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Vivak HT Sheet
Product Data

Troubleshooting Guide for Thermoforming Parts Made From VIVAK™ HT Sheet

Problem	Possible Cause	Suggested Solution(s)
Crazed, cracked or brittle parts	■ Poor mold design ■ Sheet forming temp. too low	■ Increase mold radii to equal sheet thickness ■ Increase heat settings and/or time in oven
Webbing during forming process	■ Sheet too hot ■ Complex mold design ■ Rate of vacuum too fast ■ Uneven heating of sheet ■ Poor mold design ■ Poor mold layout	■ Decrease sheet temperature ■ Use female mold design ■ Use plug and/or pressure assisted forming ■ Decrease rate and time of applied vacuum ■ Check oven heaters for “hot spots” or bad elements ■ Increase radii and draft angles ■ Spacing between molds should be approximately 2″ x depth of draw or height of molded part
Nonuniform sheet sag	■ Uneven oven heating	■ Check oven heaters and adjust accordingly ■ Check for colder air drafts around forming area
Poor material distribution	■ Uneven oven heating ■ Uneven clamp pressures ■ Deep drawn parts	■ Check oven heaters and adjust accordingly ■ Check for air drafts around forming area ■ Check clamp pressures and adjust ■ Use plug or pressure assist
Poor detail or part definition	■ Sheet too cold ■ Poor mold design ■ Insufficient vacuum ■ Uneven sheet temperatures ■ Vacuum release too soon ■ External cooling applied too soon	■ Increase sheet temperature ■ Increase radii, draft angles, spacing, etc. ■ Check vacuum pumps, increase if necessary ■ Check oven heaters and adjust ■ Check for air drafts ■ Increase timing to vacuum release ■ Increase time to external cooling application
Poor surface finish/defects/pinholing	■ Dirty mold ■ Mold surface defects ■ Vacuum holes too large ■ Vacuum rate/amount too high ■ Mold mark-off	■ Clean mold with air/damp dust-free cloth ■ Sand and/or polish mold surface ■ Decrease size of vacuum holes ■ Decrease rate and/or amount of vacuum ■ Vapor hone or lightly sand mold surface
Sticking to mold	■ Draft angle too small ■ Radii too small ■ Mold too hot	■ Increase draft angle >=5° ■ Increase radii to equal sheet thickness ■ Reduce mold temperature if possible
Voids or bubbles in sheet	■ Sheet too hot ■ Excessive sheet moisture	■ Decrease heating time and/or oven temperature ■ Dry sheet @ 80°C, 2-4 hours
Part warpage	■ Insufficient cooing of part ■ Mold too cold	■ Allow part to cool longer prior to mold release ■ Increased mold temperature to allow slower cooling

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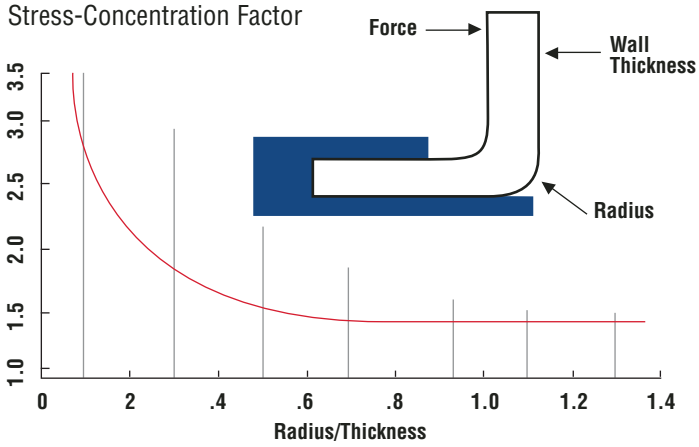
Troubleshooting Guide for Thermoforming Parts Made From VIVAK™ HT Sheet continued		
Problem	**Possible Cause**	**Suggested Solution(s)**
Material pulling from frames	■ Sheet too cold ■ Insufficient/uneven clamp pressure	■ Increase sheet temperatures ■ Increase/equilibrate clamp pressures
Trimming Difficulties	■ Improper blade selection ■ Incorrect blade speed	■ Routers: slotting cutter, carbide tipped, 0.062 decimal kerf, 4-wing (i.e. Whiteside part #6700B) ■ Router Bits: Minimum 1/4˝, 2 fluted preferred, 3-4 flutes for larger bits ■ Band Saw: Minimum 6 teeth/inch ■ Jig Saws: Minimum 10 teeth/inch ■ Table Saws: contact Sheffield's customer service at 800-254-1707 ■ Band Saws: contact Sheffield's customer service at 800-254-1707 ■ Routers: Use 20-25,000 RPM Router speed
Chipping/cracking during cutting	■ Inadequate clamping of parts ■ Saw blade tooth gap too large ■ Dull blade or shear	■ Increase/equilibrate clamp pressure ■ Choose blade with more teeth/inch ■ Replace blade/sharpen sheet

Figure 1: Radius Design



The curve gives an indication of the proper radius to be used for given wall thickness (courtesy–S.P.J. Plastics Engineering Handbook)

Critical Constraints

- "Like many clear plastics, VIVAK HT can be notch sensitive. As explained in Figure 1, the minimum internal radii for notched sensitive is 1/2 the nominal wall thickness. To obtain the best formed part from VIVAK HT, it is suggested that internal radii of 3/4–1 times the nominal wall thickness be used when designing the mold and/or forming the part."
- Larger radii distributes stress uniformly.