SPARTECH®

Guidelines for Cleaning and Fabricating Plastic Signage Materials

SUNGARD® • CRYLEX® • TUF-GLAS™ • WEATHERPRO™ SG • STA-TUF™

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GENERAL TIPS

Following are a few general guidelines to keep in mind when fabricating and otherwise working with thermoplastic sheet materials.

1. Store sheet materials horizontally in a well-ventilated, constant temperature environment. Avoid storing in areas where the temperature could exceed 100°F. A-frames or special racks can be used to store sheet vertically – rack construction should allow the sheet to lean no more than approximately 10°.
2. Thermoplastic sheet materials are combustible. Do not place or store in or near open flame or other sources of ignition. Always consider fire precautions when working with thermoplastic sheet materials.
3. Plastics used in sign faces should be cleaned periodically (1–2 times per year). A regular cleaning program will help minimize any visible weathering of the sign face from dirt, grime, rain and other natural elements. More cleaning details are explained throughout this guide.
4. For optimal cutting and drilling quality, these guidelines should be observed:
   a. Use sharp blades, bits and tools reserved for cutting plastic sheet
   b. Use proper and constant feed rates and RPMs
   c. Prolong tool life by using a faster rate of cut to achieve the desired edge or cut quality
6. Determine suitability of all sheet materials for use with products, such as paint, adhesives or cleaners, from the manufacturers of those products prior to adopting them on a commercial scale.
6. For assistance with custom requirements, contact a Spartech representative

SUNGARD® POLYCARBONATE

SunGard weatherable sheet combines the impact strength of polycarbonate with outstanding ultraviolet stability. The extreme toughness of SunGard sheet makes it the ideal choice for various exterior sign applications.

FABRICATION

Unlike some competitive polycarbonate sheet products, SunGard sheet is all polycarbonate so that delamination, mold sticking and weathering away of post-applied coatings will not occur. SunGard sheet can be drilled, routed, sheared and painted using the same fabrication and machining techniques as for general purpose polycarbonate. Most conventional mechanical fixing methods such as screws and rivets can be used; adhesive and solvent bonding are also possible. For proper mechanical fastening, always over-drill the hole by 1/16" to allow for expansion. Use an approved silicone sealant in the hole with the fastener to inhibit stress cracking at the hole.

CLEANING

To clean, wash with mild, non-abrasive soap or detergent and rinse with clean water and a dry, soft cloth. To prevent water spots, dry thoroughly with chamois or clean cloth or sponge. Avoid cleaning in direct sunlight to prevent streaking. Do not use abrasive cleaners. The following cleaning agents are compatible with SunGard products when used according to the manufacturers' recommendations:

- **Formula 409® Cleaner**
- **Joy® Liquid**
- **Palmolive® Liquid**
- **Windex® Cleaner**

The UV-resistant surface treatment on one side of the sheet significantly improves long-term weatherability. Periodic cleaning using proper procedures and compatible cleaners is recommended to prolong the service life.

CUTTING

SunGard sheet can be cut with standard high-speed metal working tools, but carbide-tipped blades are recommended for longer life. Circular saws with triple chip or beveled tooth type blades with about two teeth per inch are recommended, with blade speeds in the 6,000 to 8,000 rpm range. Band saws having 10 to 18 teeth per inch and blade speeds of 2,500 to 3,000 feet per minute should be adequate for smooth, clean cuts.

CEMENTING

Bonding SunGard sheet to itself and to other plastics can be accomplished. Excellent results can be obtained with urethane adhesives, including Hartel #17017 and Weld-On #55. Silicones are also recommended. Solvent cementing may also be used. For more information, contact your sign distributor.

PRE-DRYING

The most critical step in the thermoforming process is proper drying of the sheet. The most efficient temperature is 250°F. Drying time is dependent upon oven configuration, air circulation, sheet thickness, etc. For optimum results, remove protective film and space sheets one inch apart in an air-circulating oven. See chart for suggested starting points.

NOTE: Always remove protective film when drying sheet at over 200°F.

THICKNESS IN INCHES	DRYING TIME
.093	4 hours
.118/.125	5 hours
.150	8 hours
.177/.187	12 hours
.236/.250	24 hours

PAINTING

SunGard sheet can be easily painted and silkscreened using standard materials and techniques. Follow the manufacturer's guidelines for proper painting and paint removal procedures. Always remove solvents from plastic sheet as quickly as possible to prevent solvent attack.

THERMOFORMING

SunGard sheet can be vacuum-formed on virtually all thermoforming equipment, from high volume multi-station rotary machines to single station or shuttle presses. Pressure forming techniques have also been highly successful. Excellent forming detail can usually be obtained at sheet temperatures of 350°-425°F. All normal tooling materials such as aluminum, epoxy and various hardwoods can be used.

CRYLEX® HIGH IMPACT ACRYLIC

Crylex sheet is a preferred material for rigid formed sign faces when both weatherability and impact strength are required. It provides the needed toughness to withstand typical in-shop handling, yet retains its color, clarity and resistance to harsh outdoor environments.

FABRICATION

Sign companies have found high impact Crylex sheet to be the easiest of the rigid sign plastics to thermoform, machine and handle, owing to its balance of physical properties. Crylex sheet can be routed, sawed, punched and sheared with standard equipment and procedures recommended for conventional acrylic sheet. Painting, silk-screening, vinyl application and other decorative techniques are easily accomplished. Crylex sheet can also be readily joined to itself or other materials by adhesive or solvent bonding. Mechanical fastening may be successful depending upon procedures and end use.

CLEANING

The Crylex acrylic sheet surface offers good resistance to a variety of household cleaners and other chemical environments. Final parts should be tested with specific chemical exposure appropriate to the end-use application. To clean, wash with mild, non-abrasive soap or detergent and rinse with clean water and a dry, soft cloth. To prevent water spots, dry thoroughly with chamois or clean cloth or sponge. Avoid cleaning in direct sunlight to prevent streaking. Do not use abrasive cleaners.

PAINTING

Crylex sheet can be painted and silkscreened with standard sign paints recommended for acrylic sheet. Impact additives may be used to maximize toughness if desired. Spray and screen paints can be removed with a 50/50 mixture of VM&P Naptha in combination with Lacryl® 205-T or Solvent 100. Remove solvent from sheet quickly to reduce the possibility of attack. Follow the manufacturer's guidelines for proper painting and paint removal procedures.

THERMOFORMING

Crylex sheet can be formed to crisp, exacting detail with excellent print registration over a wide temperature range from 275–375°F. The recommended forming temperature is 325°F. Part removal temperature should be no greater than 180°F. Crylex sheet forming cycle times can be as much as 30% faster than continuous cast impact-modified acrylic. Crylex sheet has been successfully formed in hot air circulating vertical ovens; sheet should be tenter framed, or clamped on all four sides, with time and temperature carefully monitored and controlled.

TUF-GLAS™ IMPACT ACRYLIC

Tuf-Glas sheet is a clear rigid sheet for all types of sign applications. It provides clarity and stiffness and forms with better detail at lower temperatures than cast acrylic or general purpose extruded acrylic sheet.

FABRICATION

Tuf-Glas sheet can be sawed, drilled and routed with standard equipment and procedures recommended for conventional acrylic sheet. Painting, silk-screening, vinyl application and other decorative techniques are easily accomplished. Tuf-Glas sheet can also be joined to itself or other materials by adhesive or solvent bonding. Mechanical fastening may be successful depending upon procedure and end use. Contact your Spartech technical sales representative for guidelines specific to your custom requirements.

CLEANING

Tuf-Glas sheet acrylic surface offers good resistance to a variety of household cleaners and other chemical environments. Final parts should be tested with specific chemical exposure appropriate to the end-use application. To clean, wash with mild, non-abrasive soap or detergent and rinse with clean water and a dry, soft cloth. To prevent water spots, dry thoroughly with chamois or clean cloth or sponge. Avoid cleaning in direct sunlight to prevent streaking. Do not use abrasive cleaners.

CUTTING

Tuf-Glas sheet can be cut with standard power sawing equipment including table saws, band saws and circular saws if proper clamping devices are used. Standard hollow-ground, high-speed crosscut steel blades are adequate, but carbide-tipped blades are suggested for longer life. Saw blades should have a 0–5 degree positive rake angle. There should be from four to eight teeth per inch depending on sheet thickness. All teeth should be of uniform height. Saws should run at speeds of 8,000 to 12,000 linear feet per minute. Band saw blades should have 10–14 teeth per inch; blade speeds should be between 4,000 and 5,000 feet per minute.

THICKNESS IN INCHES	NUMBER OF TEETH/INCH
.100 to .125	6 to 8
.125 to .187	5 to 6
.187 & thicker	4 to 5

DRILLING

Tuf-Glas sheet can be drilled with modified, standard high-speed, steel twist drills. The drills should have slow spirals and wide polished flutes. The included tip angle should be ground to 60 degrees and the cutting edge dubbed off to a zero degree rake angle. The back lip clearance angles should be ground to 12–15 degrees.

CEMENTING

Conventional solvent cements and polymerizable cements will readily join Tuf-Glas sheet. Polymerizable cements give higher joint strengths than solvents.

PAINTING

Tuf-Glas sheet can be easily painted and silk-screened with standard sign paints for acrylic sheet; impact additives may be used if desired. Paint can be removed with a 50/50 mixture of VM&P Naphtha in combination with Lacryl 205-T or Solvent 100. More aggressive solvents or mixtures can cause crazing, particularly in thermoformed faces with residual stresses. Remove solvent from plastic sheet as quickly as possible to avoid solvent attack. Follow the manufacturer's guidelines for proper painting and paint removal procedures.

THERMOFORMING

Tuf-Glas sheet forms very easily with better detail at lower temperatures than general purpose or cast acrylic sheet on virtually all thermoforming equipment—from high-volume, multi-station rotary machines to single station and shuttle presses. Thorough heat-soaking is recommended for good part detail with minimum residual stresses. Forming temperatures range from 275–350°F with optimum sheet temperature at a uniform 325°F. Part removal temperature should be no greater than 190°F. Tuf-Glas sheet forming cycle times can be as much as 25% faster than cast acrylic. Tuf-Glas sheet has been successfully formed in vertical ovens as well. Sheet should be tenter framed, or clamped on all four sides with time and temperature carefully controlled and monitored.

WEATHERPRO™ SG HIGH PERFORMANCE ABS AND OPAQUE STA-TUF™

WeatherPro SG is a rigid, UV-stable thermoplastic sheet. Combining a unique, proprietary UV-resistant surface with the ductility and high impact resistance of ABS, WeatherPro SG is ideal for thermoforming and fabrication into custom sign applications. Specifically designed for sign backs of irregular shapes, such as “cloud” signs, this product is listed in the Sign Components Manual as suitable for sign bodies.

Opaque Sta-Tuf is a unique thermoplastic alloy especially engineered for flat and thermoformed sign letters and other shapes.

FABRICATION

WeatherPro SG and Sta-Tuf sheet can be drilled, routed, sheared and painted using the same fabrication and machining techniques as for general purpose ABS. Most conventional mechanical fixing methods such as screws and rivets can be used, solvent bonding is common as is the use of many commercial adhesives. For proper mechanical fastening, always over-drill the hole by 1/16" to allow for expansion. Use an approved silicone sealant in the hole with the fastener to inhibit stress cracking at the hole.

CLEANING

To clean, wash with mild, non-abrasive soap or detergent and rinse with clean water and a dry, soft cloth. To prevent water spots, dry thoroughly with chamois or clean cloth or sponge. Do not use abrasive cleaners, cleaners based on aromatic hydrocarbons, or other harsh solvent-based cleaners. The following cleaning agents are compatible with WeatherPro SG and Sta-Tuf surfaces when used according to the manufacturers’ recommendations:

- **Isopropanol (45% concentrations)**
- **Most mild, non-abrasive liquid or powdered soaps and detergents**
- **Mr. Clean™**
- **Top Job®**
- **Joy™**
- **Cascade™**

CUTTING

Cutting WeatherPro SG and Sta-Tuf is best accomplished using blades designed for plastics. Plastic-cutting blades have a higher tooth count than standard wood-cutting blades, allowing for a smoother cut without having jagged edges. It also helps prevent kickback if you’re using an electric saw. Use a thicker blade so the plastic does not melt and stick back together.

DRILLING

High-Speed Steel (HSS) drill bits are best for plastics including WeatherPro SG and Sta-Tuf. Black Oxide bits are somewhat more durable.

CEMENTING

Conventional solvent cements and polymerizable cements will readily join WeatherPro SG and Sta-Tuf sheet to itself and other plastics. Polymerizable cements give higher joint strengths than solvents. Many commercial cements and adhesives are readily available from your plastics distributor.

PRE-DRYING

Generally, WeatherPro SG and Sta-Tuf should not require pre-drying prior to forming, depending on age and storage conditions. As an ABS-based thermoplastic, it is hygroscopic and will absorb moisture over time. Keep WeatherPro SG and Sta-Tuf wrapped and dry at all times to reduce moisture absorption in sheet. Store in a cool dry place.

*** Spartech cannot guarantee that its laboratory testing conditions will be duplicated in your actual end-use conditions. Therefore, these results should be used as a guide only, and it is recommended that the products be tested under actual end-use conditions by the user. When using these products, do not allow them to remain on the sign face longer than it takes to remove the dirt, grime, or other deposits. Immediately remove the cleaning agent with a soft clean cotton cloth.**

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This fabrication manual is a general guide for working with Spartech thermoplastic sheet. Because actual results vary with differences in operating conditions, thickness, color, and composition, nothing contained herein can be construed as a warranty or representation that these products will perform in accordance with these general guidelines.

Important Notice: Our recommendations, if any, for the use of these products, are based on tests believed to be reliable. The greatest care is exercised in the selection of raw materials and in the manufacturing operations. However, because the use of these products are beyond the control of the manufacturer, no guarantee or warranty, express or implied, is made as to such use or effects incidental to such use, handling or possession of the results to be obtained, whether in accordance with the directions, or claimed so to be. The manufacturer expressly disclaims responsibility therefor. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing laws and/or patents covering any material or use.

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