

FOAM BOARD FABRICATION GUIDES

Thank for Choosing the Skyline Composites Foam Board products for your graphic display applications. This Fabrication Guide was launched to incorporate the most common fabrication methods that are used with Skyline composites' line of foam board products.

This guide was compiled based on our experience and is designed to give you advice on fabricating and finishing techniques to use for everything from cutting to final finishing, whatever the product or project at hand. All Skyline Composites foam board are free of toxic chemicals such as ozone depleting gases and formaldehyde. It is the responsibility of the user to test our Foam Board in their application with all third party materials and process methods (such as adhesives, die-stamping / cutting and heat/higher temperatures) before a production run. We are not responsible for the performance of other materials used independently or in conjunction with our Foam Board. Skyline Composites Foam Board is not recommended for outdoor use or for use with solvent-based materials.

Introduction to Skyline Composites Foam Board Collection

- --White Clay-coated Paper Foam board
- --Photo Mounting Foam board
- --UV printing Foam board
- --Black Foam board

Cold mounting

In this document, mounting is defined as the attachment of the graphic to the substrate. A paper, foil, plastic or fabric graphic can be mounted to the foam board substrate. The most popular mounting technology in current market is the cold mounting.

- Cold mounting typically utilizes a spray or pressure-sensitive film or coating in combination with a roller press. Printed papers, foils, and fabrics can all be mounted to the substrate provided that the proper types of adhesives are selected. Mounting can be accomplished on most standard equipment capable of applying adhesive and laminating sheets or roll stock to rigid boards.

Surface Preparation

Surface should be cleaned and free of any surface contaminants (i.e. oils, dust particles, etc.) prior to commencing.

Other Considerations

- Care should be taken when using laminate films on only one side of the mounted graphic. Moisture pickup will be sealed on one side while the other side is not protected from moisture pickup. Bowing may occur because of moisture imbalance.
- Additionally, care should be taken when mounting only one side with spray adhesives. As the mount cures out, tensile forces within the adhesive may cause the substrate to bow. It may be necessary to apply a counter-mount of comparable strength on the backside.
- Finally, one must use the minimum amount of tension when mounting with film or pressure sensitive adhesives as too much tension will cause the substrate to bow; too little will cause the graphic to wrinkle.

General Notes

Getting Good Adhesion

- To cold mount pressure-sensitive adhesives, you need sufficient pressure. You also must make sure that proper spacers are used. Because effective mounting depends on equal force exerted across the entire width of the substrate being mounted, the top roll must move down evenly left and right. Even contact between the top and the bottom mounting rolls is essential. It is recommended that the clearance of the mounting rolls be adjusted so that the substrate is compressed slightly (0.010" – 0.020") to assure a good bond.
- Adequate pressure helps squeeze out air from between the adhesive, the substrate and the print.
- The mount obtained after 3 hours will generally allow for processing. Maximum mount is usually obtained within 24 hours after mounting.
- To test adhesion, flex the finished mount. It should not come loose in the center.
- Moisture can become trapped between layers of porous material (such as paper) and cause blisters. The level of moisture in the atmosphere should be reduced before press work. Prints may even have to be pre-dried.
- When tacking prints to the substrate, some shops will hang a number of tacked pieces in an upside-down position until they are ready to pass them through. As a precaution, it is advisable not to hold them any longer than 10 minutes or the prints may absorb moisture, change in dimension and cause bubbles and wrinkles.
- Please contact the film manufacturer for recommendations concerning the use of their respective laminating material in conjunction with the substrate as film choice is the most important consideration.
- It is advisable to use a film with a high "green tack" strength. When using pressure sensitive films, the substrate should be at room temperature to achieve optimal results.

Demounting Bad Mounts

- Pressure-sensitive adhesives may be demounted if done within 5 minutes after mounting. The print will probably be ruined, but the substrate may be reused.
- Beyond 5 minutes, the adhesive has set and other methods will have to be used, such as a hot air gun or a hair dryer to peel off the laminate. The remaining adhesive may be taken off with isopropyl alcohol or mineral spirits.

Avoiding Wrinkles & Surface Blemishes

- Wrinkles can be caused by misalignment of adhesive roll, too much pressure, or unparallel rolls.
- Small bumps, particularly visible with Cibachrome or glossy prints, are caused by trapped dirt or hardened adhesive. Good housekeeping and an ionizing static eliminator on the press are important to minimize dirt pick-up. During mounting, the back of the print should be checked and wiped down before it is processed.

If bumps are caused by hardened adhesive (cut open to check), use a fresh roll or sheet of transfer adhesive.

To prevent strikethrough, one might also consider using a print made with thicker paper (.007+).

- Pressure roller applicators can compress the leading edge of the mounting substrate. In order to keep the leading edge from rounding as it goes through the roller, use a plastic lead or guide of the same thickness of the mounted substrate.

Clear Overlays

- Clear high-gloss overlays enhance color and protect against fading indoors and outdoors. To avoid blistering, do not use overlays, clear coatings, or sprays which contain solvents.

Cold Mounting Procedures

There are several techniques for cold mounting to the substrate:

Cold Mounting by Hand Using Transfer Adhesive

- Take a sheet of transfer adhesive (both sides covered by release paper) and fold back release paper on one side approximately 1/2" from one edge.
- Tack on edge of print to exposed adhesive.
- Lift the print slightly, remove the rest of the release paper and use a roller or squeegee to smooth the print onto the adhesive. The back of the print is now coated with an adhesive which is protected by release paper.
- Before mounting to the substrate, remove excess air between print and adhesive. This is done by turning the print over so that the release paper is up and smoothing out from the center with a squeegee.
- Now peel off approximately 1/2"–1" of release paper from upper edge and fold back.
- Tack on to the substrate, lining up edges.
- Using a hand roller or squeegee, closely follow the removal of the liner to eliminate bubbles caused by air entrapment. Work with a small surface at a time (approximately 12"). Continue this step until the mounting is complete.

Cold Mounting by Hand or Press Using Spray Adhesive

- Select a spray mounting adhesive that is safe to use with polystyrene and the artwork to be mounted; solvent based adhesives should be used with caution.
- Spray adhesive on the back of the piece to be mounted. Spray 6"– 8" away from the surface. A double coat is best, with the second coat applied in a cross direction to the first coat. For mounting most art materials, adhesive need only be applied to one surface, preferably the print. Avoid using excessive bonding adhesive
- Before mounting, allow adhesive to dry to the touch; the adhesive must be aggressively tacky. If there are blisters due to trapped solvent, allow slightly longer than 4 minutes of drying time.
- Carefully position piece on the substrate and smooth out if possible to eliminate any wrinkles and trapped solvent.
- If using a press, simply turn on the press to complete the mount.
- If mounting is done by hand, place a clean sheet of the substrate over the laminated piece and weigh down for 15 minutes to obtain the maximum bond. Depending upon the type of adhesive, allow 24 hours for maximum cure out before exposing the laminate to sudden temperature or humidity changes.

Cold Mounting by Roller Laminator With an Adhesive-backed Graphic

- Adjust the rollers to slightly compress the substrate.
- Peel off a 1/2"–1" section of release paper from the upper edge of the preprinted adhesive backed paper.
- Tack on to the substrate, lining up edges.
- Feed tacked edge into nip of rollers keeping printed piece bent away from the substrate.
- As it passes through the rollers, strip away the release paper. (Make sure there are no wrinkles or trapped dirt.)

Cold Mounting Non-Porous Graphics

For non-porous material such as PVC, other plastics or metal, the following types of contact adhesive with solvent may be used.

- Neoprene, nitrile, polyurethane or other synthetic rubber types.

- Adhesive must be applied to both faces. Parallel beads of adhesive are often preferred because it allows evaporation of solvent providing faster cure.
- For mounting the substrate to flexible PVC sheets, only plasticizer-resistant types of adhesives should be used.

Cold Mounting Porous Graphics

For porous materials such as paper, textiles, fabrics or wood, the following adhesives may be used.

- Contact adhesive with solvent: Same systems as for non-porous materials.
- Construction mastic, structural silicone adhesives.
- Considerations such as expected temperature ranges (expansion/contraction), porous material, and size of substrate should be taken into careful consideration when deciding on a method of attachment.

Cold Mounting With Pressure Sensitive Tapes

Pressure sensitive tapes can be used for:

- Less demanding applications that are stress-free.
- Adhering parts during installation work.
- Holding parts while the primary adhesive is curing.

DIRECT DIGITAL PRINTING

General Notes

Large format digital printing on flatbed printers has excellent application for the substrate. Although the substrate is available in a wide range of colors that all demonstrate excellent ink adhesion, the predominant substrate color is white when direct digital printing. However, colored variations of the substrate may provide vibrant color contrasts depending upon the availability of a white print head on the printer.

Surface Preparation

Surface should be cleaned and free of any surface contaminants (i.e. oils, dust particles, etc.) prior to commencing.

Suitable Inks

Actual ink type depends upon the printer make and model. Consult the printer owner's manual for recommendations. Trialing for ink compatibility is always recommended.

The substrate readily accepts all types of inks including:

- Aqueous
- Solvent-Based
- UV-curable

DIRECT SCREEN PRINTING

General Notes

Large format screen printing has excellent application for the substrate. The substrate is available with bright white, double-clay coated facers which demonstrate excellent ink adhesion.

Surface Preparation

Surface should be cleaned and free of any surface contaminants (i.e. oils, dust particles, etc.) prior to commencing.

Suitable Inks

When screen printing with the substrate, the following inks may be suitable:

- Solvent-Based
- Vinyl/Acrylic
- UV-curable

Screen Printing inks should be tested in a manner which duplicates your printing process before initiating production. It is advised that you contact the equipment and ink supplier to provide you with specific recommendations to achieve maximum results. It is strongly recommended to consult the appropriate ink manufacturer regarding any required ink additives such as catalyst for proper adhesion and exterior use.

Ink Curing

- The ink, once applied, must be given proper time and treatment to completely adhere and cure.
- Oven temperature must be controlled to a maximum of 180°F to prevent deterioration of the foam and

PAINTING

General Notes

Painting is a suitable fabrication option for the substrate, whether for artistic expression or more commercial applications. On some projects that involve the substrate, a small quantity of “custom color” may be required that is often not practical to obtain from the factory and post painting is a viable option.

Surface Preparation

Surface should be cleaned and free of any surface contaminants (i.e. oils, dust particles, etc.) prior to commencing.

Suitable Paints

The substrate readily accepts the following:

- Poster colors
- Acrylic paints
- Tempera
- India ink
- Latex-based pigments
- Lacquers
- Vinyls
- Some water-based paints may also be suitable, depending upon the application.

Lacquers, shellacs, and solvent-based paints should be used only when not allowed to penetrate the liner or contact the foam edge. The types of paints are likely to attack and deteriorate the polystyrene foam.

When coating the majority of one side of the substrate, the backside should also be coated to maintain more perfect long-term flatness. Place weights at the edges when allowing the substrate to dry. Heavy paint coating will warp the substrate; therefore, it is advisable to trial the paint coating to determine the proper coat thickness before proceeding to production.

Application

Paints can usually be applied with a brush or roller, although conventional air spray equipment will provide a more consistent appearance. Consult paint manufacturer’s literature for recommended application technique and thinning requirements.

Drying

For drying and cure times, consult paint manufacturer’s literature.

Due to the wide variety of paint products on the market, testing is recommended for the initial use of any coating system before commercialization.

CUTTING

General Notes

There are many different methods in which “cutting” can be accomplished. This guide focuses on five primary cutting methods:

- Knife Cutting
- Shearing
- Saw Cutting
- Routing

When necessary, laying out a pattern on the surface of the substrate is best achieved with a soft pencil.

Knife Cutting

The substrate can be cut by hand with mat knives, utility knives, and razor blades. Mat cutters make smooth, excellent cuts, either right-angled or beveled. Cardboard and glass cutters also work well. The key to getting a smooth, clean cut is to use a very sharp thin blade held at as low an angle as possible to the board, which reduces friction and allows the foam to slice rather than tear. If a straight edge is being used as a guide, it may be practical to make the cut in more than one pass which also helps eliminate any foam tearing.

Shearing

Large-scale straight-line cutting of the substrate can be done in several ways, including automated razor blade cutters or power shearing with guillotine cutters. Though not generally recommended because they can compress and fray the edges of the board, a guillotine cutter can be used to cut one or more sheets at a time. Caution must be observed to prevent the foot-clamp from indenting the board’s edge. A stop block placed on each side of the foot-clamp may be necessary. A sheet of cardboard on top of the substrate may reduce compression. The blade must be maintained sharp and cut with a scissor-like motion.

Saw Cutting

Saw cutting is generally not recommended for paper-faced foam board cutting. However, some custom saw blades can be utilized. General Saw Company makes a blade for this use. Other manufacturers make thin-rimmed, high-speed carbide-tipped plastic cutting blades (72-80 25o alternating teeth on a 10” blade) acceptable for cutting the substrate.

Band Saws

- Band saws with a similar tooth design and a linear speed approximating 9000 ft/min can be used.
- Trialing this type of cutting is a must to ensure the cut meets the desired customer result.

Intricate Shapes

- Cutting intricate curves and shapes can be accomplished with a Cutawl model K-11 power tool.
- Cutawl 21D or 23D blades are available for cutting the substrate.

Routing

For irregular cuts and shapes, cuts can be easily accomplished with a CNC router.

In general, routing is not suitable for all laminated foam board products, but you can produce a clean finished edge with the proper bit. A “compression spiral” or an “up shear/ down shear” router bit will work best. Additionally, cutting foam board with a router can be easy if you’re using the right kind of knife tool. An oscillating knife will deliver clean-cut edges without fraying any of our foam board products. For heavier and thicker foam board products, a more robust cutting tool, like a tangential knife, is recommended.

NOTE:

1. Trialing is recommended to ensure suitability for the proposed application and fabrication before full-scale commercialization.
2. Foam Board is flammable and may constitute a fire hazard. Do not expose to an open flame or other ignition source.

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