

Troubleshooting

MATERIAL USE GUIDELINES

Incorrect heating is the most common cause, when a forming problem arises.

If a problem identify the possible cause and solution using the chart below.

Step 1: Check the heating times, temperatures, controls, and gauges

Heating Boltaron sheet too rapidly, at incorrect temperatures is the most common cause of thermoforming problems.

Verify the accuracy of the gauges and controls and correct the conditions as necessary.

Step 2: Review the information in this guide

If the cycle times and temperatures are correct and the problem still persists, review the possible causes and solutions below.

Problem	Possible Causes	Solution
Bubbles, blisters in sheet or part	Sheet heating too rapidly Sheet overheating Sheet too close to heaters	Reduce heater temperatures Reduce heating time Increase space between heaters and sheet
	Uneven heating, hot spots	Use screening to deflect heat from hot spots Verify heaters are operating correctly Balance heater zones
	Sheet exposed to excessive humidity or moisture	Pre-dry sheet Heat sheet on both sides Reduce heater temperatures Increase dwell time as needed
Scorching, discoloration	Sheet surface overheated Sheet too close to heaters	Reduce heater temperatures (may need to increase dwell time) Reduce dwell time Increase space between heaters and sheet
Blush marks; whitening at corners	Sheet not heated sufficiently	Increase dwell time Reduce platen time and or vacuum delay Check heaters for accuracy
	Uneven heating, hot spots	Use screen to deflect heat from hot spots Verify heaters are operating correctly Balance heater zones
Localized glossy spots, streaks	Specific areas of sheet are being overheated	Adjust heaters where the problem appears If adjustments can't be made, use screens to deflect heat from the problem areas
Excessive sag in sheet	Sheet getting too hot	Reduce heater temperatures and/or dwell time
Webbing, wrinkling, bridging	Sheet getting too hot	Reduce heater temperatures and/or dwell time
	Vacuum not sufficient	Verify mold's vacuum level Check vacuum lines for blockages
	Improper draw ratio or mold design for part	Increase mold draft angle, radii Add a plug-assist Use take-up blocks to pull material from corners Use web moats or pockets in web areas In multi-mold designs, increase spacing between
Nippled part surface	Sheet getting too hot	Reduce heater temperatures and/or dwell time
	Vacuum holes too large	Plug holes and re-drill to smaller diameter



www.boltaron.com | +1 800 342 7444

DISCLAIMER AND LIMITATION OF WARRANTY: All information contained herein is believed by SIMONA AMERICA Inc. to be reliable. Typical properties are based on laboratory tests conducted on material samples in accordance with standard test methodology. SIMONA AMERICA Inc. makes no express or implied warranty that its products will perform in accordance with the data in all conditions and circumstances. To determine suitability for use, users must test applications under actual operating conditions. As a result, ALL EXPRESS OR IMPLIED WARRANTIES IN CONNECTION WITH SIMONA AMERICA INC. and BOLTARON PRODUCTS INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.

Troubleshooting

MATERIAL USE GUIDELINES

Problem	Possible Causes	Solutions
Poor detail in surface texture or design features	Vacuum inadequate	Check vacuum holes, hoses for blockage Check hoses, fittings for vacuum leaks Add vacuum holes or increase hole diameter
	Sheet not heated adequately	Increase dwell time and/or heater temperature Verify heaters are operating correctly Eliminate any cool ambient air drafts Pre-heat clamping frame
	Vacuum draw too slow	Check vacuum level with gauge Inspect hoses, fittings for leaks, blockage Increase vacuum capacity Use slots rather than holes
	If pressure forming, pressure low	Ensure pressure of 20 - 50 psi (0.137 - 0.345 Mpa)
Mark-off; chill marks	Mold is too cold	Increase mold temperature to recommended level of 10 °F (-12 °C) below the product's heat distortion temperature If molds are not heat-controlled, pre-heat the mold Increase pre-stretch bulge so mold doesn't contact sheet early
	Plug-assist is too cold	Use syntactic foam as plug-assist material Use a felt or flannel cover on plug-assist
	Sheet is too hot	Reduce heater temperatures and/or dwell time
Poor wall thickness uniformity	Improper or distorted sag	Ensure sheet is heated uniformly for even material flow Mount the mold on the top platen Use billow snap-back technique Add a plug-assist
	Hot or cold spots in the sheet	Ensure heaters are operating correctly Balance heating temperatures Eliminate any ambient air flow, cool air drafts Use screening to deflect heat at hot spots
	Mold is too cold	Increase mold temperature to recommended level of 10 °F (-12 °C) below the product's heat distortion temperature
Surface imperfections, pock marks	Pocks on mold surface trapping air	Sand blast mold surface using #30 grit
	Dirt, foreign matter on mold or sheet	Ensure mold surface and sheet are thoroughly cleaned
Shrinkage marks evident in corners	Inadequate level of vacuum	Check vacuum holes, hoses for blockage Check hoses, fittings for vacuum leaks Increase vacuum hold time, add vacuum holes
Corners too thin (with female mold)	Incorrect forming method	Use billow snap-back technique Add a plug-assist
	Sheet temperature not uniform	Check temperatures to ensure uneven heating of sheet Increase perimeter temperatures (5 - 10% higher than center)
Part difficult to remove from mold	Mold design; draft angle inadequate	Increase draft angle Increase air pressure for ejection Sand blast mold with #30 grit With undercuts, use a breakaway mold Apply a mold release agent

Expert Thermoforming Support Available from SIMONA Boltaron

SIMONA Boltaron offers hands-on technical thermoforming support services. If necessary, a qualified and experienced expert in the distinct properties and performance of SIMONA Boltaron sheet will visit your facility to train, diagnose, and guide the production of formed parts with the highest quality, best appearance, and longest service life.

For more information, contact:

Mike Robinette
Director of Product Development
+1 419 355 6767
mrobinette@boltaron.com



www.boltaron.com | +1 800 342 7444

DISCLAIMER AND LIMITATION OF WARRANTY: All information contained herein is believed by SIMONA AMERICA Inc. to be reliable. Typical properties are based on laboratory tests conducted on material samples in accordance with standard test methodology. SIMONA AMERICA Inc. makes no express or implied warranty that its products will perform in accordance with the data in all conditions and circumstances. To determine suitability for use, users must test applications under actual operating conditions. As a result, ALL EXPRESS OR IMPLIED WARRANTIES IN CONNECTION WITH SIMONA AMERICA INC. and BOLTARON PRODUCTS INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.