



## VIVAK™ HT Sheet

<b>Troubleshooting Guide for Thermoforming Parts Made From VIVAK™ HT Sheet</b>		
<b>Problem</b>	<b>Possible Cause</b>	<b>Suggested Solution(s)</b>
<b>Crazed, cracked or brittle parts</b>	<ul style="list-style-type: none"> <li>■ Poor mold design</li> <li>■ Sheet forming temp. too low</li> </ul>	<ul style="list-style-type: none"> <li>■ Increase mold radii to equal sheet thickness</li> <li>■ Increase heat settings and/or time in oven</li> </ul>
<b>Webbing during forming process</b>	<ul style="list-style-type: none"> <li>■ Sheet too hot</li> <li>■ Complex mold design</li> <li>■ Rate of vacuum too fast</li> <li>■ Uneven heating of sheet</li> <li>■ Poor mold design</li> <li>■ Poor mold layout</li> </ul>	<ul style="list-style-type: none"> <li>■ Decrease sheet temperature</li> <li>■ Use female mold design</li> <li>■ Use plug and/or pressure assisted forming</li> <li>■ Decrease rate and time of applied vacuum</li> <li>■ Check oven heaters for “hot spots” or bad elements</li> <li>■ Increase radii and draft angles</li> <li>■ Spacing between molds should be approximately 2” x depth of draw or height of molded part</li> </ul>
<b>Nonuniform sheet sag</b>	<ul style="list-style-type: none"> <li>■ Uneven oven heating</li> </ul>	<ul style="list-style-type: none"> <li>■ Check oven heaters and adjust accordingly</li> <li>■ Check for colder air drafts around forming area</li> </ul>
<b>Poor material distribution</b>	<ul style="list-style-type: none"> <li>■ Uneven oven heating</li> <li>■ Uneven clamp pressures</li> <li>■ Deep drawn parts</li> </ul>	<ul style="list-style-type: none"> <li>■ Check oven heaters and adjust accordingly</li> <li>■ Check for air drafts around forming area</li> <li>■ Check clamp pressures and adjust</li> <li>■ Use plug or pressure assist</li> </ul>
<b>Poor detail or part definition</b>	<ul style="list-style-type: none"> <li>■ Sheet too cold</li> <li>■ Poor mold design</li> <li>■ Insufficient vacuum</li> <li>■ Uneven sheet temperatures</li> <li>■ Vacuum release too soon</li> <li>■ External cooling applied too soon</li> </ul>	<ul style="list-style-type: none"> <li>■ Increase sheet temperature</li> <li>■ Increase radii, draft angles, spacing, etc.</li> <li>■ Check vacuum pumps, increase if necessary</li> <li>■ Check oven heaters and adjust</li> <li>■ Check for air drafts</li> <li>■ Increase timing to vacuum release</li> <li>■ Increase time to external cooling application</li> </ul>
<b>Poor surface finish/defects/pinholing</b>	<ul style="list-style-type: none"> <li>■ Dirty mold</li> <li>■ Mold surface defects</li> <li>■ Vacuum holes too large</li> <li>■ Vacuum rate/amount too high</li> <li>■ Mold mark-off</li> </ul>	<ul style="list-style-type: none"> <li>■ Clean mold with air/damp dust-free cloth</li> <li>■ Sand and/or polish mold surface</li> <li>■ Decrease size of vacuum holes</li> <li>■ Decrease rate and/or amount of vacuum</li> <li>■ Vapor hone or lightly sand mold surface</li> </ul>
<b>Sticking to mold</b>	<ul style="list-style-type: none"> <li>■ Draft angle too small</li> <li>■ Radii too small</li> <li>■ Mold too hot</li> </ul>	<ul style="list-style-type: none"> <li>■ Increase draft angle <math>\geq 5^\circ</math></li> <li>■ Increase radii to equal sheet thickness</li> <li>■ Reduce mold temperature if possible</li> </ul>
<b>Voids or bubbles in sheet</b>	<ul style="list-style-type: none"> <li>■ Sheet too hot</li> <li>■ Excessive sheet moisture</li> </ul>	<ul style="list-style-type: none"> <li>■ Decrease heating time and/or oven temperature</li> <li>■ Dry sheet @ 80°C, 2-4 hours</li> </ul>
<b>Part warpage</b>	<ul style="list-style-type: none"> <li>■ Insufficient cooling of part</li> <li>■ Mold too cold</li> </ul>	<ul style="list-style-type: none"> <li>■ Allow part to cool longer prior to mold release</li> <li>■ Increased mold temperature to allow slower cooling</li> </ul>

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