

PLASKOLITE

DRAPE-FORMING and COLD-FORMING GUIDELINES

TUFFAK® FC SHEET

TUFFAK FC is a transparent polycarbonate sheet that has a formable coating on both sides. It can be drape and cold-formed to a minimum bend radius equal to 100-times the sheet thickness. Example: 0.118" x 100 = 11.8" radius (3mm x 100 = 300mm radius). Compound bending is not recommended as biaxial stretching of the coating compromises adhesion and may induce cracking.

DRAPE-FORMING

TUFFAK FC drape-forming temperature ranges from 320°F-325°F (160°C-163°C). Normally, at these processing temperatures FC requires no pre-drying. Avoid prolonged cycles and over-heating since both conditions may result in moisture bubbles, mold mark-off and pimpling in the sheet.

EQUIPMENT for DRAPE-FORMING:

Wear proper personal protection equipment such as eye protection and heat resistant gloves.

Processing options include a batch circulating air oven or a tunnel conveyor belt design oven.

Temperature controller initial set point should be 320°F (160°C).

Recommended materials for molds include wood, fiberglass or similar non-conductive heat resistant material. Metal molds covered with felt fabric, melamine sheet, or other heat resistant and flexible materials are also suitable options.

Use of an air hose equipped with an anti-static device for blowing ionized air is useful to remove accumulated dust and dirt the sheet may pick up while handling.

A clean work environment is important when attempting to form optically critical parts as every micro-dust particle on the sheet or mold surface can transfer to the sheet during forming.

SHEET HANDLING and FABRICATION PRACTICES:

Maintaining part consistency requires controlled sheet orientation since directional sheet shrinkage and edge curl varies with extrusion direction. Keep the following practices in mind when handling and processing TUFFAK FC.

Before removing sheet from its original packaging take note of identification tape and utilize sheet in the same orientation for all parts. The top surface should remain facing up and sheet direction should remain consistent.

Transfer sheet orientation identification to any smaller cut parts taken from a full-size sheet.

Do not flip or rotate these cut parts when staging for production or returning to inventory.

DRAPE-FORMING by HEATING SHEET and MOLD at SAME TIME

Drape-forming large parts are often performed by heating both the sheet on the mold in the oven, allowing the sheet to come to temperature on the mold:

Place the mold in center of oven. Use a rack or stand so that the mold is centered in the oven chamber where it has optimum uniform heating.

Preheat the oven and mold together to 320°F (160°C) then place sheet on top of mold.

The total process time in the oven will vary depending on sheet thickness and oven efficiency.

Typical processing rates are 3 to 4 minutes for 1/8" (3mm) sheet or 5 to 6 minutes for 3/16" (4.5mm), actual times may vary.

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Once the sheet sags and generally conforms to the contours of the mold, remove the mold with formed sheet in place. Care must be taken to avoid overheating and generating moisture bubbles in the sheet.

If the sheet is not completely formed, you can assist the sheet to conform to the mold manually with heat resistant gloves or use a matching mold plug assist. Touching softened sheet may leave a mark so it is recommended that you only handle it in areas that will be removed during trimming.

Allow several minutes for cooling before removing the part from the mold. Cooling time is dependent on material thickness.

Continue controlling the cool cycle of the part to minimize warping. Place the part on its edge or fixed in a manner allowing for air circulation completely around the part until it reaches room temperature.

DRAPE-FORMING by HEATING SHEET ONLY

Forming TUFFAK FC outside of the oven requires heating sheet on a horizontal shelf. To prevent sticking or inadvertent scratching or mark off of the product, cover the shelf with felt fabric, melamine sheet or other heat resistant material.

Place the horizontal shelf at center of the oven for balanced heating.

Heat the oven and the shelf to 320°F (160°C). Then place the sheet on the shelf. Heating time will vary by oven and sheet thickness: approximately 3 to 4 minutes for 1/8" (3mm) and 5 to 6 minutes for 3/16" (4.5mm).

The mold should be located adjacent to the oven door opening for rapid transfer of the heated sheet.

Wearing thermal gloves, carefully handle softened sheet by its edges. Cracks in the coating may occur if the sheet is too flexible during transfer to the mold.

Quickly position the sheet on the mold, conforming to the mold surface manually or by use of a mold assist.

Keep the part on the form until material turns rigid. This can take several minutes, and time varies by thickness.

After removing formed FC from the mold continue controlled cooling until it reaches room temperature by positioning part on its edge or fixed in a manner, so it has air circulation completely around the part for even cooling.

COLD-FORMING

TUFFAK FC may be cold-formed either at the glazier's shop or at the job site providing savings on fabrication, installation costs, and improved efficiencies.

Cold-forming requires a strong frame and can resist the sheet's tendency to return to a flat geometry.

Mechanical screw fastening through TUFFAK FC is not a recommended attachment method, long term, cracking can occur at these are stress points. When considering a point fastening design, please contact Bayer MaterialScience Sheet Technical Department for further recommendations.

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MINIMUM BEND RADIUS GUIDELINES:

Drape-Forming 320°F-325°F (160°C-163°C)			
Cold Bending			
Sheet Thickness		Minimum Bend Radius	
0.118"	3.0mm	11.8"	300mm
0.177"	4.5mm	17.7"	450mm
0.236"	6.0mm	23.6"	600mm

GASKETS, SEALANTS and TAPES:

- Gaskets, sealants, and tapes come in various types. When not stated by the manufacturer or Plaskolite, confirm a product's compatibility with polycarbonate by contacting the manufacturer or Plaskolite LLC. Neoprene, EPDM, butyl tape, silicone products are all options for use with TUFFAK FC. Refer to the glazing section of our TUFFAK Technical Guide [Design/Forming/Fabrication](#) for compatible solutions.

Disclaimer:

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.