Thermoforming Abskyn™

Application Guide

Abskyn™ is a product of Schneller LLC and is an alloy of materials combined to obtain custom colors, designs and finishes as directed by designers, air-frame manufacturers and airlines, in a product that will meet the requirements of Federal Aviation Specifications CFR 25.853, Para. A.

Thermoforming equipment that is best suited for Abskyn™ is the type that has individually controlled heat output for top and bottom. In most instances, Abskyn™ should be heated at 10% on the finished surface and 70% on the back surface.

Air circulating hot air ovens can be used. However, these are less efficient because heat is equal on both sides, therefore requiring a longer heating cycle at a lower temperature to prevent overheating the finished surface.

Material must be stored in a cool, dry area at recommended temperatures of 65°F to 85°F (18°C to 30°C).

Abskyn™ should be pre-dried before forming using a circulating, hot air oven. The recommended oven temperature is 130°F to 150°F (55°C) for twelve (12) hours for .062 inch gauge (1.5mm) material thickness and up to twenty-four (24) hours for .125 inch gauge (3.0mm) material thickness. The sheets must be placed in the oven either on racks or suspended for air circulation between each sheet. Be careful not to heat above 150°F (55°C) or heat flatwise, colored face up, on racks if you do not have capacity to monitor temperature accurately.

NOTE: Extreme care must be taken to prevent the decorative face of the Abskyn™ from coming in contact with the rack or another sheet while in the drying oven.

The minimum amount of time required for drying will have to be determined by the user on each lot or shipment because the moisture content may vary. Recommended forming temperatures: Surface temperature of the material shall not exceed 310°F (154°C). This is only a guideline.
The final temperature and time cycles in the oven are to be determined by the user based on his equipment, forming conditions and ambient temperature where the equipment is located.

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Helpful Hints For The Thermoforming of Abskyn™

- A change in the temperature or relative humidity of the air in the forming area will affect ™a need to adjust the forming cycle accordingly.
- Overheating Abskyn™ will cause blistering and glossing of the surface. The amount of heat that would cause this condition will vary, depending on how the material is decorated and constructed. Variations could also happen between different lots of the same construction. In many cases there is a fine line of only two or three degrees or seconds during which the heating cycle will make the difference between an acceptable or a defective part. An experienced machine operator will make adjustments to overcome most variations in material as well as environmental conditions.
- Clamping frames should be heated. In some instances, a cold frame will remote heat from the adjacent material so that excessive heat will sometimes be applied in order to achieve good detail. This could cause overheating in the center of the sheet.
- Certain other conditions will cause overheating and underheating of the material. Electric heating elements can become less efficient with age, or if part of the heating sections have been replaced with new elements, it could cause uneven heat over the heated area. Shadowing the hot spots with screen can be helpful when radiant heat is used.
- Air drafts can cause heating problems if heating elements are exposed.
- Mold temperatures are important when forming deep and detailed parts using Abskyn™. The importance of mold temperature also varies with the type of material used to make the mold. If the mold is made of a highly conductive material such as aluminum, then better temperature control of the mold is required. 150ºF is the recommended mold temperature.
- A cold mold will cause the formed material to be chilled on contact so that it will not draw evenly. The condition can cause thick and thin areas and in some instances a rupture of the material.
- The surface condition of the forming mold is important. Sharp edges and rough surfaces can cause tearing of the sheet during forming. For severe draw problems that can cause tearing, a lubricant may be applied to the problem area; however, a smoothing or polishing of the troubled area should be the favored remedy.
- There are numerous techniques for forming Abskyn™ such as pre-stretching with vacuum, etc. The procedures are the same as with forming other sheet materials. These methods are usually general knowledge in the industry.

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Pre-Drying

Recommended at 155°F (68°C) 10 to 24 hours depending on gauge.

Machine Conditions

0.065" Abskyn™

	0.065ga	0.095ga	0.125ga
Top heat (deco side)	10%	10%	10%
Bottom heat (back side)	70%	70%	70%
Dwell time (seconds)	58-85	60-100	75-120

Surface Temperature

Using Teletemp tabs, the surface of Abskyn should not exceed 310°F (154°C).

Recommendations

- Lower % heating with longer dwells will produce better forming results. Plug assist and positive pressure techniques will also improve forming definition.
- The shrinkage factor was calculated to be approximately 0.5% to 0.6%.
- The back surface will be attacked by certain solvents such as ketones. Adhesive systems should be evaluated for compatibility.
- All trials were done using Schneller's Comet thermoforming machine. Conditions will vary from equipment to equipment.
- Top heat elements were 11" (280mm) from the decorative surface. Bottom heat elements were 21" (535mm) from the back surface.

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