Thermoforming Methods

MATERIAL USE GUIDELINES

Thermoforming Methods and Advantages

Thermoforming involves clamping a sheet into a frame, heating it to a formable state, then applying vacuum, pressure, or both to form the sheet to the shape of a mold. Part design generally determines the thermoforming method and the type of mold used. Depth of draw, level of detail in surface and design features, and the need for ribbing, fillets and undercuts may be carefully considered.

The following information summarizes the most common forming methods and their impact on part design and appearance:

Vacuum Forming

A vacuum created between the heated sheet and the mold draws the sheet over a mold (male mold) or into a mold cavity (female mold). This technique allows very deep draws with uniform wall thickness. Molds can be created from aluminum, wood, or epoxy, depending on the finished part design requirements.

Advantages

- Low tooling and modification costs
- Large size capability
- Fast tooling turn-around time
- Fast, easy production set-up
- Ideal for simple designs where fine detail is not needed

Pressure Forming

This method applies air at high pressure to the sheet while it is being vacuum formed. Female molds are most commonly used. A pressure level approximately five times greater than the applied vacuum forces the sheet against the mold surface. The result is greater detail in textures, patterns, corners and other design features of finshed parts, approaching that of injection molding at far lower tooling costs.

Advantages

- More well-defined surface and design detail than vacuum forming alone
- Sharper corners and undercuts can also be achieved
- Allows zero or near-zero draft angles
- Overall part detail similar to injection molding at lower costs

Note: pressure forming requires a two platen machine with high claiming force to keep the platens closed while applying air pressure.