

## PC Manipulation

### Cleaning

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

In case this is not sufficient certain solvent cleaners can be used.

### 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 band with wide set teeth as the gaps help to remove chippings.

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.

### Polishing

Sheet edges can be polished using rigid fabric rotator discs with polishing paste followed by soft fabric discs with polishing paste for the final finish.

### Drilling

PC 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 is 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 part securely in place when drilling but avoid excessive clamping pressure.

The hole must be larger than the screw to permit the thermal expansion and contraction.

There must be a separation between the edge and the hole of at least the double of the hole diameter. 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 5mm thick.

### Bonding

Bonding with adhesives:

Recommended adhesives include solvent-based, hot melt, silicone, two part polyurethanes, two parts epoxies and tapes.

Several characteristics to consider when selecting an adhesive:

- Chemical compatibility with PC sheet
- Aesthetics of the finished joint
- Expansion / contraction with temperature changes
- Brittleness / rigidity / flexibility
- Weatherability, if required
- Durability / service life
- Adhesive strength
- End-use requirements

The surfaces to be bonded should be cleaned with a soft cloth with alcohol to remove dirt and grease. 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 may shrink while curing. To compensate for this, cut the joint on an angle, providing space for the joint to be slightly overfilled.

## **Thermoforming**

There are various thermoforming techniques that can be applied to PC sheet to give them the desired shape when hot, either using mechanical force, compressed air or by means of a vacuum. Moulds preferably made out of steel or aluminium but also other materials such as wood or epoxy. Pre-drying is necessary, at 120° in a hot air circulation oven because moisture can cause bubbling and other surface appearance problems. Drying time depends of sheet thickness.

Important: The protection film must be removed before pre-drying.

For vacuum forming: Thermoforming temperatures should be between 185°C and 205°C, depending on the sheet thickness.

Drape forming: Temperatures between 145°C and 160°C.

## **Bending**

### **Hot bending:**

Using two electrical resistance heaters (above and below) it is possible to bend in more accurate angles. When the sheet reaches the correct temperature (just above 155°C) and a slight resistance to folding can be noted, it can then be easily bent.

If an attempt is made to bend the sheet before it is sufficiently hot, stress is caused which could make the part brittle; if, on the other hand, it is overheated, bubbles can appear along the bent section.

### **Cold bending:**

For sheet thicknesses less than 6 mm. the maximum angle recommended is 90°. More than 6 mm. thick minimum angle is 135°. Usually overbending is needed to achieve the final angle.

## **Decoration**

### **Screen Printing:**

PC can be printed using most printing methods.

A list of recommended silk screen inks for PC is available.

### **Painting:**

PC can be painted without surface treatment.

## **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 the 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 PC in direct sunlight or in conditions of high humidity or temperature as these may adversely affect the adhesion of the surface protection film.