

tech.topic

Surging

Surging is a variation in extruder output that can occur in a cyclical pattern or at random. You can tell when surging occurs because the weights of bottles and/or the lengths of tail flash fluctuate. In severe cases, blowouts occur and molding cycles can be interrupted.

Surging has many causes, but it is not the result of any change in operating conditions made by the machine operator. Causes include:

1. **An obstruction in the feed hopper**
2. **Partial blockage of resin flow in the feed section of the extruder**
3. **Variation in regrind or color concentrate feed rate**
4. **A malfunctioning or incorrectly calibrated temperature controller**
5. **A malfunctioning or improperly installed thermocouple**
6. **Fluctuations in the electrical supply to the extruder drive**
7. **Broken or worn gears in the gear box**
8. **Worn, stretched and slipping drive belts**
9. **Malfunctioning variable speed drive**
10. **Dirty or broken screen packs**
11. **Low pressure on the nitrogen cylinder used to facilitate the delivery of polymer in reciprocating-screw, extrusion-blow molding**
12. **Leaking hydraulic cylinder seals**

Most of the solutions to surging problems are fairly straight forward, but some are more complex. For example, a “bridge” or “collar” occurs when the resin flow in the feed section of the extruder is partially blocked. Premature melting of the polymer is usually the cause. The melted polymer attaches to the screw and solidifies.

To correct bridging and prevent it from happening again, lower the temperature set points on the extruder and check for a runaway heater band. Eliminating the existing bridge can be difficult. Sometimes, an unground handle “slug” fed into the extruder scrapes the bridge off the screw. Sometimes, soft metal or wooden instruments are needed to scrape it off.

If the surging can be traced to machine temperature control problems, check the temperature controller and thermocouples. Use the operations manual for your specific blow molding machine as a guide. Also check the cooling system and the coolant (usually oil) temperature, which should fall within a specific range for that type of blow molding machine. Finally check the entire system for sticking valves and clogged tubing.

Troubleshooting surging problems can be difficult. For further recommendations, please your LyondellBasell sales or technical service representative.