



ACRYLITE® Fabrication Brief

Edge and Surface Finishing

Procedures

Be sure to follow manufacturer's safety recommendations for equipment and materials used with ACRYLITE® sheet.

Type of Finish

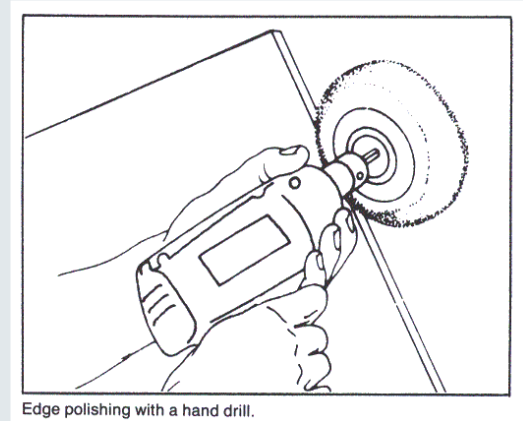
Finish	Method
High Luster	Polishing
Satin	Sanding Method
Matte	Scraping (Edges Only)
Medium High Luster	Flame Polishing (Edges Only)
Matte to Medium Luster	Edge Finishing Machines

Preparation

The amount of finishing required to produce a smooth, transparent edge is dependent on the quality of the machined edge. A sharp and properly designed cutting tool will reduce the amount of the finishing work needed. Finishing work is also reduced when spray coolant is used with the cutting tool to prevent excessive heat build-up.

Polishing Edges

Polishing creates the best finished edge but requires the most preparation. A well machined (milled) edge can be polished without prior sanding. However, a saw-cut must either be sanded, run through a jointer, shaper, router, edge finishing machine, or be hand-scraped before it can be polished. If sanding, wet sand with a wet/dry paper and then progress in grit from 320 to 400 to 600 and 800 grit sandpaper. Edge polishing is best done on a stationary polishing head. Use 8" to 14" (200 – 300 mm) diameter soft bleached muslin wheels designed with bias strips, which give the buffing wheel a pleated appearance. This design will do a faster job.



Edge polishing with a hand drill.

Edge finish quality depends on the selection of the polishing compounds. Begin with a medium cutting compound to produce a fairly good finish in one operation. For a high luster finish, it is best to first use a fast cutting compound to remove all sanding marks, and then a high luster compound for the final buffering operation.

Finally use a polishing wheel with no compound to remove compound residue from the previous polishing.

Be careful to avoid excessive heat buildup when buffing edges. Too much heat can induce stress into the sheet and eventually cause crazing. To reduce to a minimum the amount of stress, anneal the part, if possible, after all fabrication steps are complete (including polishing). See Tech Brief #12 on *Annealing* for the proper procedures.

Polishing Surfaces

If the scratches or machining marks are not too deep, the surface can be polished without prior sanding. Wheels used for surface polishing can be from 6" to 12" (150 – 300 mm) in diameter, built up to a width of 1 ½" to 2" (38 – 51 mm). They are made of soft, bleached muslin for initial polishing operation and of soft flannel for the final finishing.



For the first buffing operation, use a medium-coarse polishing compound depending on the depth of the scratches.

When polishing the surface of the sheet, the piece must be kept in motion at all times. Do not use excessive pressure, as softening from over-heating can result.

Sanding Edges

Wet sanding is desired for finishing acrylics. Normally 180 – 320 grit “wet-or dry” paper is used along with plenty of water. If done by hand, use a sanding block to keep edges even. Only light pressure should be applied when grinding with power sanders to minimize frictional heat which can cause gumming from over-heating of the acrylic. Follow “Polishing Edges” procedure for a higher finish.

Sanding Surfaces

A scratched surface should not be sanded unless the imperfections are too deep to be removed by polishing alone. If sanding is required, it is recommended that wet sanding be used. The application of water makes it possible to produce a smoother finish because a fine-grit sandpaper can be used. Without water, the same fine-grit paper would fill up and over-heat the acrylic.

Tape off the area to be sanded to limit the area requiring sanding and polishing.

For very deep scratches, a 240-grit or 320-grit paper will be coarse enough to start the sanding process. The first step should be followed, after rinsing, by a 400-grit, and then by a 600-grit paper. Be sure to use plenty of water and rinse the sandpaper frequently to keep it from clogging. With power sanders, only light pressure should be applied to reduce friction. Follow “Polishing Surfaces” procedure for a higher finish.

Scraping Edges

Scraping is the easiest finishing technique. A scraper can be almost any piece of metal with a sharp, flat edge. Whatever tool you use, it must have a sharp square edge.

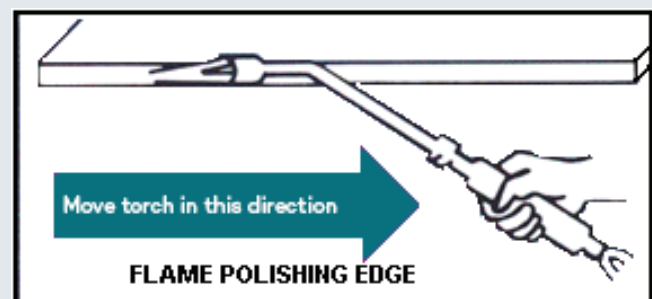
Hand scraping is an alternative to sanding for preparing the edges for polishing. Used in conjunction with flame polishing, high luster edges are achieved, but without the smoothness of sanded and polished edges.

Clamp the work vertically. Start at the rear of the edge with the scraper tilted 45° and draw with uniform speed and pressure to the front. A uniform strip should be removed. Follow an edge polishing procedure for a higher finish.

Flame Polishing Edges

Flame polishing should be done with an oxygen-hydrogen welding torch. The flame should be bluish, nearly invisible, approximately 3” (75 mm) long and narrow. Hold the torch at the angle shown and draw the flame along the edge of the sheet. Practice will help you to estimate the speed and distance. If the first pass does not produce a completely polished edge, allow the piece to cool, and then try a second pass. The sudden heating of the sheet when flame polishing induces a high degree of stress into it.

If required, protect the top and the bottom of the sheet to prevent the flame from contacting these surfaces. A piece of acrylic placed above and below the piece being flame polished will work well to protect these surfaces.



After flame polishing, be sure to anneal the part. This will decrease the amount of stress and reduce or prevent the chance of crazing over time. See Tech Brief #12 on *Annealing* for more information.



Edge Finishing Machines

Commercially available edge finishing machines offer a fast method of obtaining smooth edges without sanding or scraping. Finishes range from smooth edges with slight machining marks to smooth, almost polish edges, depending on design of the machine and cutting tools used. Machine finished edges are ideal for cementing or flame polishing, but are sharp and require some additional fabrication to make them safe for handling.

Care should be taken to adjust the feed rate to eliminate chipping and melting. Feed rates that are too fast will result in chipping, while a slow feed rate will result in melting. Edge finishing machine will vary in cutter diameter and rotation speed. In general, machines with larger cutter and rotation speeds will permit faster feed rates without chipping.

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Fire Precautions

ACRYLITE® sheet is a combustible thermoplastic. Precautions should be taken to protect this material from flames and high heat sources. ACRYLITE® sheet usually burns rapidly to completion if not extinguished. The products of combustion, if sufficient air is present, are carbon dioxide and water. However, in many fires sufficient air will not be available and toxic carbon monoxide will be formed, as it will when other common combustible materials are burned. We urge good judgement in the use of this versatile material and recommend that building codes be followed carefully to assure it is used properly.

Compatibility

Like other plastic materials, ACRYLITE® sheet is subject to crazing, cracking or discoloration if brought into contact with incompatible materials. These materials may include cleaners, polishes, adhesives, sealants, gasketing or packaging materials, cutting emulsions, etc. See the Tech Briefs in this series for more information, or contact your ACRYLITE® sheet Distributor for information on a specific product.

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