels of impact strength - a function of butadiene content. Heat resistant, flame-retardant and palatable grades are also available. Most natural ABS resins are translucent to opaque, but they are also produced in transparent grades, and they can be pigmented to almost any color. Grades are available for injection molding, extrusion, blow molding, foam molding and thermoforming.

### Polystyrene

A versatile amorphous thermoplastic available in a wide range of formulations from general-purpose crystal and impact grades, to specialized resins for foam molding and extrusions. The wide range of physical properties and ease of processing make polystyrene an attractive material for many applications. General-purpose polystyrenes are used for knobs, light shields, disposable beverage glasses, serviceware and packaging items. High-heat formulations are found in radio and TV cabinets, tape reels and appliance parts. Impact grades are used in appliances, toys, housewares and specialty items. Structural foam polystyrene is used in wood-replacement products such as "carved" components for furniture and, in extruded form, trip strips and baseboards for residential and mobilehome use.

### PETG

Polyethylene Terephthalate Glycol (PETG) is a high impact, FDA compliant thermoplastic copolyester that provides toughness, chemical resistance and fabricates well using processes like die cutting, drilling, routing, bending and polishing without chipping or burs. Due to its low forming temperature, PETG is readily vacuum and pressure-formed, heat bent or it can also be easily bonded using solvents or adhesives. PETG can be screen printed using any number of inks and comes in custom colors to match any scheme.

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## Technical Data Sheet



### KYDEX® 100 High impact fire-rated sheet

#### Introduction

Super tough, durable KYDEX® 100, a proprietary alloy sheet, brings new dimensions to thermoformers in: formability, rigidity, breakage resistance, chemical resistance and fire retardancy.

#### General Information

KYDEX® 100 is available in a wide range of standard and custom colours, textures, and sheet sizes. It is Underwriter's Laboratories, Inc® recognized for UL Std 94 V-0, 5V and UL Std 746C and has 961 J/m (18 ft-lbs/in) Notched Izod impact resistance.

#### Suggested Applications

- Aircraft Interiors
- Mass Transit Vehicle Interior Components
- Equipment Housings
- Medical Products
- Miscellaneous Applications

#### Features

- Good for deep or hard to form parts more rigid, parts will deform less when loaded
- High Notched Izod impact resistance offers unsurpassed resistance to breakage
- Meets highest standard for chemical resistance for thermoplastic materials
- Recognized by Underwriter's Laboratories, Inc® for Std 94 V-0, 5V and Std 746C in all thicknesses and colours
- Uniform wall thickness and crisp detail
- Easy machining and fabricating using conventional methods and equipment

#### Environmental and Safety Considerations

KYDEX, LLC is committed to ensuring that its products can be manufactured, transported, stored, used, disposed and recycled with an appropriate regard for safety, health and environmental protection. We support the safe handling of our products. Please contact our Technical Service department at 800.682.8758 for resources or visit our website: <http://www.kydex.com>. For Material Safety Data Sheets, please call 800.325.3133.



ISO 9001:2000 | ISO 14001:2004 Certified

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### KYDEX® 100 High impact fire-rated sheet

#### Physical Properties

Property	Test Method	Typical Value	
Specific Gravity	ASTM D-792	1.35	
Tensile Strength	ASTM D-638	42 MPa	6,100 psi
Elongation %	ASTM D-638	160	
Flexural Strength	ASTM D-790	63 MPa	9,100 psi
Modulus of Elasticity	ASTM D-790	2,310 MPa	335,000 psi
Notched Izod Impact Resistance, @ 23°C (73°F)	ASTM D-256	953 J/m	18 ft-lbs/in
Rockwell Hardness (R Scale)	ASTM D-785	94	
Coefficient of Linear Thermal Expansion	ASTM D-696	7.56 x 10 <sup>-4</sup> °C	4.2 x 10 <sup>-4</sup> °F
Heat Deflection Temperature (HDT) @ 264 psi (1.8 MPa) annealed	ASTM D-648	78.3°C	173°F
Flammability: Underwriter's Laboratories, Inc* Component Recognition	UL Standard 94 UL Standard 746C	V-0, 5V <sup>1</sup>	
Motor Vehicle Safety Standard	MVSS 302	Pass	
Federal Aviation Administration	FAR 25.853 (a)	Pass <sup>2</sup>	
BS 476 Part 7		Class 1 @ 3.20 mm Class 1Y @ 2.00mm	
EC 95 / 28 / EG		Pass (1.00 - 6.00mm)	
DIN 5510-2		0.90mm (S4, ST2, SR2) 6.50mm (S4, ST2, SR1)	

<sup>1</sup> Values based upon 3.18mm (0.125") sheet unless otherwise specified.  
<sup>2</sup> Underwriter's Laboratories, Inc\*, File E115252  
<sup>3</sup> All thicknesses 0.71mm (0.028") and above  
\* The thicknesses are added.  
Not intended for specification purposes.



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This information supersedes all previously published data.

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## General Purpose ABS SP-9010

SP-9010 is a medium impact rigid ABS sheet, which provides good physical properties at an effective price. Standard stock sheets of 48" x 96" are available in many gauges.

### General Purpose SP-9010 Data

Test	Condition	Units	Value
Specific Gravity	ASTM D792	g/cm <sup>3</sup>	1.04
Tensile Modulus	ASTM D638	psi	310,000
Tensile Strength	ASTM D638	psi	6,000
Flexural Modulus	ASTM D790	psi	340,000
Flexural Strength	ASTM D790	psi	10,000
Izod Impact	ASTM D256	Ft-lbs/in.	7.5
	(73°F, -40°C)		2.5
Falling Dart Impact	ASTM D3029	Ft-lbs	33
	(73°F, -40°C)		12
Heat Deflection Temperature	ASTM D648	°F	198
Hardness	ASTM D785	Rockwell R	105
Gardner Gloss	ASTM D523	%	90
Flammability Rating	MVSS 302		Passes
	UL94 HB		Passes

Spartech warrants that its products conform to its published specifications in effect at the time of sale, but Spartech expressly disclaims any warranties of the merchantability and of fitness for a particular purpose with respect to its products. The values shown above are representative of values that have been obtained in the testing of samples produced in various colors. Each user of the material should conduct his own testing and evaluations to determine the effectiveness, safety, and suitability of the material for its particular use.

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## Premium SP-9020

SP-9020 rigid ABS thermoplastic sheet offers customized gloss with no sacrifice in performance. Exact resin blends are precisely controlled to achieve gloss, impact and total conformance to customer specifications.

### Premium SP-9020 Data

Test	Condition	Units	Value
Specific Gravity	ASTM D792	g/cm <sup>3</sup>	1.03
Tensile Modulus	ASTM D638	psi	310,000
Tensile Strength	ASTM D638	psi	5,400
Flexural Modulus	ASTM D790	psi	300,000
Flexural Strength	ASTM D790	psi	9,600
Izod Impact	ASTM D256 (73°F, -40°C)	Ft-lbs/in.	8.0
			4.0
Falling Dart Impact	ASTM D3029 (73°F, -40°C)	Ft-lbs	35
			23
Heat Deflection Temperature	ASTM D648	°F	195
Hardness	ASTM D785	Rockwell R	105
Gardner Gloss	ASTM D523	%	90
Flammability Rating	MVSS 302		Passes
	UL94 HB		Passes

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## HIPS SP-2010

**SP-2010** is engineered from the toughest polystyrene resins to provide a superior balance of processability, stiffness, deep-draw formability, and high impact strength.

### HIPS SP-2010 Data

Test	Condition	Units	Value
Specific Gravity	ASTM D792	g/cm <sup>3</sup>	1.04
Tensile Modulus	ASTM D638	psi	239,000
Tensile Strength	ASTM D638	psi	3,500
Flexural Modulus	ASTM D790	psi	277,000
Flexural Strength	ASTM D790	psi	6,900
Izod Impact	ASTM D256 (73°F, -40°C)	Ft-lbs/in.	2.0
Falling Dart Impact	ASTM D3029 (73°F, -40°C)	Ft-lbs	125 (in-lbs)
Heat Deflection Temperature	ASTM D648	°F	185
Hardness	ASTM D785	Rockwell R	95
Gardner Gloss	ASTM D523	%	70
Flammability Rating	UL94 HB		Passes

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## Product Data VIVAK® VI Sheet

### Ease of Fabrication

VIVAK® VI Sheet is a transparent copolyester product that offers a unique balance of physical properties and ease of fabrication. It is ideally suited for complex parts requiring fabrication, including deep thermoforming draws, and precise molded-in details. In addition, VIVAK VI Sheet is produced using resin that complies with FDA regulations for food contact applications. It is easily decorated by painting, silk screening or hot stamping. VIVAK VI Sheet is offered in thickness from 0.020"-0.500".

### Applications

Typical applications include shelving, greeting card displays, revolving merchandise racks, indoor signs, point of purchase displays, menu boards, photo frames, and slatwall fixtures. Heavy gauge VIVAK VI Sheet is also used in prosthetic applications.

### Typical Properties

Properties	Test Method	Units	Values
<b>PHYSICAL</b>			
Specific Gravity	ASTM D792	-	1.27
Water Absorption, 24 hours	ASTM D570	%	0.2
Light Transmission	ASTM D1003	%	86
Refractive Index	ASTM D542		1.57
Haze	ASTM D1003	%	1.0
<b>MECHANICAL</b>			
Tensile Strength, Ultimate	ASTM D638		7,700
Tensile Modulus	ASTM D638	psi	320,300
Flexural Strength	ASTM D790	psi	11,200
Flexural Modulus	ASTM D790	psi	310,000
Shear Strength	ASTM D732	psi	9,000
Compressive Strength	ASTM D895	psi	8,000
Izod Impact Notched 0.125" @ 73 °F	ASTM D256	ft-lb/in	1.7
Izod Impact Notched 0.125" @ 32 °F	ASTM D256	ft-lb/in	1.2
Drop Dart Impact 0.250"	ASTM D3763	ft-lb/in	22
Rockwell Hardness	ASTM D785	R Scale	115
<b>THERMAL</b>			
Heat Deflection Temperature, @ 264 psi	ASTM D648	°F	157
Heat Deflection Temperature, @ 66 psi	ASTM D648	°F	164
Coefficient of Thermal Expansion	ASTM D696	in/in/°F	3.8 x 10 <sup>-5</sup>
Glass Transition Temperature	ASTM D3418	°F	178
<b>ELECTRICAL</b>			
Dielectric Constant @ 1kHz	ASTM D150	-	2.6
Dielectric Constant @ 1mHz	ASTM D150	-	2.4
Dielectric Strength	ASTM D149	V/mil	410

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