

Helpful Tips On Working With Plastic

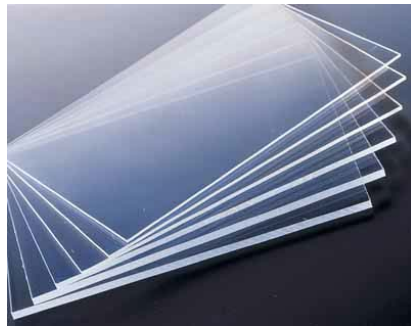


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Introduction

Do It With Acrylic...

Acrylic sheet is a remarkably versatile material. It is strong, lightweight and transparent. Use it to replace glass in windows and partitions. It can be a designer's or hobbyist's delight. Work with it. Get to know it. Be creative. And don't restrict yourself to other people's designs. Your new use may be the best use yet.

Working with acrylic sheet is easy and fun – no more difficult than wood, and a lot more versatile. Learn a few simple techniques, and you turn out work that will please the most demanding professional.

First... get to know your material

Acrylic sheet is a high quality plastic. Its properties have led to its wide use as a replacement for glass.

Acrylic sheet is:

Lightweight: Half the weight of glass

Break Resistant: Withstands many times the impact force of glass of similar thickness

Weather Resistant: Virtually unaffected by sun, extreme cold, salt water spray

Heat Resistant: Acrylic sheet takes a range of temperatures from -30°F (-24°C) to +200°F (93°C), though it may be affected by continuous temperatures in the 180° - 200°F (82°-93°C) range. Acrylic sheet plastic can be used at temperatures from -30°F (-34°C) up to +190°F (88°C). It is recommended that temperatures not exceed 160°F (71°C) for continuous service, or 190°F (88°C) for short intermittent use.

Easy to work with... we're going to tell you how.

Characteristics of Acrylic Sheet

Acrylic sheet behaves differently from other types of material. Learn what it can do... and what it can't. Learn how to care for it. You'll be sure to get the best results.

Expansion and Contraction: Like most plastics, acrylic sheet responds to temperature changes by expanding and contracting at a far greater rate than glass. When using acrylic sheet for outdoor glazing, cut the sheet approximately 1/16" per running foot (or 0.5 cm per running meter) shorter than the frame size.

Flexibility: Acrylic sheet is much more flexible than glass or many other building materials. When using large sheets for windows, it is important that rabbets or channels be deep enough to provide support against high winds (see page 22, "Glazing with Acrylic Sheet").

Electrical Properties: Acrylic sheet is an excellent insulator. Its surface resistivity is higher than that of most plastics. Continuous outdoor exposure has little effect on its electrical properties.

Chemical Resistance: Acrylic sheet has excellent resistance to attack by many chemicals. It is affected, in varying degrees, by benzene, toluene, carbon tetrachloride, ethyl and methyl alcohol, lacquer thinners, ethers, ketones and esters. Acrylic sheet is not affected by most foods, nor are foods affected by it.

Chemical Resistance

Acetone	< 15 min	> 24 hrs
Ethylene Dichloride	< 15 min	> 24 hrs
Gasoline	> 24 hrs	> 24 hrs
Hydrochloric Acid	> 24 hrs	> 24 hrs
Methyl Alcohol	> 24 hrs	> 24 hrs
Methylene Chloride	< 15 min	> 24 hrs
Methyl Ethyl Ketone	> 15 min	> 24 hrs
Nitric Acid	< 15 min	< 24 hrs
Sodium Hydroxide	< 24 hrs	> 24 hrs
Sulfuric Acid	< 15 min	> 24hrs
Toluene	< 15 min	> 24 hrs
Isopropanol	> 24 hrs	> 24 hrs
Kerosene	> 24 hrs	> 24 hrs

Testing for the resistance to the above chemicals was conducted per ASTM D 1308. Time intervals for visually inspecting the sheet surface: 15 minutes, 1 hour and 24 hours. The table shows the time it took the chemicals to visually attack the surface.

Light Transmission: Colorless acrylic sheet has a light transmittance of 92%, which is greater than glass.

Fire Precaution: Acrylic sheet is a combustible thermoplastic. The self-ignition temperature range is 830-910°F. Protect it from flames and high heat. Refer to page 24 for further information.

Some General Hints

Do's

- Keep masking on as long as possible through your fabrication operations.
- Wear safety glasses when working with power tools.
- Wear gloves when handling large sheets to prevent cuts.
- Use drill bits, carbide tipped circular saw blades and router bits that are designed or reground for acrylics.
- Make sure all your tools are sharp.
- Use water as a coolant when cutting sheets over 1/4" (6.0 mm) thick or drilling sheets over 3/16" (4.5 mm) thick.
- Use the right thickness for glazing panels and ensure there is sufficient rabbet depth to permit sheet deflection and thermal contraction without disengagement.
- Allow 1/16" per linear foot (0.5 cm per linear meter) for expansion in glazing applications.
- Use plenty of water when cleaning acrylic sheet to help prevent scratching.

Don'ts

- Don't store acrylic sheet near radiators or steam pipes or in direct sunlight.
- Don't leave masking on if it will be exposed to the outdoors (sun or rain).
- Don't install large sheets with bolts. . . frame them.
- Don't mark with a punch marker.
- Don't use saw blades that have side-set teeth. Saw teeth should be carbide tipped with 0°-15° rake and slight radial clearance.
- Don't bring the material in direct contact with heaters.
- Don't subject the sheet to high surface temperatures during polishing.
- Don't use glass cleaning sprays, scouring compounds or solvents like acetone, gasoline, benzene, carbon tetrachloride, or lacquer thinner.
- Don't heat acrylic sheet in a kitchen oven.

Cleaning

Wash acrylic sheet with a mild soap or detergent and plenty of lukewarm water. Use a soft cloth, applying only light pressure. Rinse with clear water and dry by blotting with a damp cloth or chamois. Grease, oil or tar may be removed with a good grade of hexane, aliphatic naphtha, or kerosene. These solvents may be obtained at a paint or hardware store and should be used in accordance with manufacturers' recommendations. Any oily film left behind by solvents should be removed immediately by washing.

DO NOT USE: Window cleaning sprays, kitchen cleansers, gasoline, benzene, carbon tetrachloride or lacquer thinner.

Masking

Acrylic sheet comes covered on both sides with a polyethylene film masking. The masking protects the sheet from scratching during storage and handling. **Be sure to leave the masking in place during most phases of fabrication and installation.** Except for intricate detail work, you should remove the masking only when your project is completed.

All masked acrylic sheet should be kept away from heat and sunlight, and masking should be removed soon after installation. Never use a knife or scraper to remove masking.

Cutting Acrylic Sheet

Acrylic sheet can be sectioned in a wide variety of ways, with either hand tools or power tools. The method you choose will likely depend on the particular tools available to you, but all tools cannot be used in all cases. Your choice of tool and techniques should be based on the type of acrylic sheet used, the thickness of the sheet, and the shape of the particular cut. This section, though not comprehensive, gives some guidelines for choosing the right tool, and using it properly to get the best results with acrylic sheet.

Cutting With a Knife or Scriber

Acrylic sheet up to 3/16" (4.5 mm) thick may be cut by a method similar to that used for cutting window glass. Use a scriber of some kind—a scribing knife, a metal scriber, an awl, or even a sturdy craft knife—to score the sheet. Draw the scriber several times [7 or 8 times for a 3/16" (4.5 mm) thick piece] along a straight edge held firmly in place. It is best not to remove the protective masking. Make the cuts carefully using firm, even pressure. For best results, make each stroke cleanly off the edge of the sheet. Then, clamp the acrylic sheet or hold it rigidly under a straight edge with the scribe mark hanging just over the edge of a table. Protect your hands with a cloth, and apply a sharp downward pressure to the other side of the sheet. It will break along the scratch. Scrape the edges to smooth any sharp corners. This method is not recommended for long breaks or thick material.

Cutting With a Power Saw

CAUTION! Wear safety glasses when working with power tools.

As with any type saw, blades should be sharp, and free from nicks and burrs. Special blades for cutting acrylics are available for most types of saws. Your authorized acrylic sheet retailer should have them in stock. Otherwise, use carbide-tipped blades designed for cutting plastics available at industrial products suppliers like Sears. Teeth should be fine, of the same height, evenly spaced, with little or no set.

Table saws and circular handsaws: Use hollow ground, high-speed blades with no set, and at least 5 teeth per inch (25 mm), such as those used to cut copper and aluminum. If you intend to do a lot of cutting use carbide-tipped blades designed for plastics (a triple chip type tooth design is recommended). These give a cleaner cut in acrylic sheet. Set the blade to project approximately 1/8" (3 mm) above the surface of the sheet being cut. This will reduce edge chipping.

When cutting with a hand-held circular saw, clamp the sheet securely to the work surface to minimize vibration. A wood block 1" x 3" (25 x 75 mm) clamped on top of the sheet spreads the clamping force and can act as a guide for the saw. No matter which type of saw you use, the sheet must be held firmly and fed slowly and smoothly to prevent chipping. Be sure the saw is up to full speed before beginning to cut. Water-cooling the blade is suggested for thicknesses over 1/4" (6mm), especially when edge cementing will be performed.

Cutting With a Power Saw (Cont'd.)

CAUTION! Wear safety glasses when working with power tools.

Saber Saws: Use blades which have a slight set, such as the blades recommended for cutting metals or other plastics. Be sure they are sharp. The blades you use for cutting acrylic should never be used to cut other materials. Set them aside. Use them only for acrylic sheet. High speed is best for cutting acrylic sheet with a saber saw. Always be sure the saw is at full speed before beginning to cut. Press the saw shoe firmly against the material, and don't feed too fast. Water cooling is suggested for cutting acrylic sheet over 1/4" (6 mm) thick.

Band saws or jig saws: Band saws and jig saws are excellent tools for cutting acrylic sheet. But because of their relatively thin blades, they are not recommended for cutting acrylic sheet over 1/4" (6 mm) thick. Use blades with a slight set, and about 10 teeth per inch (25 mm). Feed acrylic sheet at a rate 10 times faster than you would feed steel. Blades may break easily in acrylic, so operate accordingly.

Cutting With a Hand Saw

Acrylic sheet may be cut with almost any type of hand saw. And while good results are possible with a hand saw, the techniques involved are considerably more difficult than with power saws. Practice on scrap material before attempting to make critical cuts. With any hand saw, it is most important that the blades be kept sharp. For best results, the teeth should be of uniform size and shape, and have very little set.

Every effort should be made to prevent vibration or stress while cutting. Flexing at the point of the cut or binding of the saw blade may cause the acrylic to crack. Clamp the material securely. Keep the saw straight when cutting, and apply very little pressure. Let the saw do the work. With proper care, you can get good results.

Straight saws: Straight saws, or cross-cut saws may be used for long, straight cuts on acrylic sheet of almost any thickness. The saw should have a hollow-ground blade with very little set and at least 10 teeth per inch (25mm). Make certain the material is firmly clamped and supported. Hold the saw at an angle of about 45° from vertical, and be sure to keep it straight.

Coping saws: Coping saws or scroll saws are good for shorter cuts, curved cuts, or even intricate designs. Use very narrow blades with only a slight set.

Hacksaws: These hand saws for cutting metal may also be used for short cuts in acrylic sheet. Choose a blade with approximately 18 teeth per inch (25mm). Use a smooth, even stroke. Apply very little pressure.

Routing and Shaping

Acrylic sheet can be machined with standard woodworking routers, in much the same way as wood. You'll find many uses for portable hand routers and small table routers. Use them to cut patterns into edges, or large holes out of pieces of acrylic sheet. For best results, use single-fluted bits for inside circle routing, and double-fluted bits for edge routing.

Routers are designed to operate at high speeds. 10,000 to 20,000 rpm is recommended for acrylic sheet. And because routing speeds are so high, vibration must be scrupulously avoided. Even small vibrations can cause crazing and fractures in acrylic sheet during routing.

Turning

Turning is the only practical way to produce most round cross-sectioned parts such as knobs, furniture legs, and vases. Acrylic sheet can be turned on almost any type lathe.

Bits designed especially for cutting acrylic are available. But most high-speed tool bits with a zero-degree, or slightly negative rake will work very well. It is essential that rake be maintained at 0° to -4° for satisfactory results. Clearance angles should be from 5° to 10° . Use a turning speed approximately 10 times faster than for wood. You should be able to get a continuous chip from the acrylic sheet.

Drilling Acrylic Sheet

Any kind of hand or power drill may be used for drilling acrylic sheet. A stationary drill press is the preferred tool because it gives better control and greater accuracy. But a drill press won't be applicable in all instances, and with a little care, proper technique, and a correctly-ground drill bit, you can get good results with an ordinary hand drill.

For best results, use drills designed specifically for acrylics. They are available from your acrylic sheet Retailer. He can help you select the ones that are best you're your job. Regular twist drills can be used, but the cutting edges must be modified to prevent the blade from grabbing and fracturing the plastic. Acrylic sheet is relatively soft. Your drill should have an edge that cuts with a scraping action. To obtain this you can modify your drill bit by grinding small "flats" onto both cutting edges with a medium or fine-grit grinding wheel, or a pocket stone. The flats can be parallel to the length of the drill and about 1/32" (1 mm) wide. Tip angle should be between 60° and 90°. For the best possible finish inside the hole, use a drill with smooth, polished, slow-spiral flutes which will clear the hole of all shavings without marring or melting the walls.

If the drill is correctly sharpened and operated by proper speed, two continuous spiral chips or ribbons will emerge from the hole. When drilling a hole three times deeper than the diameter of the drill, a lubricant or coolant should be used. This will help remove chips, dissipate heat, and improve the finish of the hole. Rough, irregular, or fuzzy holes can lead to cracking and breaking months after the piece has been completed.

Finishing Acrylic Sheet

Many of the techniques used to cut acrylic sheet can leave a rough edge that is usually unsuitable either as a finished edge, or to join to another piece of acrylic. It is necessary to smooth and square the edge of the sheet. You can do this by a number of different techniques, depending on the finish desired.

Scraping

The first step, and perhaps easiest technique, is scraping. A scraper can be almost any piece of metal with a sharp, flat edge. The back of a hacksaw blade, the back of a knife blade, or a tool steel blank are ideal. Special acrylic scraping tools are also available from your acrylic sheet retailer. Whatever tool you use must have a sharp, square edge.

Filing

It is easy to file acrylic sheet to a surface ready for final polishing. The filing, however, must be done correctly, and carefully. Almost any commercial file can be used. But the quality of the finish will depend on your choice of file coarseness. A 10 to 12 inch (250 to 300 mm) smooth-cut file is recommended for filing edges, and removing tool marks. Other files—half round, rat tail, triangular files, and even small jewelers' files are good for smoothing insides of holes, cutting grooves and notches, or finishing detail.

File in only one direction. Keep the teeth flat on the surface of the acrylic sheet, but let the file slide at an angle to prevent the teeth from cutting unwanted grooves in your work. Always keep your files clean and sharp. Wire brush them often to prevent the teeth from filling up. And don't use your acrylic files for working metal or other materials that might dull the teeth. For small work, try clamping the file in a vise, and rubbing your work across the file.

Sanding

Before acrylic sheet is ready to be polished, it should be sanded to a smooth, satiny finish. As with filing, the quality of the final finish will depend on the grades of sandpaper used. The finer the final grit, the smoother the finish. It will usually take at least three steps to get a good finish.

First, if there are scratches deep enough to require it, start with coarse grit No. 120 sandpaper. Use it wet. When the original scratches are completely removed, sand with a medium grit paper—220 is good—to remove the scratches from the coarse paper. Use the medium grit paper wet as well. Finally, sand to a satiny finish with a fine grit, wet-or-dry No. 400 paper. Fine grit paper should always be used wet to keep the paper from clogging and obtain a smoother finish. Rinse the paper frequently. Grits as fine as 600 may be used. Always wipe your work clean when changing to a finer grit. Be sure all deep scratches have been removed.

Sanding by Hand

Hand sanding acrylic sheet is very much like hand sanding wood. Most of the same techniques apply. But sanding acrylic must be done with far greater care. You should always use a wooden or rubber sanding block. When removing scratches, be sure to sand an area that is slightly larger than the scratch. This will help prevent low spots. Sand with a circular motion. Use light pressure and plenty of water with wet-or-dry papers. As you get the feel of working with acrylic sheet, your own observations and experience will be your best guide to determining how coarse a grade to start with on each particular job, and how many different grades will be needed to do the job most efficiently. Don't be afraid to experiment with different sanding techniques and different types of blocks.

Sanding with Power Sanders

Almost any commercial power sander can be used to work acrylic sheet. Naturally, different types of sanders are preferred for different operations. As a basic rule, use them as you do when sanding wood. They should, however, be operated with lower pressure, and at slower speeds. Experiment on scrap pieces. All wet or-dry machine sanding should be done wet—especially with grit sizes of 150 or finer.

Polishing

The original high luster of acrylic sheet can be restored to the edges and surfaces by polishing with a power driven buffer. It is also possible to polish acrylic sheet by hand using a soft cloth and a very fine abrasive. But hand buffing is an extremely tedious process. You're likely to get a sore arm long before you get a finely polished surface. Power-driven buffing tools are recommended without exception. Because inexpensive buffing wheels are available as an attachment for any electric drill, equipment should not be a problem. Buffing wheels and compounds good for acrylics are sold by your acrylic sheet retailer, but special wheels are not necessary. A good buffing wheel for acrylic sheet will consist of layers of 3/16" (4.5 mm) carbonized felt, or layers of unbleached muslin laid together to form a wheel between 1 and 3 inches (25 and 75 mm) thick. The larger the wheel, the better. But don't use one too large for your equipment. The wheel should reach a surface speed of at least 1200 feet per minute (370 m per minute). Speeds up to 4000 feet per minute (1220 m per minute) are useful for acrylics. Solidly stitched wheels with rows of concentric stitching should be avoided. They are often too hard and may burn the acrylic. Never use a wheel at speeds higher than its rpm rating. Never use a wheel that has been used to polish metal. Traces of the metal may remain to scratch the acrylic sheet.

Polishing (Cont'd)

Acrylic sheet should be polished using a commercial buffing compound of the type used for polishing softer metals such as silver or brass. Or you can use a non-silicone car polish that has no cleaning solvents in it. First, however, tallow should be applied to the wheel as a base for the buffing compound. Just touch the tallow stick to the spinning wheel. Then quickly apply buffing compound. To polish, move the piece back and forth across the wheel until you get a smooth, even polish. Be careful not to apply too much pressure. And keep the work constantly moving across the wheel. This will help prevent heat buildup which can mar the surface by melting or smearing it. For safety reasons, it is important not to start polishing near the top of the sheet. The wheel may easily catch the top edge, tearing the piece of acrylic sheet out of your hands and throwing it across the room . . . or at you. **Always wear safety glasses and be extremely careful.** Begin polishing approximately one-third of the way down the sheet, and keep moving it back and forth until you've reached the bottom edge. Then turn the sheet around and repeat the process on the other half.

Forming Sheet Plastic

Acrylic sheet becomes soft and pliable when heated—behaving almost like a sheet of flexible rubber. It may then be formed into almost any shape. As the sheet cools, it hardens and retains the formed shape, provided it has been held in place during the cooling process.

Never heat acrylic sheet in a kitchen oven. Acrylic sheet gives off highly flammable fumes when decomposed by overheating. These gases are potentially explosive if allowed to collect in an unventilated area. Most kitchen ovens do not have accurate temperature control. Temperatures can be off as much as 75° (42°C), possibly allowing the acrylic to overheat. And because air is not forcibly circulated in a standard kitchen oven, the fumes will accumulate. When they come into contact with the heat source, there is likely to be an explosion. Repeat: **Do not heat acrylic in a kitchen oven.**

Forming With a Strip Heater

A strip heater heats only the area to be formed— there's no need to heat the entire sheet if you only intend to make a straight-line bend. It heats quickly. And with a little care you'll get excellent results, because the rest of the piece stays cool. Strip heater kits with complete instructions are available from your acrylic sheet retailer. Heating and forming acrylic sheet with a strip heater is not difficult. When properly heated, the acrylic may be easily bent into smooth, clean corners. With patience and a little practice you should soon be able to achieve excellent results.

First, remove the masking paper from the line of the bend. The rest of the masking paper should be left in place to protect the unheated area. Then lay the sheet on the heater with the bend line directly above the exposed heating element so that the bend will be made **away** from the heated side. The length of heating time will vary according to the thickness of the sheet. Acrylic sheet thicker than 3/16" (4.5 mm) should be heated on both sides for a proper bend. Heat the sheet until it begins to sag at the bend line. Don't try to bend the sheet before it is fully heated, or after it has partially cooled. This will result in irregular and creased corners and high internal stress. Forming jigs and clamps should be used for best results. They can be made of wood and used over and over. Make preformed jigs for certain angles, or even special shapes for individual projects. Variable angle jigs can be made with two pieces of wood hinged together and held at the desired angle with a variable brace, as shown. Felt, flannel, or flocked rubber should be used to line any surfaces that may come into contact with the heated acrylic. Wear heavy cotton gloves when handling heated acrylic sheet. They'll protect your hands, as well as the sheet.

Other Forming Techniques

Acrylic sheet may be formed into almost any shape. However, specialized heating and forming equipment is usually required for all but the simplest projects. Furthermore, while many of the forms and jigs required for two and three dimensional forming can be easily made out of wood in the home shop, such projects are beyond the scope of this booklet. Many excellent books are available covering all types of acrylic forming. They deal with techniques such as drape forming, plug and ring forming, surface molding, blow and vacuum forming, and even design, construction, and use of ovens for heating acrylic sheet. Your acrylic sheet retailer should have a selection of these books, and can recommend one that will suit your needs.

Joining Acrylic Sheet

Acrylic sheet can be joined with solvent cements to form strong, durable, transparent joints.

The ingredients in most solvent cements are hazardous materials, and extreme care should be observed using proper ventilation and handling techniques as recommended by the manufacturer of these products. Always follow the manufacturer's recommendations and instructions when using these and any other products.

The ultimate strength and appearance of your joints will depend on how carefully you make them. Getting really good joints requires a lot of care, and considerable skill. Practice on scrap pieces. The more experience you have, the better your work will be.

Observe some basic precautions when working with acrylic solvents:

- Always work in a well-ventilated area.
- Do not smoke—solvents are highly volatile and flammable.
- Protect skin from contact with cement.
- Do not attempt to cement acrylic sheet in temperatures under 60°F (15°C). Temperatures from 70° to 75°F (21° to 24°C) are ideal.
- Always follow the cement manufacturer's recommendations.

Preparation for Joining Acrylic

All surfaces that are to be joined should fit together accurately without having to be forced. Flat, straight surfaces are easiest to work with. Any area that is part of the original surface of the sheet should be left untouched. A smooth cut made with a cooled power saw also should be left alone. If the area to be joined has a saw cut that is rough, it should be wet sanded or finished with a router to

get a flat, square edge. Do not polish edges that are to be cemented. Polishing leaves a highly stressed, convex edge with rounded corners. It will make a very poor joint. Always remove the masking from around the area to be joined.

Capillary Cementing

Capillary cementing is probably the most popular method of joining acrylic sheet. It works because of the ability of a low-viscosity solvent-type cement to flow through a joint area by capillary action. Properly done, it yields strong, perfectly transparent joints; however, it won't work at all if the parts do not fit together perfectly. Solvent cements are available from your acrylic sheet retailer who can recommend the ones that are best for your particular projects. Hold the pieces together using a jig that will support the pieces firmly but will permit slight movement as the joint dries. It is important that the joint be kept in a horizontal plane, or the cement will run out of the joint. Apply the cement carefully along the entire joint. Apply it from the inside edge, whenever possible on a box-corner type joint, and from both sides, if possible, on a flat piece. A special needle-nozzled applicator bottle available from your acrylic sheet retailer is recommended. If the cement does not flow completely into the joint, try tilting the vertical piece very slightly (about 1°) towards the outside. This should allow the solvent to flow freely into the entire joint.

Always let the joint dry thoroughly (usually 10-30 min.) before moving the part. Maximum bond strength will not be achieved for 24 to 48 hours.

Dip or Soak Cementing

This method of cementing acrylic sheet involves dipping the edge of one of the pieces to be joined directly into the solvent. It is very important that only the very edge be dipped. Exposing too much area to the solvent will result in a weak, slow-setting joint. You'll need a shallow tray in which to dip the acrylic. The tray can be made of aluminum, stainless steel, galvanized steel, or glass. Do not use plastic—the solvent may dissolve it. Place short pieces of wire, pins, or brads into the tray to keep the edge of the acrylic sheet from touching the bottom of the tray. The tray must be level. Pour solvent cement into the tray so that it just covers all the brads—and covers them evenly. Carefully place the edge to be cemented into the tray so it rests on the brads. You can hold the piece upright by hand, but it is better to use some kind of support to hold the piece in place while it soaks. A couple of padded clamps attached to the sheet, and resting on the edge of the tray are fine. Heavy pieces of wood placed against each side of the sheet will also work. Slotted wooden supports are usually used for production work, but anything that will hold the piece firmly upright is sufficient.

The acrylic sheet should be left in the solvent from 1/2 to 2 minutes, depending on the thickness of the sheet, the type of solvent used, and the bond strength required. Soaking time should be long enough to allow the edge of the sheet to swell into a “cushion.” As soon as an adequate cushion is formed, the piece must be removed. Hold it for a few seconds at a slight angle to allow the excess solvent to drain off. Then carefully, but quickly, place the soaked edge precisely into place on the other part to be joined. Hold the parts together for about 30 seconds without applying any pressure. This will allow the solvent to work on the surface of the other piece. Allow the joint to set for another 8 to 24 hours before doing any further work on it.

Viscous Cementing

Viscous cements are used to cement joints that can't be easily cemented by capillary or solvent soak methods—either because they are difficult to reach, or because the parts don't fit properly together. Viscous cement is thick. It will fill small gaps, and can make strong, transparent joints where solvent cements can't.

Viscous cements are available from your acrylic sheet retailer. Or you can make your own viscous cement by dissolving chips of clear acrylic sheet in a small amount of solvent. Let the solution stand overnight.

Apply the cement like glue with a brush, spatula, or directly from the applicator tube. Remove the masking material from around the joint area, and carefully apply a small bead of cement to one side of the joint. Then gently join the pieces as described under “Soak Cementing.”

Masking tape may be applied to protect the area around the joint, but it should be removed carefully after about 5 minutes, while the cement is still wet. Don't touch the parts at all for the first critical 3 minutes, or the joint will not hold. The part may be carefully moved after 30 minutes, but don't do any additional work on it for 12 to 24 hours.

Glazing With Acrylic Sheet

One of the most popular uses for acrylic sheet is as a replacement for window glass. Acrylic sheet is lighter, more transparent, and far more break resistant than glass. Glazing with acrylic sheet is safe and easy.

Important: Acrylic sheet expands and contracts at a much greater rate than glass. To compensate, remember to allow approximately 1/16" per running foot (.52 cm per running meter) shorter than your frame size.

The sheet thickness you need depends on the size of your window. Use the chart on page 23 to determine the proper thickness for each application. For windows smaller than 24" (600 mm), use an elastic glazing compound which is compatible with acrylic sheet. Your acrylic sheet retailer can recommend one. For windows over 24" (600 mm), it is important that you select the proper rabbet depth to allow for expansion and contraction. Use a continuous removable stop, and caulk with a polysulfide sealant or butyl tape. If it is necessary to bolt a small panel [less than 24" x 24" (600 x 600 mm)] to a frame, drill mounting holes larger than the diameter of the bolts or screws. Use round-head screws, with rubber washers against the acrylic sheet, and stainless steel washers against the screw head. After tightening, back off 1/2 turn. Do not use counter-sunk, flat-head screws. They will fracture the acrylic sheet. Your acrylic sheet retailer can supply any glazing materials—and any additional information you may need to do the job right with acrylic sheet.

Additional Information

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