Design For Manufacturing Analysis

PART NAME: Q-Sample
DATE: 06/11/10

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The following report provides an overview of the manufacturability of the part. Below is the list of the items covered in the report:

- Part Orientation and Parting Line
- Draft Analysis
- Features Requiring Side Actions
- Rib/Bosses & Wall Thickness Ratio
- Thickness Analysis
- Warp Analysis
- Shut-off Conditions
- Thin Tool Conditions
- Features Requiring EDM
- Weld Lines
• Parting lines may flash as a result of, but not limited to, part material, draft, wall thickness and mold usage. Part strength and surface appearance may not be as expected as a result of manufacturing orientation.
• Our analysis shows the part should not require any draft adjustments

• Parts should have at minimum 1 deg. draft added to all surfaces with textured surface requiring more draft
FEATURES REQUIRING SIDE ACTIONS

- Parts with features not in the direction of part ejection will require mold mechanisms to facilitate part production

- This feature will require side action
• Ribs/Bosses/Root Radii need to be adjusted or sink may occur.

• Ribs/Bosses thickness should be 50%-60% of the nominal wall thickness. Height should be no more then 3x nominal wall thickness. Draft on these features of 0.5 deg. is acceptable. Radii at feature intersection should not exceed 1/4 wall thickness. These recommendations are general guidelines, even when followed, sink may still show.
Thick/Thin Wall Analysis

• Our analysis shows the wall thickness in some areas should be adjusted or sink may occur.

For example

• Core out this red and yellow areas as shown

Parts with open faces, long unsupported walls, or thick/thin wall thicknesses ratios may warp. Parts may also warp as a result of resin selection or uneven cooling.
As mold flow analysis suggests the thick areas causes sink marks as shown. The sink mark estimate results displays the calculated depths of sink marks in the part, and shows a legend to detail the depth differences.
To appreciate whether or not a good quality part can be molded, consider which colors are visible and how much of each color appears. You should also look at quality prediction results.
1. Will have high quality.
2. May have quality problems.
3. Will definitely have quality problems.

Quality prediction result is not available when there is a short shot.
• Our analysis indicates that this part may experience warp due to PP resin and part geometry.

• Parts with open faces, long unsupported walls, or thin wall thicknesses may warp. Parts may also warp as a result of resins with high degrees of shrink or extreme processing requirements.
• Areas on a part that are created by mold halves coming together require at least 3 degrees of draft.

• These shut-offs help eliminate hand load/side action for this feature

• Our analysis shows the part has acceptable shut-off conditions
THIN TOOL CONDITIONS

- Our analysis shows the tool does not have thin metal conditions.

- Areas on the part where tool metal will be less than 0.050" can result in tool failure.
• These areas require EDM (EDM adds costs to the tooling)

• Features with sharp corners or height-to-thickness ratio more than 8/1 will require EDM rather than CNC machining.
• Where ever plastic must flow around an obstruction, a weld line is formed. Usually a visible line, which might be mistaken as a crack is formed where the plastic joins together.
The weld lines result displays the angle of convergence as two flow fronts meet. The presence of weld lines may indicate a structural weakness and/or a surface blemish.