

# Mold Designs and Factors

## MATERIAL USE GUIDELINES

### Types of Molds

#### Male Molds

- Produce gentle radii and limited outer surface detail
- Provide better detail inside the part
- Textured sheet imparts outer surface detail where needed
- Allow closer tolerance control than female molds
- Corners and sheet areas first contacting the mold will be thicker
- Pre-stretching can improve thickness uniformity
- Lower cost than female molds

#### Female Molds

- Sharper exterior detail possible
- Surface texture created by texturing the mold
- Greater thinning occurs at the bottom of the mold
- Pre-stretching can improve thickness uniformity
- Thicker areas occur at the flange or clamped area
- Higher cost than male molds

### Mold Shrinkage

Shrinkage of the sheet during forming occurs with all materials, and must be factored into mold design. The level of shrinkage will vary according to:

- The level and type of orientation in the sheet
- Mold temperature: higher = more shrinkage
- Time in contact with the mold
- Male vs. female mold configuration

### Draft Angles and Radii

- Observe minimum draft angles to facilitate part removal
- Note that female mold designs allow tighter radii

### Mold Design Recommendations

	Male Molds	Female Molds
Draft angle, min.	2-4°	1-2°
Radius, min.	2.4 mm (3/32")	1.6 mm (1/16")
Mold shrinkage	0.4 - 0.6%	0.5 - 0.7%*

\*0.4-0.5% for female pressure molds

### Multi-cavity Molds

Tools can be designed with multiple cavities to allow for higher production rates, and to improve yields from single sheets by minimizing trim scrap. Single tools with molds for different part configurations can also be designed.

*Guideline: space mold cavities at 2x the part height to allow for good material distribution and wall thickness uniformity.*



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