

PROCESSING GUIDE FOR EUROMIR® ACRYLIC MIRROR SHEETS

HANDLING: All EUROMIR® sheets are supplied with a protective masking on the topside. Do not slide the sheets when transporting. The masking should be left on the sheet during storage and fabrication to prevent damage. The materials should be stored in a clean, dry and warm area with the original packaging intact. However, if this is not possible the following guidelines should be followed: Vertical Storage: Sheets must be stood with an angle of no more than 10° from the vertical to avoid warping. Horizontal Storage: If the acrylic mirror sheets are 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 panels are at the bottom and the smallest on top. Pallets should be packaged with a heavy cardboard sheet which protects the sheets from dirt and blows.

MAINTENANCE: Masking: Masking should remain in place to protect the sheets during all phases of fabrication and installation. EUROMIR® Acrylic mirror sheets should be handled mirror side down, with the masking left on. Removing Masking: If there is any 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 a light pressure. To remove grease, oil or tar deposit on the surface, use hexane, kerosene or aliphatic naphtha. 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 cleaner or polish. 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.

CUTTING: Scribing and Breaking: This method is used to achieve a quick straight line cut of single sheets or EUROMIR® Acrylic mirror thinner than 3mm. Mark the line to be scored on the mirror with a commercial scribe. Firmly place a straight edge along the line and use it as a guideline for the scribe knife. Scribe the mirror along the line using several firm even pressured strokes. Then overhang the end of the mirror off the work table. Circular Table and Panels Saw Cutting: These saws are used to achieve a precise straight line cut of one or more sheets of EUROMIR® Acrylic mirror. (Because vibration is minimal, this method of cutting is

recommended). The best way to avoid vibration and unwanted run out is to install a stiffener 1/2 to 2/3 the saw blade diameter and mount it against the outside of the blade. To prevent back cutting, the saw table and the table fence must be properly aligned. Also the throat plate (table kerf) must be kept to a minimum. Use enough power to make the needy cuts, using a smooth and even feed rate. Uneven feed rates may produce gumming or chipping of the EUROMIR® Acrylic mirror. Saber Saw Cutting: Saber saws are generally used for cuts involving a 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 fully speed before cutting the EUROMIR® Acrylic mirror. Without feeding too fast, press the saw shoe firmly against the mirror while cutting. (*) 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 EUROMIR® Acrylic mirror. To avoid this, use a fast and steady feed rate. (*) Band Saw Cutting: Band saws are used for cutting curved sections or trimming thermoformed parts. (*) Laser Cutting: Lasers may be used to cut virtually any image on an EUROMIR® Acrylic mirror with a minimal of material waste. The CO² laser operates by focusing a large amount of energy on a small defined area and melting and vaporizing the material. It produces a clean, polished edge without any saw chips. Annealing the sheet is recommended after cutting, especially when cementing is anticipated. Caution: laser can create stresses along cutting 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 1 horse power and a no load speed of about 20,000RPM. Routers are normally used with a single or double fluted bit, but may consist of 1 to 4 flutes. Router bits can be carbide tipped, high speed steel, solid carbide or diamond tipped. They may be one piece, piloted, not 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 EUROMIR® Acrylic mirror, the hand held router may be smoothly guided around the pattern. Move the clamps whenever necessary. (*) Circle Routing: A circle router would be used when a 360° piece of EUROMIR® Acrylic mirror is needed. (*) Pin Routing: Pin routers are very flexible. A double backed tape or vacuum holds the acrylic mirror in place. Using the mounted over arm 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 EUROMIR® Acrylic mirrors 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.

(*) *CAUTION: A cool air mist should be in contact with the blades of all cutting devices before during penetration of the plastic*

Computerized Numerical Control (CNC) Routing:

Direction of Travel: CNC routers are used in the manufacture of high volume production. This type of router is designed for maximum use of the EUROMIR® Acrylic mirror. Mirrors may be designed for stacking which eliminates much of the waste normally produced. (*) This router is designed to rotate counter-clockwise for external cuts and clockwise for routing the inside edges of the EUROMIR® Acrylic 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 EUROMIR® Acrylic mirror or the tool in use. 1. 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 EUROMIR® Acrylic mirror during routing. 2. Watch RPM speeds, higher RPM rates for faster feeding of the EUROMIR® Acrylic mirror, resulting in a smoother finish. Recommended RPM speeds are 18,000 to 28,000 RPM. 3. For maximum production, operate the feed rate just below chipping speed. Do not overload the motor. 4. Maintaining a sharp cutter is very important to avoid chipping and decreased production. 5. Use the largest diameter cutter whenever possible, in order to provide a better surface with less tendency to chip.

DRILLING: EUROMIR® Acrylic mirror may be easily drilled with any commercial power driven drill available. Before drilling a hole in EUROMIR® Acrylic mirror, it is recommended to use a bit offered especially for plastics, if a drill bit for plastic is not available, a metal working drill bit with a high speed twist may be used with some modification. Since metal working drill bits are designed to push through metal the following modifications must be made to ensure no chipping or other damage of the EUROMIR® Acrylic mirror:

1. The tip angle is usually about 120°, this is too flat to cut through EUROMIR® Acrylic mirror without damage and must be ground to a sharp angle of 60°-90° 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 EUROMIR®

Acrylic 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.

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

Holes of 25mm or larger may be cut with a circle cutter. To accommodate the material properties of EUROMIR® Acrylic 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 press for uniform pressure and constant vertical positioning.

(*)*CAUTION: A cool air mist should be in contact with the blades of all cutting devices before during penetration of the plastic.*

EDGE AND 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 sharp from a saw cut, sanding is not necessary when there is a well milled edge. A Jointer, sharper 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 200mm to 355mm with bias strips. The finished quality of the polished edge is determined by the polishing compound used. To produce a high luster 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. Prior sanding is not necessary when the scratches or machining marks are not too deep. A surface polishing wheel should be from 150mm-300mm in diameter, built up to a width for 40mm to 100mm. For the initial polish, use a soft, bleached muslin wheel, followed by a soft flannel wheel for finishing.

Depending on the depth of the scratches, use a medium-course polishing compound or a fine compound. EUROMIR® Acrylic mirror sheets may soften when

over-heating is a result of excessive pressure, also be sure to keep the EUROMIR® Acrylic mirror in motion at all times during the polishing procedure.

CEMENTING Mirrored acrylic, like mirrored glass, is a reflective film applied to a substrate. When the substrate is affixed to another surface; both of these materials will conform to all the irregularities of the supporting surface. A non smooth, non planar surface will cause localized bending of the acrylic 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 5 to 7 ply, 16mm or 19mm 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 a 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 fastener. Do not over tighten as this will cause dimpling and distortion.

Visual distortion is a function of viewing distance and material thickness. A thicker piece of the material will be less flexible and therefore maintain better optical integrity. Correct installation and sufficient material thickness can reduce visual distortion but may not completely eliminate it.

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

Some adhesives may contain strong solvent contents which can attach the back coat. Since numerous adhesives 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 84 hours in advance to determine compatibility to the backside, the reflexive coating and the acrylic itself. Again we stress, before using any adhesives, mystics or cements, please test expendable samples For at least 84 hours to determine suitability.

ACRYLIC MIRROR BENDING: Line or strip bending is best accomplished by applying an intense narrow band of heat approximately 3mm away from the mirror substrate. ■ 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 color; ■ Peel all masking several centimeters away from the bend area. Masking left in place, either poly or paper will increase the heating time and yield

poor results. ■ Acrylic will become bindable at 143° to 163°. 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 to 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.

FLAMMABILITY INFORMATION: Acrylic mirrored sheet is a combustible thermoplastic. Precautions normally used to protect wood and other combustibles from flame and high heat should be observed with this material. It is recommended that appropriate building codes be followed to ensure proper and safe use.

IMPORTANT: Careless handling of the product can result in injury. The same caution should be exercised when using acrylic mirror as that taken when fabricating with glass, plastic or wood to prevent accident or ingestion.

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