

VIVAK HT[®] S H E E T

The Clear Choice for
Outdoor Signs



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Sheffield
Plastics Inc.

A  Bayer Polymers Company

VIVAK HT® SHEET-

Provides Outdoor Sign Options that Work for You

Sheffield Plastics has served the sign industry for over half a century and our VIVAK HT Sheet clearly illustrates that we understand the material needs of the industry. VIVAK HT Sheet is a proprietary, high performance thermoplastic sheet with enhanced UV resistance. It offers exceptional formability with outstanding impact strength that makes it ideal for a wide variety of outdoor sign applications. VIVAK HT Sheet is easily thermoformed and fabricated. VIVAK HT Sheet can be decorated with sign vinyl, paint, and inks to fit any sign company's capability.

VIVAK HT Sheet offers the kind of fabricating, forming, and finishing ease that can really make a difference on the job. It delivers superior impact strength compared to acrylics with temperature resistance that matches impact acrylics.

VIVAK HT Sheet gives the sign manufacturer more design flexibility. With lower forming temperatures and faster cooling cycles, VIVAK HT Sheet is an excellent substrate selection for faces formed with vinyl. If impact resistance is an issue, VIVAK HT Sheet has an average of 19 times the impact strength of impact modified acrylic. With no drying requirements and faster cycle times, VIVAK HT Sheet is an excellent material choice for outdoor sign manufacturers. At Sheffield Plastics we work with sign manufacturers every day to troubleshoot, solve problems, and meet material requirements.

Please call for further information: 800-254-1707



Photo Courtesy of Sign Faces, Birmingham, AL

VIVAK HT® SHEET...

Cost Effective Thermoplastic for Outdoor Sign Fabrication

VIVAK HT Sheet offers superior strength over impact modified acrylics and can be more cost effective than high impact acrylics. The benefits of VIVAK HT Sheet's higher performance translates into faster thermoforming production rates. VIVAK HT Sheet's higher flatwise impact and forgiving nature means less breakage. These significant advantages can result in higher margins and lower costs.

Key Features:

- Ideal for Forming Preapplied Vinyl
- No Drying Required
- Cycle Times Faster
- Riveting
- Stability

VIVAK HT Sheet provides sign fabricators high impact resistance, superior forming qualities, and faster cycle times. It is suitable for the production of formed vinyl faces, distortion printing, and detail-oriented images. An advantage of VIVAK HT Sheet is its uniform shrink rates, which make it a highly desirable product for forming with distortion print screening. With a HDT (heat deflection temperature) of 185°F, VIVAK HT Sheet delivers the heat stability demanded by the sign industry.

VIVAK HT Sheet is available in both standard and custom widths in clear and white. Standard sheets come in 52 and 75 inch widths with corresponding lengths of 96, 100, 120, and 144 inches. Custom sizes can be ordered if needed. If a manufacturer requires reel quantities, they are available in 40, 52, 64, 76, and 100 inch widths. Reel sheet thickness ranges from: .093-625 linear feet; .150-400 feet; .118-450 feet; .177-300 feet. All materials carry a standard 7 year limited warranty.

Performance Comparison

Compare VIVAK HT Sheet performance for sign fabrication and formed applications. It delivers an optimum balance of performance and design flexibility for exterior signage.

	Impact Modified Acrylic	VIVAK HT Sheet
Thermal		
Forming Temperature °C/°F	135-177°C/275-350°F	132-160°C/270-320°F
Deflection Temperature 264 psi (ASTM D-648) °C/°F	79°C/175°F	85°C/185°F
Mechanical		
Flexural Modulus .125 (ASTM D-790) psi	270,000	305,600
Notched Izod Impact .125 (ASTM D-256) ft. lbs/in	.5	1.4

VIVAK HT® SHEET

Easily Fabricated—Even on the Most Complex Designs

Sawing Recommendations

Cutting

A circular blade with carbide-tipped teeth utilizing the "triple chip" tooth design is the preferred method of cutting VIVAK HT Sheet. Table or overhead saws can be used successfully. Band saws are useful for trimming formed parts or irregular shapes and a variety of other saws can be used for specific cutting operations.

Type of Cut	Tool	Blade Type	Blade Parameters	Blade Speed
Straight Cut	Circular Saw	Triple-Chip Design	7-1/4" diameter; 40 teeth (carbide-tipped cutoff) 7-1/4" diameter; 200 teeth plywood blade	4,500 rpm
Curved Cut	Saber or Jigsaw	Finish Cutting Blade	10 teeth per inch	
Curved Cut	Band Saw	1/2"	6 teeth per inch	2,000 ft/min
Trimming & Deflanging	Router	Carbide-tipped or high-speed steel, double fluted Circular Blade	3/8–1/4 2 fluted preferred	20,000 rpm
			4 wing, carbide tip, 1/16" kerf, slotting cutter (Whiteside Machine Co. Part #6700B)	
	Circular Saw	3.4–4" diameter	Multipurpose wood – 2-3 teeth/inch	

Drilling

Drill bits specifically designed for plastics are recommended although standard twist drill bits for metal or wood can also be useful. VIVAK HT Sheet is easily drilled using zero-degree rake angle bits with dubbed off cutting edges. Typical peripheral speeds of drill for plastics range from 100 to 200 feet per minute. The rate of drill feed into the VIVAK HT Sheet can vary from 0.010 to 0.025 inch per revolution.

Thermoforming

VIVAK HT Sheet offers deeper draws without the webbing often associated with impact modified acrylics. It can be thermoformed on standard equipment.

VIVAK HT Sheet forms well with many commonly used vacuum-forming machines that have infrared heating elements. Rotary and shuttle design with automatic or semiautomatic controls are most suitable. Key features of this type of equipment include: timer control accuracy, uniform heating sources, and sufficient vacuum power. Single-sided heating has proven effective for VIVAK HT Sheet in gauges up to .177". For thickness above .177", dual-sided heating ovens should be used for faster radiation penetration, quicker cycle times, and avoidance of overheating the surface of the sheet.

VIVAK HT Sheet allows the use of a wide variety of mold materials including wood, filled and unfilled polyesters, epoxies, and metals. Molds for vacuum forming need to take only 14 psi, so there is little wear on the tooling with low pressure of the material against the mold surface. Use standard mold design practices and mold materials.

In general, male molds are more commonly used for vacuum forming. However, other factors such as part size, finish, and shape dictate mold design. Choice of mold materials should be determined by considering the length of the production run. For optimum cost effectiveness, use the least expensive material that will take the entire run. It is evident that thermal transfer is much more efficient with aluminum than wood. Wood, however, can be utilized for the short-run projects.

Typical Mold Materials

THERMAL CONDUCTIVITY PROPERTIES

Material	Heat Transfer Rate Factor	K Value Btu/Hr/SF/F/Ft
Aluminum	6190	130
Steel	1238	26
Aluminum Filled Epoxy	24–47	.52–.87
Plaster of Paris	8.29	.17
Epoxy	6.24	.13
Wood (Maple)	4.48	.09

VIVAK HT Sheet tends to reproduce mold surface finish quite faithfully, even to the point of replicating wood grain in a smooth wood mold. Sometimes it is desirable to reduce the polish on a steel or aluminum mold by utilizing a vapor hone or bead blast. This is due to the fact that if the mold surface is too smooth, air entrapment can occur creating "mark off". For best results, use fine hand sanding on the surfaces. Sanding provides tiny channels for air evacuation to prevent air entrapment. This may have to be repeated on long production runs, as the sanded finish smooths out from extended use.

Finishing

VIVAK HT Sheet can be printed with conventional printing equipment. Vivak HT Sheet can be decorated with sign vinyl, paint, and inks to fit any sign company's capability. Consider each application individually to decide on the best ink for the specific job. Consult with ink, vinyl, and paint manufacturers for best results.

Bonding/Fasteners

The recommended method for bonding VIVAK HT Sheet to itself or polycarbonate is the use of 2-part adhesives such as Weld-on 55 or Weld-on 42 (both give clear bonds). Other clear adhesives that work well are UV systems such as Dymax 3094 and Loctite 3105 (clear bond). When clarity is not an issue, Lord Adhesives #7542 is recommended for bonding any of the three substrates to HT.

Self-closing rivets and machine screws may be used to join VIVAK HT Sheet parts if proper consideration is given to the installation. Use oversized holes at least 1/64" larger than the fastener. A cushion-type washer should be used to avoid localized stress on VIVAK HT Sheet. Use plastic or aluminum fasteners. Mechanical fastening will produce a stronger part than solvent or adhesive bonded parts and allows for easier disassembly and cleaning.

PERFORMANCE

VIVAK HT® Sheet combines an excellent balance of properties for a wide range of fabricated products

Typical Physical Properties of VIVAK HT Sheet

Property	VIVAK HT Sheet	Unit	Test Method
General			
Specific Gravity	1.2	-	ASTM D-792
Water Absorption after 24 hrs.	0.13	%	ASTM D-570
Thermal			
Deflection Temperature @ 264 psi	185	°F	ASTM D-648
Deflection Temperature @ 66 psi	198	°F	ASTM D-648
Coefficient of Thermal Expansion	4.1	In/in/°F x 10 ⁻⁵	ASTM D-696
Flammability .060"	HB	-	UL 94
Glass Transition Temperature	215	°F	-
Forming Temperature	260-320	°F	-
Mechanical			
Tensile Strength, Ultimate .118"	8500	psi	ASTM D-638
Tensile Modulus .118"	300,000	psi	ASTM D-638
Flexural Strength .118"	13,000	psi	ASTM D-790
Flexural Modulus .118"	310,000	psi	ASTM D-790
Izod Impact Notched .118" at 73°	1.5	ft. lb/in	ASTM D-256
Izod Impact Notched .118" at 32°	1.4	ft. lb/in	ASTM D-256
Drop Dart Impact .118" at 73° (@max load)	46	ft. lbs.	ASTM D-3763
Drop Dart Impact .118" at 32° (@max load)	53	ft. lbs.	ASTM D-3763
Rockwell Hardness	115	R Scale	ASTM D-785
Optical			
Light Transmission .118"	89	%	ASTM D-1003
Refractive Index	1.57	-	ASTM D-542
Haze .118"	<1	%	ASTM D-1003

Sheffield will not be responsible for the use of this information relative to actual application. Users must make their own determination of its suitability for their specific use. No warranty is made for the fitness of any product, and nothing herein waives any of the seller's condition of sales.

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