# PETg Manipulation

## Cleaning

Clean the sheet with a solution of lukewarm water and a little neutral soap and rinse with fresh water, using a very soft sponge or chamois.

## Cutting

### Saw cutting:

- The types of saw commonly used in wood- or metal work produce good results: circular saw, band saw, roughing saw and handsaw. Circular and band saws produce better edges and can be used for almost all cutting operations.
- The blade design plays an important part in sawing plastics. It is preferable to use a saw blade with wide set teeth. The best results are obtained with straight, angle set teeth. To prevent the plastic from melting or cracking the blade must be very sharp and the fence should be placed very near the cut to reduce any vibration.
- The PET sheet (up to 2mm) can be satisfactorily cut using a die with steel blades. The blade should be changed or sharpened frequently.
- The press for die cutting should be adjusted so that the stroke completely slices through the plastic sheet and stops before the blade becomes damaged.

## Polishing

- Sheet edges must first be smoothed to remove the marks left by the circular saw.
- The following may be used:
- Rigid fabric rotary discs with polishing paste followed by soft fabric discs with polishing paste for the final finish.
- PETg sheet 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.

## Drilling

- PETg sheet can be readily drilled using a standard drill press or hand-held drill with sharp, clean drill bits. Drill bits designed for use with plastic are recommended. Standard drill bits can, on occasion, be used but may have to be ground to reduce the depth or angle of cut. Hold the work securely in place when drilling but avoid excessive clamping pressure. Drill speeds up to 1,750 rpm are best for smaller holes, while speeds as low as 350 rpm can work for larger holes. Use compressed air to prevent overheating, especially if sheet is more than 5 mm thick.

## Bonding

### Bonding with adhesives:

Recommended adhesives include cyanoacrylates, two-part acrylics, two-part polyurethanes and two-part epoxies.
Several characteristics to consider when selecting an adhesive are:

- Chemical compatibility with sheets
- Aesthetics of the finished joint
- Expansion/contraction with temperature changes
- Brittleness/ rigidity/ flexibility

- Weather ability, if required
- Durability/ service life
- Adhesive strength (adhesion to the plastic)
- End-use requirements

Joined surfaces must fit well without forcing and have no visible gaps. The surfaces to be bonded should be smooth but not polished.
Some adhesives with a volatile component may shrink while curing. To compensate for this, cut the joint on an angle, providing space for the joint to be slightly overfilled to compensate to shrinkage.

**Mechanical fastening:**
This method is useful when assembling or installing large or heavy parts. It is important to use screws designed specifically for plastics.

**Thermoforming**
There are various thermoforming techniques that can be applied to PETg sheet to give it the desired shape when hot, either using mechanical force, compressed air or by means of a vacuum. Moulds can be made of plaster, steel, aluminium or other materials such as wood or epoxy.
**For thermoforming:**

- Pre-drying is not necessary, unlike polycarbonate, and this offers significant savings in time and energy.
- Thermoforming temperatures are from 120ºC to 160ºC. High temperatures can reduce impact resistance.
- This lower thermoforming temperature means that vinyl laminates are not damaged during the process.
- Remove the printed film before thermoforming to prevent print from the film marking the sheet.

**Bending**
PETg sheet can be bent and folded with a small radius by first heating a thin strip on each side of the sheet using a resistance wire. When the sheet reaches the correct temperature (just above 105ºC) and a slight resistance to folding can be noted, it can then be easily bent.

**Decoration**
**Hot stamping:**
PETg sheet can be hot stamped with signs, drawings, trademarks and other designs.
**Printing:**
PETg sheet can be printed using most printing methods; the ink, however, does not penetrate plastic in the same way as cloth or paper and ink adhesion may be less than desired. The risk of this occurring can be reduced by applying a layer of transparent lacquer over the print. The sheet can also be painted, silk-screened or decorated by means of a laser.
Remove the printed film before printing to avoid that the film illustration picture could be fixed on the sheet.

**Transport**

- Dirt and abrasive objects can damage the surface if rubbed.
- During transport, always use flat, stable pallets, securing the sheets to prevent them sliding.
- Ensure the sheets do not slide over one another when loading or unloading.
- Lift by hand or using suction pads.

**Storage**

- An incorrect position during storage may cause permanent deformation.
- Store under cover in dry temperate conditions.
- Stack the sheets on a flat, horizontal surface.
- Cover the top sheet in each stack with a sheet of polyethylene or cardboard, etc.
- Do not store PETg in direct sunlight or in conditions of high humidity or temperature as these may adversely affect the adhesion of the surface protection film.