



NovAcryl Fabricating and Finishing Techniques

The Clear Advantage

NovAcryl PT Series is a new generation of nylon based photopolymer material on an extruded, clear, UV stable copolyester PETG thermoplastic base. When manufacturing DDA compliant or raised graphic signs, NovAcryl provides the manufacturer with significant fabricating techniques over phenolic, aluminium and acrylics. Below are factory recommendations for optimum finishing and the highest quality results.

Guillotining

For thicknesses up to PT-190 (4.8mm), use a small 36" (1 metre) squaring guillotine with a 60 degree plastic cutting blade. Hydraulic shears may be used for thicker gauges. When using a "metal" cutting blade, expect to experience a minimal draw. There should be no cracking or chipping with any thickness.

Sawing and Routing

A dedicated saw blade should be used for saw cutting unprocessed photopolymer sheets. No such dedicated blade is necessary after processing. Use the following saw blades and router bits for best results.

<u>Type of cut</u>	<u>Tool</u>	<u>Blade type</u>	<u>Blade parameters</u>	<u>Blade speed</u>
Straight	Circular Saw		190mm (7 1/2") dia. 40 tooth carbon tipped cutoff 190mm (7 1/2") dia. 200 tooth plywood	4,500 rpm
	Band Saw	12.5mm (")	3 to 6 teeth per 25mm (1") skip	600m/min.
	Saber/Jig saw	Finish cutting blade	7 teeth per 25mm (1")	
	Handsaw	Crosscut	8 or 10 pt.	
Curved	Band Saw	12.5mm (")	3 to 6 teeth per 25mm (1"), skip	600m/min.
Trimming & De-flanging	Radial Arm or Table saw	250mm (10")	72 teeth, triple chip grind	3,450 rpm
	ROUTER	Carbon tipped double fluted straight	18mm dia. (3/4")	23,000 rpm

Routers with two-flutes straight cutters produce very smooth edges. The sheet should be fed to the router slowly to avoid excessive frictional heating and shattering. Compressed air can be used during the router operation to cool the bit and aid in chip removal.

NOTE: be sure to hold or clamp the part securely while sawing to prevent chattering which can cause cracking.



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Joining

A standard woodworking jointer / planer will produce an accurately aligned and good quality finished edge.

Laser Cutting

NovAcryl can be laser cut up to PT-190 in thickness AFTER processing. The photopolymer layer should not be laser cut. Laser power and speed must be optimized to minimize whitening of the sheet while cutting.

Hot Bending

NovAcryl can be bent on a small radius by preheating an area on both sides with an electric strip heater and then quickly bending the sheet along the heated line. The side of the sheet that is to form the inside angle should be heated first and the outer side last. When optimum sheet temperature is reached, slightly over 125 degrees Fahrenheit, and slight resistance to bending is noticeable the part can be readily formed.

Cold Bending

Brake forming and cold bending can be used to produce simple shapes from NovAcryl. The permissible degree of bending is dependent on both sheet thickness and rate of deflection. Cold bending of gauges over 2.5mm (0.1") will likely result in high stress levels.

Drilling

Twist drills for plastics should have 2 flutes, a point with an included angle of 60 to 90 degrees and a lip clearance of 12 to 18 degrees. Wide, highly polished flutes are desirable since they expel the chips with the low friction and thus avoid overheating and consequent gumming.

Bonding

NovAcryl can be fabricated in to a variety of shapes and articles with solvent, cement or adhesive bonds. Recommended agents are

When bonding NovAcryl base to PETG - Weldon 7

When bonding NovAcryl to other materials - Weldon 55 (two part)

Sanding

NovAcryl is best sanded wet to avoid frictional heat buildup that is characteristic of dry sanding techniques. Progressively finer abrasives are used. Rough sanding with 80 grit silicon-carbide would be followed by finer sanding with 280 grit silicon-carbide, wet or dry. The final sanding may be with 400 or 600 grit sandpaper.



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Filing

When thermoplastics like NovAcryl's base are filed, a light powder that tends to clog some files is produced. Therefore, aluminium Type A, shear tooth, or other files that have coarse, single cut teeth with an angle of 45 degrees are preferred.

Ashing, Buffing & Polishing

Ashing, buffing and polishing are accomplished on abrasive charged wheels made of cloth, leather or bristles. When coolant is used, finishing wheel surface speeds of 35 to 45 feet (approx. 12 metres) per second are suggested. When the wheel is operated dry, lower speeds should be used.

Flame Polishing

NovAcryl can be flame polished using a standard propane torch or a hot-nitrogen welder. Both techniques require accurate control of the distance between the sheet and the heat source; otherwise surface whitening or excessive material flow may occur. A heat gun can be used to remove scratches from the back, non-adhesive side of NovAcryl. The hand held unit, which should have a temperature range of 750 - 1,000 degrees Fahrenheit should be held about 4 inches (100mm) from the scratch for approximately 5 seconds.

Thermoforming Recommended Conditions

Optimum forming temperature		300 degrees F
Forming Temperature Range		250-330 degrees F
Heat Cycle	Hot Air	< 12 minutes
	Infrared	3.75 minutes
Cooling Cycle		< 1 minute
Part removal temperature		170 degrees F
Forming Time		10 seconds
Total Forming Cycle	Hot Air	< 13 minutes
	Infrared	< 5 minutes