

## Troubleshooting Guide for Extrusion

Problem	Possible Causes	Possible Solutions
<b>1. High drive motor amperage</b>	Low resin temperature, resin not correct, plugged screens, motor, or contamination	<ul style="list-style-type: none"> <li>• Raise the temperatures and check the electrical output of the heaters</li> <li>• Use resin with lower molecular weight</li> <li>• Change the screens</li> <li>• Motor needed maintenance</li> <li>• Decrease motor speed</li> <li>• Pull the screw to check for any contamination</li> </ul>
<b>2. Interrupted resin output</b>	Hopper clumping, bridging, clogging, or cooling jacket	<ul style="list-style-type: none"> <li>• Lower the feed zone temperature</li> <li>• Use a cram feeder or extrude the material into pellets in a separate operation</li> <li>• Look for degraded or cross-linked resin in screen pack</li> <li>• Check the cooling jacket not to be turned off in the solid sections</li> </ul>
<b>3. Uneven flow (surging)</b>	False temperatures, contamination, or melt conveying problems	<ul style="list-style-type: none"> <li>• Raise the temperatures in the heating zones</li> <li>• Remove the internal mixer if it is used</li> <li>• Lower the feed zone temperature in the case of bridging</li> <li>• Clean screen pack</li> <li>• Check for plugging in the hopper</li> <li>• Pull the screw and check for a large contaminant</li> <li>• Increase the pulling pressure on the part</li> <li>• Density of resin could be too low, thus requiring a cram feeder, starve feeding, or pelletization</li> <li>• Change screw design</li> </ul>
<b>4. No output</b>	Hopper, screw, screen pack, or die	<ul style="list-style-type: none"> <li>• Open slide valve of feed hopper</li> <li>• Use soft rod to dislodge the bridging</li> <li>• Put vibrating pads or use stirrer in feed hopper</li> <li>• Switch the terminals on the screw drive motor</li> <li>• Repair broken screw or have spare made</li> <li>• Dislodge blockage at feed opening</li> <li>• Clean screw or use low friction screw coating</li> <li>• Use an extruder with a grooved feed section</li> <li>• Use lower mesh screens or replace with new ones</li> <li>• Increase die temperature</li> </ul>
<b>5. Unmelted particles in the extrudate</b>	Screen pack, false temperatures, contamination	<ul style="list-style-type: none"> <li>• Hole in the screen pack, so replace it</li> <li>• Raise the temperature in the compression and metering zones</li> <li>• Check for bad heater</li> <li>• Lower the die temperature if the material seems cross linked</li> <li>• If particles melt on high plate, raise the temperature</li> </ul>

<b>6. Discolored extrudate</b>	Degraded polymer, poor mixing, or die design	<ul style="list-style-type: none"> <li>• Lower temperatures or screw speed</li> <li>• Add a mixing head or use concentrates to enhance pigment mixing</li> <li>• Streamline the die</li> <li>• Use smaller extruder or lower its speed for the output</li> </ul>
<b>7. Die pressure drop too high</b>	Plugging or unfinished melting	<ul style="list-style-type: none"> <li>• Replace screen packs or use screens with larger openings</li> <li>• Raise the temperatures</li> </ul>
<b>8. Rough surface/die lines/melt fracture</b>	Die or resin	<ul style="list-style-type: none"> <li>• Modify die design and temperature</li> <li>• Decrease melt temperature</li> <li>• Use material with lower molecular weight or wider molecular weight distribution</li> </ul>
<b>9. Sharkskin</b>	Die, resin, or operation	<ul style="list-style-type: none"> <li>• Raise die temperature or increase resin gap</li> <li>• Use resin of lower modulus or wider molecular weight distribution</li> <li>• Reduce extruder speed or back pressure</li> <li>• Change screen packs</li> <li>• Raise melt temperature</li> </ul>
<b>10. Fish eyes</b>	Contamination or degradation	<ul style="list-style-type: none"> <li>• Check the screen pack for discolored material, which would indicate contaminant with a hopper origin</li> <li>• Dry the resin</li> <li>• Lower temperatures especially in die that leads to cross linking or gels</li> </ul>
<b>11. Bubbles in the part</b>	Humidity or degradation	<ul style="list-style-type: none"> <li>• Dry the resin</li> <li>• Check for an odor and if present, lower the temperatures of the melt</li> </ul>
<b>12. Warped part</b>	Die, cooling tank, or part design	<ul style="list-style-type: none"> <li>• Spider mandrel needs adjusting to be concentric in the die</li> <li>• Entry angle of the die is not uniform on all sides</li> <li>• Align the cooling tanks to be parallel with the extruder outlet</li> <li>• Look for nonsymmetries and thickness differentials in the part, which may induce internal stresses</li> </ul>
<b>13. Gel formation</b>	Polymerization process, extrusion process, or contamination	<ul style="list-style-type: none"> <li>• Check gel level in incoming raw material</li> <li>• Reduce residence times in extruder</li> <li>• Reduce hangup of material in screw and die</li> <li>• Use low friction coating on screw and die</li> <li>• Use filter with good gel capture capability</li> <li>• Thoroughly clean extruder before startup</li> <li>• Avoid contamination at every point</li> </ul>