Designing/Manufacturing with HYTAC® Syntactic Foam Plug Assist

Key considerations:

- **Sheet Material:** Forming temperature is critical to material distribution, elimination of marks, orientation lines and overall molding costs.
    - HYTAC materials have very low thermal conductivity, allowing sheet to run at optimal thermoforming temperature. Use HYTAC selector guide for best recommendation.

TYPICAL* RECOMMENDED FORMING TEMPERATURES								
Plastic	^{0}F	^{0}C	Plastic	^{0}F	^{0}C	Plastic	^{0}F	^{0}C
ABS	300	149	HDPE	295	146	PLA	212	100
APET	300	149	PMMA	350	177	PP	330	165
EVOH	212	100	PC	375	191	PVC	280	138
HIPS	302	150	PETG	300	149	PS	300	149

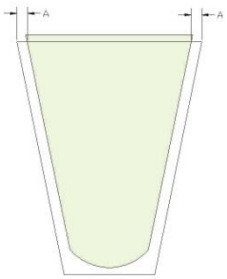
* Typical temperature values are reference only and are core (center of sheet) temperatures. See Supplier's Data Sheet for your specific material.

- **Mold Design:** Timing of vacuum and pressure affect sheet separation from plug. This timing affects the penetration depth for a plug and the best radius between the side wall and the bottom of the plug. HYTAC plug geometry may be easily modified to meet the performance of most mold designs.

Suggestions from customers working with HYTAC products:

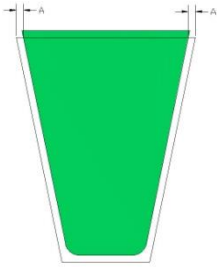
W & WF: Basic syntactic foam

- 3 – 5 mm plug distance from mold wall at dimension "A"
- Moderate taper towards bottom of plug



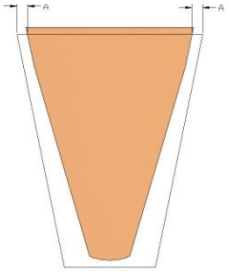
WFT & FLXT: Low friction/stick with Teflon additive

- 3 mm plug distance from mold wall at dimension "A"
- Maintain close proximity to wall for entire plug.



FLX, XTL, B1X: Best material distribution and transparency

- 3 – 5 mm plug distance from mold wall at dimension "A"
- Greater taper towards bottom of plug



Common design differences when changing from Nylon/Delrin®/POM

- HYTAC materials do not remove heat from the sheet. Sheet temperature is typically reduced.
- HYTAC materials do not expand with heat. Plug geometry changes due to improved material distribution.
- HYTAC materials do not require long warm up times in the press.
- Hollow microspheres contained in the HYTAC material are abrasive to cutting tools. Solid carbide tooling designed for cutting hard, abrasive plastic should be used to machine/turn HYTAC materials. (See http://www.cmtmaterials.com/machining-guides.html for guidelines.)