About Our Products

ACRYLIC MIRROR SHEETS:
The most popular lightweight and flexible mirror substrate available in the widest range of thicknesses, colours and sizes. Acrylic mirror may be saw cut, router cut or laser cut.

PETG MIRROR SHEETS:
Higher impact strength than acrylic mirror. Can easily be cold formed, die cut or punched. These processes are suitable for high volume. Available in thinner gauges than acrylic.

POLYCARBONATE MIRROR SHEETS:
Recommended for applications requiring high impact strength, heat and flame resistance. The optics of Polycarbonate is comparable to acrylic, but its strength is 30 times stronger.

ARMADILLO (AR) COATING:
In-house processing offers an abrasion, solvent and strain resistant coating on acrylic and polycarbonate one or two sides, mirrored. Increases and enhances the versatility of the substrate.

SEE-THRU MIRROR (TWO-WAY MIRROR):
A semi transparent reflective coating for monitoring or surveillance. Available in acrylic clear and colours and polycarbonate clear.

FIRST SURFACE MIRROR:
An opaque, two-sided mirror used where a reflection in two directions is desired.

FABBACK®:
A grey paint backing on all of our mirrored sheet products. This backing is the most durable, toughest, scratch-resistant backing in the acrylic mirror industry.

ABM:
Adhesive backed mirror is used to mount mirror sheet to another substrate or surface. It is a white paper backing that transfers an adhesive on the sheet once the white paper is pulled off. This replaces adhesives applied by hand that can cause messy edges and non-uniform adhesive coverage.

PAPERMASK:
White or brown papermask, available as additional protection over the Fabback® backing for ease of handling, fabrication and working with mirror sheet.

Bay Plastics Ltd

Product Advantages of Plastic Mirror

Reflectivity Approximately	85-90% over the 400-700 nanometer visual light spectrum.
Lightweight	Less than one half the weight of glass in the same size and thickness.
Break Resistance	Can be ten times more break resistant and has seventeen times greater impact resistance than glass of equal thickness.
Heat occasional	Will tolerate continuous service up to 160°F, and can withstand short-term exposure up to 190°F.
Easy Fabrication	Various shapes and sizes can be obtained by cutting with conventional power saws and routers, using the proper blades and cutters. Mirrored acrylic can be cold bent for curved shapes or strip heated for a sharp bend. State-of-the-art laser systems can produce accurate, complex designs.
Extensive	Available in .060 to .236 thickness. 19 standard colours with custom colours available.
Product Line	Also available in See-Thru, First Surface and Textures.
Economical	Low fabrication and installation cost.
Quality	High reflective surface for use in display, decoration or other mirror applications.

Do's and Don't's

1. Because acrylic has a relatively soft surface and is flexible, some imperfections or distortion may occur. It should not be used for precise image reflection. An appropriate thickness should be determined well in advance cutting.

2. Acrylic mirror cannot be thermoformed.

3. Some adhesives attack the mirrored surface. Please test expendable pieces at least 72 hours in advance to determine suitability.

4. Do not use see-thru or first surface mirror for glazing or any outdoor application.

5. Acrylics tend to absorb moisture. High humidity levels may cause temporary warpage to the material. The warpage is characteristic of the material and should be considered in the design of the product or application.

6. Solvent gluing at edges may cause crazing.

7. Plastic Mirror acrylic sheet is a combustible thermoplastic. Precautions should be used to protect the material from flames and high heat sources.

8. Acrylic mirror cannot be die cut, but can be router, saw, or laser cut.

9. Materials should be stored in a cool, dry area. Acrylic sheets will warp if exposed to variable temperatures, storage, and applications conditions. Changing humidity levels cause the greatest variation. Materials should be stored flat and over wrapped with plastic to minimise absorption of water vapour.

10. Overage is provided for your convenience, check peripheral areas for suitability before cutting.

11. Protective masking should not be removed until fabrication is complete. Exercise care during fabrication and handling of both sides of mirror.

12. Do not use in shower doors, window applications or rooms where humidity could cause the thermoplastic sheet to expand or contract.

13. These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.

Backings

Fabback - Fabback is the grey paint backing on all of our mirrored sheet products. This backing is the most durable, toughest scratch resistant backing in the acrylic mirror industry. Offered on all acrylic, polycarbonate and PETG mirror sheet products.

Papermask - White or brown papermask available, an additional protection over the Fabback for ease of handling, fabrication and working with mirror sheet.

Pressure Sensitive - This adhesive backing is used to mount mirror sheet to another substrate or surface. It is a white paper backing that transfers an adhesive on the sheet once the white paper is pulled off. Mounting a mirror becomes a simple procedure of cutting to a desired size or shape, peeling off the release paper and carefully pressing in place. There is caution, however, the mirror cannot be moved or adjusted after being pressed in position so extreme care is required in the placement. This replaces adhesives applied by hand that can cause messy edges
and non-uniform adhesive coverage.

Handling

All mirrored sheets are furnished with a protective masking on the top side of the sheet. Do not slide Mirrrorised sheets when transporting. The masking should be left on the sheet during storage and fabrication to prevent damage. Plastic mirror is shipped in "ready to store" condition. Keep away from excessive heat, paint over spray and vapours from solvents and other chemicals. The materials should be stored in a clean, dry and warm area with the original packaging intact. However, this is not always practical as all or part of the shipment must be unpacked for the customer to use. In these cases, the following guidelines should be followed:

Vertical Storage

If the mirror sheets are to be stored on end, care must be taken to avoid warping. Sheets must stand with an angle of no more than 10 degrees from the vertical. A-frame racks made of plywood can be made to give full support to the materials.

Horizontal Storage

If the Acrylic Mirror is to be stored flat, care must be taken to avoid warping, slipping and scratching. If different sizes are to be stored together, make sure the largest pieces are at the bottom, the smallest on top. This will prevent overhang, which can lead to warping and slipping during movement. Preventing dirt from settling between the sheets will reduce the risk of scratching if a slip occurs, or while unpacking. Pallets are packages with a heavy poly over wrap, which protects the sheet from dirt and moisture. The over wrap should be intact during storage.

Maintenance

Masking
Each mirrored product is well protected by a durable paint backing and a removable masking on the front. This mask should remain in place to protect the sheets during all phases of fabrication and installation. Mirror plastic sheets should be handled mirror side down, with the masking left on. Care should be taken not to slide sheets against each other.

Removing Masking
If there is difficulty in removing the masking, use aliphatic naphtha, kerosene, or distilled alcohol to moisten the adhesive. Do not use other chemicals or sharp objects to remove the masking.

Cleaning

Washing
Use mild dish soap, water and a soft cloth to wipe the surface, apply only light pressure. To remove grease, oil or tar deposits on the material, use hexane, kerosene or aliphatic naphtha to remove them. Do not use any chemicals on a painted print design. Do not use window-cleaning sprays, kitchen scouring compounds or other chemicals to clean mirrored sheets.

Polishing
A surface gloss can be maintained by occasionally using a flannel cloth and a good plastic cleanser or polish, such as Johnson's Pledge. Follow the instructions for polishing on the container.

Removing Scratches
Fine scratches can be removed by hand polishing with a plastic scratch remover or compound cleaner. Remove all residue and polish with a flannel cloth. Deep scratches need to be lightly sanded using a 400 grit "wet or dry" sandpaper.

Cutting

Scribing and Breaking

This method is used to achieve a quick, straight line cut of single sheets of acrylic mirror less than 3 mm thick. Mark the line to be scribed (scored) on the mirror with a commercial scriber. Firmly place a straight edge along the line and use it as a guideline for the scriber of knife. Scribe the mirror along the line using several firm, evenly pressured strokes. Then, overhang the end of the mirror off the worktable. Break the mirror with a sharp downward pressure. *

Circular Table and Panel Saw Cutting

These saws are used to achieve a precise, straight line cut of one or more sheets of mirror. Because vibration is minimal, this method of cutting is recommended. The best way to avoid vibration and unwanted runout is to install a stiffener 1/2 to 2/3 of the saw blade diameter and mount it against the outside of the blade. To prevent back cutting, the saw arbor, the saw table and the table fence must be properly aligned. Also, the throat plate (table kerf) must be kept to a minimum. A 10", 80 tooth carbide tipped blade is recommended for all –purpose cutting. The blade's teeth should be the triple-chip design, where every other tooth has a beveled cutting edge to help clear away saw chips. For best results, the teeth should have a clearance angle of 10 to 15 degrees. **Material should be cut with masked side down.** Use enough power to make the needed cuts, using a smooth and even feed rate. Uneven feed rates may produce gumming or chipping of the mirror. *

Saber Saw Cutting

Saber saws are generally used for cuts involving frequent change in direction. Maintaining adequate support is important to prevent vibration, which may cause chipping. To achieve this, clamp a straight board on the sheet near the cutting line. This may also be used as a saw guide. Set the saw to full speed before cutting the mirror. Without feeding too fast, press the saw shoe firmly against the mirror while cutting. * Blades for saber saws should have at least fourteen teeth per inch.

Jig Saw Cutting

Jig saws should be used primarily for inside cuts and intricate letters. Since the stroke is short, the blade heats up quickly and tends to soften and fuse the mirror. To avoid this, use a fast and steady feed rate. * Blades for jig saws should have at least fourteen teeth per inch.

Band Saw Cutting

Band saws are used for cutting curved sections or trimming thermoformed parts. * Blades for band saws should have at least 10 teeth per inch.

Laser Cutting

Lasers may be used to cut virtually any image on a mirror with minimal material waste. The CO2 laser operates by focusing a large amount of energy on a small, defined area and melting and vaporising the material. It produces a clean, polished edge without any saw chips. An average of 200 inches per minute may be accomplished by using about 200 watts from a 1200 -watt laser. Annealing the sheet is recommended after cutting, especially when cementing is anticipated.

CAUTION: LASERS CAN CREATE STRESSES ALONG CUT AREAS. BE SURE TO USE A TEST PIECE BEFORE FABRICATION

Routing

Many routers are available for use in the fabrication process. The router should have a minimum of one horse power and a no load speed of about **20,000** RPM. Routers are normally used with a single or double fluted bit, but may consist of one to four flutes. Router bits can be carbide tipped, high-speed steel, solide carbide or diamond tipped. They may be one piece piloted, non-piloted, straight cutting, multiple part forming or specialty bits. *

Hand Routing
A hand router is generally used when making a prototype or a replacement part, by using a pre-cut template pattern clamped to the mirror, the hand held router may be smoothly guided around the pattern. Move clamps whenever necessary. *

Circle Routing
A circle router would be used when a 360° piece of mirror is needed. *

Pin Routing
Pin routers are very flexible. A double-backed tape or vacuum holds the mirror in place. Using the mounted overarm router to hold the cutter over a guide pin in the table, feed the mirror and pattern into the cutter and rotate 360° to form finished product. *

Contour Routing
By using a contour jig on a pin routing machine, multiple parts can be manufactured. Cut the desired pattern on the base of the jig to follow the base guide pin. To secure several mirror sheets at one time, clamps should be mounted on the top of the work. Be sure to raise and lower clamp holders as necessary when the jig is rotated. *

Computerised Numerical Control (CNC) Routing
CNC routers are used in the manufacture of high volume production. This type of router is designed for maximum use of the mirror. Mirrors may be designed for stacking, which eliminates much of the waste normally produced. *

Direction of Travel
The router is designed to rotate anticlockwise for external cuts, and clockwise for routing the inside edges of the mirror. When properly fed in the direction necessary, a smooth cut will result. When operating a router, several precautions are necessary to avoid mistakes to the mirror or the tool in use. First routers are designed with a small diameter and must be operated at high speeds. Avoid vibrations, even the slightest vibration can cause crazing and fractures in the mirror during routing. Second, watch RPM speeds, higher RPM rates allow for faster feeding of the mirror, resulting in a smoother finish. Recommended RPM speeds are 18,000 to 28,000 RPM. Third, for maximum production, operate the feed rate just below chipping speed. Do not overload the motor. Fourth, maintaining a sharp cutter is very important to avoid chipping and decreased production. Finally, use a 1/2" or larger diameter cutter whenever possible, this larger diameter provides a better surface with less tendency to chip. *

Drilling

Plastic mirror may be easily drilled with any commercial power -driven drill available. Included are: Portable drills, drill presses, lathes, or automatic multiple - spindle drilling units.

Before drilling a hole in a plastic mirror, it is recommended to use a bit offered especially for plastics. If a drill bit for plastics is not available, a metal -working drill bit with a high-speed twist may be used with some modification.

Since metalworking drill bits are designed to push through metal, the following modifications must be made to ensure no chipping or other damage to the mirror.

1. The *tip* angle is usually about 120 degrees, this is too flat to cut through mirror products without damage and must be ground to a sharp angle of 60-90 degrees to allow the bit to enter and exit easily without chipping.

2. The cutting edge must be ground to a rake angle of 0-4°. This 'flat' cutting edge will scrape the mirror without gouging it.

3. The *surface* behind the cutting edge must be ground away to clearance angles of 12-15°. This will allow back relief for reduced metal to plastic contact and heat build up.

Drill bits with tips larger than 5/8" should be ground to a point to reduce the amount of force required to start a hole. Drill bits must be true, or melting, burning and chipping may occur. Correctly modified drill bits will create two continuous spiral strips as the bit passes evenly through the mirror, when operated at the proper speed.

When drilling the actual mirror, it would be wise to back up the surface with a durable surface, such as plywood, so the drill bit will continue in to a solid material, this will prevent chipping on the opposite side of the mirror. A slow feed rate should be used when the bit enters or exits the mirror.

Holes of 1" or more may be cut with a circle cutter. To accommodate the material properties of mirror, the cutter bit must be modified so the tip scrapes the material without gouging it. Use a cool air mist system to avoid heat build up, leaving the walls of the hole with a smoother cutting edge. Use a drill pressure and constant vertical positioning.

*** CAUTION:** A COOL AIR MIST SHOULD BE IN CONTACT WITH THE BLADES OF ALL CUTTING DEVICES BEFORE AND DURING PRENETRA TION OF THE PLASTIC.

Edge & Surface Finishing

The extent of finishing needed to produce a smooth, transparent edge is based upon the quality of the cutting tool used to machine the edge. A properly designed cutting tool with a sharp cutter will reduce the amount of finishing needed. Finishing is also reduced when a spray coolant is used along with the cutting tool to reduce excess heat build-up.

Polishing

A polished edge is the best possible finished edge, but requires the most preparation. Prior sanding is necessary if the edge is shaped from a saw cut, sanding is not necessary when there is a well-milled edge. A jointer, shaper or hand scraped edge can be used in place of sanding. A stationary polishing head produces the best polished surface. Bleached muslin wheels with a diameter of 8" to 14" with bias strips is recommended. This gives the buffing wheel a pleated appearance, and runs cooler than a stitched buffing wheel design and will also do a fast job.

Polishing Compounds

The finished quality of the polished edge is determined by the polishing compound used. To produce a high lustre finish, the use of a fast cutting compound first will remove all sanding marks, followed by a high luster compound for the final buffing. To achieve a fairly good finish in one operation, a medium cutting compound would be best.

Polishing Surface

Prior sanding is not necessary when the scratches or machining marks are not too deep. A surface polishing wheel should be from 6" to 12" in diameter, built up to a width for 1 1/2" to 2". For the initial polish use a soft, bleached muslin wheel, followed by soft flannel wheel for the finishing. Depending on the depth of the scratches, use a medium-course polishing compound or a fine compound. Be sure to keep the mirror in motion at all times during the polishing procedure.

Chemical Resistance

Like all plastic materials, mirrored acrylic will react when exposed to many chemicals. Below is a partial list of chemicals known to react with acrylic mirror, exposure to them should be avoided. Factors such as fabrication stresses, exposure to loads or changing temperatures and the method of application can all influence the possible reaction. In all cases, care should be taken with dry chemicals or solvents used near mirrored acrylic.

Known Chemicals that attack plastic mirror

BENZINE
LACQUER THINNERS
ESTERS
CARBON TETRACHLORIDE
TOLUENE
ETHYL ALCOHOL
KETONES
METHYL ALCOHOL
ETHERS

Weather Resistance

Mirror products are **not recommended for exterior use**. If used outside, seal perimeter with silicon sealant to keep moisture out and protect mirror paint backing. Salt spray can also begin to degrade mirror.
PLEASE SEE PAGE TITLED GUIDELINES FOR EXTERIOR APPLICATIONS FOR ACRYLIC AND POLYCARBONATE MIRROR FOR MORE GUIDANCE.

Cementing

Mirrored acrylic, like mirrored glass, is a reflective film applied substrate. When the substrate is affixes to another surface, both of these materials will conform to the irregularities of the supporting surface. A non-smooth, non-planar surface will cause localised bending of the mirrored sheet and distortion in the reflected image.

For best results, mirrored acrylic should be mounted to a smooth, rigid, sturdy, flat backing such as five to seven ply, 5/8" or 3/4" plywood. The surface should be coated with a good paint or sealant to cover pockets and seal out moisture. The entire surface should then be covered with mastic or another type of pressure sensitive adhesive.

Another option is to drill oversized holes in the mirrored acrylic and hold it to the wall using screw fasteners. Do not over tighten the screw fasteners as this will cause dimpling and distortion.

Ceiling and overhead installations are not recommended unless the mirrored acrylic is mounted in edge-engaging frames such as T-bar suspended ceiling frames or mechanical mounting.

Some adhesives may contain strong solvent contents, which can attack the back coat. Since numerous adhesive cements, and mastic tapes are available, they should be tested on expendable pieces prior to application of the adhesive. All tests should be applied at least 72 hours in advance to determine compatibility to the backside, the reflexive coating, and the acrylic itself.

AGAIN WE STRESS, BEFORE USING ANY ADHESIVES, MASTICS OR CEMENTS, PLEASE TEST EXPENDABLE SAMPLES FOR AT LEAST 72 HOURS TO DETERMINE SUITABILITY.

Mirror Bending

Line or strip bending is best accomplished by applying an intense narrow band of heat approximately 3mm away from the mirror substrate. 1.15mm nichrome (nickel-chrome) resistance wire is a commonly used heating element.

- Place the mirror face toward the heating element. Do not attempt to heat the paint side. Doing so will prolong heating times and cause blushing, a dulling of the mirrors reflective finish.
- Adjust your power source so that the wire becomes a medium to bright red colour
- Peel all masking several inches away from the bend area. Masking left in place, either poly or paper, will increase heating time and yield poor results.
- Acrylic will become bendable at 143 degrees Celsius to 163 degrees Celsius. Bending should be done at the coldest possible temperature requiring gentle force to make the bend. 3mm mirror should become pliable enough to bend within 20 - 25 seconds.
- Timing is critical. Under heating will cause warpage along the bend line and undue stress, which may lead to cracking. Overheating will cause blushing.
- Cooling should be done as quickly as possible by air circulation.

Guidelines for exterior applications for polycarbonate and acrylic mirror

Acrylic and Polycarbonate mirror are made from standard acrylics and polycarbonate, giving the front surface the characteristics of the original product. Full specifications available on request.

It is essential to prevent water from reaching the mirror coat. The ingress of water may cause the mirror coat to oxidise and freezing and thawing may cause delamination. All edges and fixing holes should be sealed with a silicone sealant of a type, which will not attack the mirror. Avoid contact of the mirror coat (aluminium) with other metals, e.g. fixing screws.

Mirror should be fully adhered to a suitable substrate, such as an outdoor grade plywood or MDF. Adhesive should be suitable for outdoor use and of type, which will not attack the protective coating, and mirror. **Solvent adhesives should be avoided.** Adhesives should be applied as recommended by the manufacturer.

Allowance must be made for thermal expansion and contraction. Note: the coefficient of linear thermal expansion is 0.000032 to 0.000038 per inch per degree Fahrenheit. This range applies to both acrylic and polycarbonate.

Additional mechanical fixing may be necessary for large areas. Screw holes should be 1/16" oversize and pre-drilled without countersinking. Use large head screw, at least 1 per 2-2.5 feet, and not less than 1 inch from the edges. Use "J" moulding or mullions around the perimeter edge.

The mirror will tend to conform to the contours of the substrate and should be of adequate thickness to minimise image distortion.
We recommend testing adhesive and sealant on the mirror at least 15 days prior to installation where there is any doubt about compatibility.

The following adhesives are suitable for use with acrylic and polycarbonate mirror.

However,

IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF ANY ADHESIVE FOR THE SUBSTRATE AND CONDITIONS.

NOTE:

ALL SUGGESTIONS AND DATA ARE BASED ON INFORMATION WE BELIEVE TO BE RELIABLE. THEY ARE OFFERED IN GOOD FAITH, BUT WITHOUT GUARANTEE, AS CONDITIONS AND METHODS OF USE OF OUR PRODUCTS ARE BEYOND OUR CONTROL. WE RECOMMEND THAT THE PROSPECTIVE USE DETERMINE THE SUITABILITY OF ACRYLIC/POLYCARBONATE MIRROR, AND SUGGESTIONS FOR USE, BEFORE ADOPTING THEM ON A COMMERCIAL SCALE.