

**Manufacturers of PVC Foam Sheet**

**POLYBOARD**

## CHARACTERISTICS

THE General characteristics of POLYBOARD can be listed as follows

- Waterproof
- Insect Proof—Termites
- Good mechanical performance
- Excellent chemical resistance
- Lightweight
- Rustproof
- Durable
- Rigidity
- Good thermal insulation
- Machinable
- Hygienic
- Tough
- Non-flammable
- Printable
- Self-extinguishing
- Easily fabricated by readily available techniques and tools
- Rot proof
- Accommodates most fixing systems (screws, nut & bolts, glue)
- High quality smooth finish on both sides
- Non toxic
- Very Low water absorption
- Weatherable
- Paintable



## THICKNESS AVAILABLE

5MM, 6MM, 9MM, 12MM AND 18MM

SIZES ARE 8FT X 4FT

### **POLYBOARD Applications:**

- Substrate for signs – easily screen printed, painted, laminated; ideal for vinyl letter application
- Exhibit and trade-show booths
- Point-of-purchase and 3D displays
- Photo mounting
- Arts and crafts
- Dimensional lettering
- Marine
- Refrigeration
- Vehicle manufacturing
- Theatre and stage sets
- Models, architectural prototypes
- Wood replacement



### **The Versatile, Closed-cell, Rigid Foam PVC Sheet for Graphics, Display and Industrial Applications**

Suitable for a virtually unlimited range of applications, PVC is one of the oldest and most developed synthetic materials. Kapadivav Composites is dedicated to developing PVC processing, specifically to manufacturing high-quality sheeting from rigid PVC.

POLYBOARD features a closed-cell, smooth surface with a fine cell structure. It will fit the requirements for a multitude of applications, from substrates for graphics, point-of-purchase displays and backers for channel letters to wood replacement. Experience has shown that POLYBOARD is the highest-quality PVC sheet available.

### **Characteristics and Benefits**

POLYBOARD is the product of choice for these application requirements:

- Chemical and corrosion resistance
- Moisture resistance, low water absorption
- Low flammability (UL-940VO) – perfect for trade shows and exhibit halls
- Thermal and sound insulation – absorbs vibrations and oscillations
- Matte finish that readily accepts most inks, paints and vinyls
- Easy fabrication with most common tools
- Bonds easily to similar and various other substrates
- Suitable for the majority of interior applications; can be used in limited exterior applications

POLYBOARD sheets are not harmful to human health or the environment in manufacturing, applications or disposal. It is not recommended to laser cut POLYBOARD, as it will produce a dark side-edge during cutting.

# **PROCESSING**

This chapter details various methods of cutting POLYBOARD as part of processing the material into its final form. Common metal and woodworking tools and machinery can be used, depending on the specific application for the finished product.

## **Cutting**

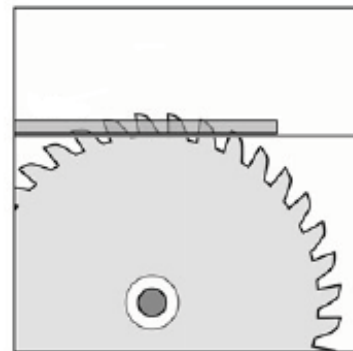
Sheets of POLYBOARD up to 6 mm thick can be cut with a utility knife. To cut sheets thicker than 6 mm, band saws, table saws and panel saws can be used, as detailed later in this chapter. Power shears and guillotines can crush the edges of POLYBOARD sheets and generally produce unacceptable results.

With any cutting procedure, frictional heat can build up and produce unacceptable results on cut edges. Rough edges can also occur from cutting the POLYBOARD using inadequate support or from using worn tooling. For best results, test the machine setups and cutting processes before beginning production.

## **Sawing**

**Circular Saws** For POLYBOARD sheets 3 mm and thicker, carbide-tipped, triple chip ground type circular saws can be used (Figure 1j). The following settings are recommended:

- Rake angle: 0° to 15°
- Clearance angle: 10° to 20°
- Cutting speed: 8,000 to 12,000 feet per minute
- Feed: 70 to 90 feet per minute
- Tooth pitch: 0.080" to 0.040"



**Band Saws** High speed steel blades normally recommended for wood or plastic (hook type) can be used for POLYBOARD material within the following guidelines.

- 4 to 8 teeth per inch
- Cutting speed: 3,000 to 5,000 feet per minute
- Feed: up to 40 feet per minute

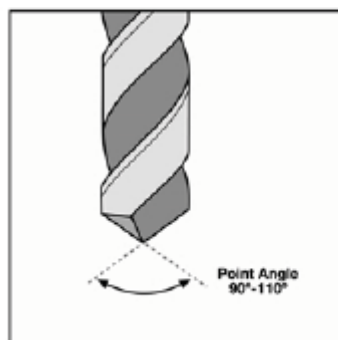
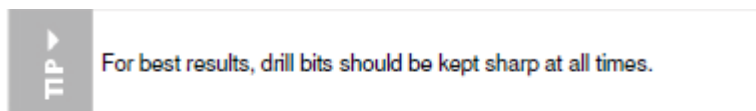
**Saber Saws** Rough cut type blades ground for plastics can be used on POLYBOARD sheets. Smooth metal-cutting blades, however, will not produce acceptable results.

# Drilling

POLYBOARD can be drilled with carbide-tipped bits using twist drills recommended for metals (Figure 1k). The following settings are recommended:

- Point angle: between 90 ° to 110 °
- Spiral angle: 30 °
- Relief angle: 10 °
- Cutting speed: 150 to 1,300 feet per minute
- Feed rate: 0.01 to 0.02 inches per revolution

Removing the drill from the POLYBOARD material periodically may be necessary when drilling deeper holes so that frictional heat does not build up. Drill bits ground for normal rigid PVC will not produce acceptable results.

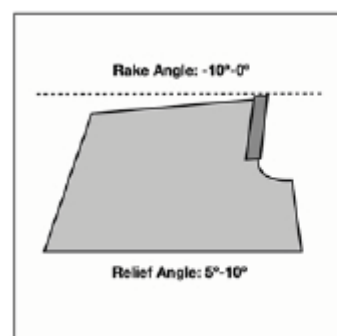


**Figure 1k:**  
Drill grinding specifications.

# Milling

POLYBOARD can be milled by using standard milling machines of various types within the following guidelines (Figure 1l).

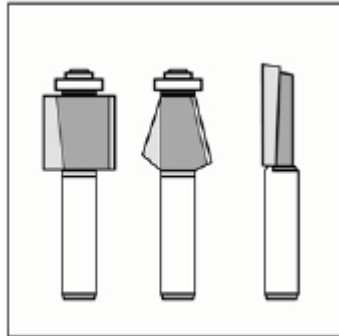
- Relief angle: 5 ° to 10 °
- Rake angle: -10 ° to 0 °
- Cutting speed: 3,000 to 3,500 feet per minute
- Cutting feed: 0.12 inches per revolution



**Figure 1l:**  
Helical milling cutter.

## Routing

POLYBOARD material can be easily routed using multi-fluted carbide tools on standard woodworking routers. Standard tools and machines can be utilized without having to alter equipment bits (Figure 1m). Adjust feeds and speeds as needed to achieve the best edge finish on the POLYBOARD parts.



**Figure 1m:**  
Standard router bits.

## Edge Finishing

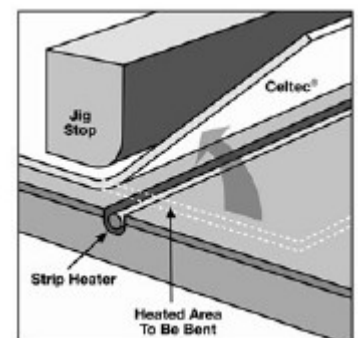
Edge finishing of POLYBOARD can be accomplished using various sanding, filing or grinding tools, such as a sander or file. Be careful to not overheat surfaces. Slight cell structure may be visible on cut edges of the POLYBOARD material.

## FORMING

POLYBOARD can easily be shaped using conventional methods, such as heat bending, pressure forming and vacuum forming. Because POLYBOARD heats and cools very quickly, the formed parts are cleanly and clearly defined, making the material excellent for sign faces and point-of-purchase displays.

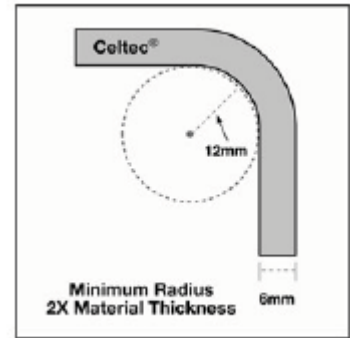
### Heat Bending

POLYBOARD sheet material can be bent by using Calrods, radiant heaters, strip heaters (Figure 3a) or air-circulated ovens. Heat guns can also be used on small areas. To ensure best results, a rheostat should be used to control heating of the POLYBOARD so that the surface temperature does not exceed 340°F.



To form tighter bends with smaller radii, use a small heated area on the upper surface (inside the bend) of the POLYBOARD sheet and a larger heated area on the bottom surface (on the outside of the bend) of the sheet.

A minimum radius of twice the sheet thickness is necessary to avoid breakage. When bending POLYBOARD into an angle, typically the extension of the POLYBOARD on either side of the angle should be at least 20 times the thickness of the POLYBOARD material. For example, 6 mm (1/4") POLYBOARD would require the extension on each side to be 120 mm (4-3/4") in order to avoid warping of the material. For sides less than 20 times the material's thickness, the entire sheet must be heated.



Once the POLYBOARD is bent, place it in a fixture, such as a jig or clamp, to cool. Fans and/or compressed air will speed the cooling process.

## Bonding and Adhesives

### POLYBOARD to POLYBOARD or other PVC material

For bonding POLYBOARD to itself or another PVC material, a solvent-based adhesive system used for rigid non-expanded PVC (U-PVC Cement), will provide the best results. Solvent-based adhesives are sold through various suppliers. Proper ventilation and a clean working environment are essential for this type of bonding.

When bonding large panels face to face, avoid using solvent-based adhesives, which will not cure properly.

### POLYBOARD to various substrates

There are numerous types of adhesives that can be used with specific substrates. Contact, epoxy, rubber-base, cyanoacrylate, and urethane adhesive systems are all acceptable. For best results, test the selected adhesive for suitability in a particular application before general use.

Parts to be joined should fit without forcing and be prepared with appropriate cleaner. Depending on the type of application and the consistency of the adhesive, the adhesive can be applied to the material with a brush, a syringe or an eyedropper. If cement is applied to one surface, let the two surfaces be in gentle contact for a few seconds to allow the cement to soften the dry surface, then press parts together in firm contact.

## Screwing and Nailing

Any type of screw or nail can be used to fasten POLYBOARD material; pre-drilling is typically unnecessary. Power nailers and screw driving equipment are suggested. Inserting the screw or nail in an elongated slot or an oversized hole is recommended so that the material can expand or contract if fluctuations in temperature occur (Figure 2b). For best results, use oversized washers or grommets in combination with screws.