

PLASKOLITE

PREDRYING TUFFAK® POLYCARBONATE SHEET

Most plastic materials, including polycarbonate, are hygroscopic. They can adsorb moisture from humid air but release moisture to dry air. Although polycarbonate resin is thoroughly dried prior to extrusion, once the resin has been converted to sheet it begins to readily reabsorb moisture. The rate of water absorption is dependent on temperature and relative air humidity levels, but a sheet can reach the saturation concentration of 0.3% within 24 hours.

Absorbed moisture can create defects within a sheet if heated too quickly. Rapid heating converts the water to steam and with enough vapor pressure to create a void, defects, within the softened, heated sheet. The defects can be observed as single points, linear or swirly lines of miniature bubbles within the thermoformed polycarbonate sheet.

Before thermoforming, it is recommended to dry TUFFAK® polycarbonate sheets in a dehumidifying, air circulating oven. The temperature of the oven should be held under 250°F and monitored with thermostatic controls. Recommended drying times and temperature settings for specific polycarbonate thickness are shown in the table below.

Polycarbonate sheet will reabsorb water immediately upon removal from the drying oven if exposed to air containing moisture. For this reason, it is crucial to thermoform the sheet as quickly as possible once removed from the oven.

DRYING SYSTEMS;

The traditional method for drying sheets with an oven has remained unchanged over the past several decades. The development of new technology, such as dehumidification, addresses many of the concerns with recirculating moist air within a contained oven. Both convection ovens and dehumidification ovens can be used to dry plastic sheet.

CONVECTION OVENS:

Convection ovens can dry plastic sheet if they are correctly vented. A convection oven heats and circulates air around the sheet allowing for moisture to be removed from the plastic. However, the moisture will remain in the air inside the oven unless some of it is vented to the outside. Without venting, it is ineffective in removing additional moisture from the sheet. Venting the moist air from the oven is necessary but the process is not energy efficient. The make-up air must be heated to the oven set point and the heat present in the exhaust air is wasted. Furthermore, the make-up air will vary in moisture content from summer to winter based on seasonal conditions. The amount of venting necessary is dependent upon the amount of sheet in the oven and the moisture content of the ambient air.

DEHUMIDIFICATION OVENS:

This system operates by circulating the high temperature, moisture laden air through a dehumidification system to remove water from the air. The dried warm air is recirculated back into the oven to further dry the sheet. This type of system typically results in lower energy costs because little energy is used to heat make-up air. The process is also advantageous over traditional convection ovens, which does not need to be readjusted due to the seasonal variability.

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DRYING TIMES HOURS

GAUGE	250° F	180°F
0.093"	4	8
0.118"	6	14
0.150"	8	20
0.177"	12	30
0.236"	24	50

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.