



## Extrusion Blow Molding – Resin or Color Change: Performance Tips

We have identified instances where process alterations may enhance your results. Listed below is a collection of performance tips that we feel offer processors potential benefits.

**If experiencing a difficult color change or contamination, try repeatedly increasing and then decreasing the screw speed.**



Short bursts of agitation at higher screw speed loosens the carbon or pigment. Subsequently slowing the screw speed down allows the purge to expand and push the loosened contamination out.

**If experiencing windmilling or screw slippage, particularly with high temperature resins, try adjusting the temperature profile.**



This phenomenon is due to poor solids conveying. Solids conveying occurs when the plastic material “sticks” to the barrel and “slips” on the screw. This is necessary for the material to be moved forward. Normally you can solve this problem by adjusting your barrel temperature profile. Try switching from the commonly used “flat” profile to a reverse temperature profile, where the barrel temperatures are higher in the rear and lower at the discharge end of the barrel. For example, if your current profile, starting in the feed zone, is 450F, 450F, 450F, and 450F, adjust that to 500F, 480F,

460F, and 440F. Some molders believe that higher settings in the rear zones will increase their melt temperature. Not so – the plastic is still in pellet form in the feed section of the screw; increasing the heat there will improve the coefficient of friction at the barrel wall between the pellets and barrel, and, therefore, improve the solids conveying and eliminate “windmilling.” – Timothy Womer, TWWomer and Associates, LLC Mr. Womer has been a recognized authority in plastics technology and machinery for over 35 years and is a member of the Plastics Hall of Fame.

### **Increasing the screw speed will help Dyna-Purge flow downstream faster.**



Start purging at a low speed. When Dyna-Purge starts coming out, increase the screw speed to the maximum safe level. This increases the level of agitation and allows for the Dyna-Purge to plasticize sooner. The combination of producing more thermal heat and agitation may enhance the purging process. Remember always to work within resident resin temperature profile to minimize possible degradation of the resin.

### **Gear Pumps – Operating at low delta P (low difference in pressure) will improve purging.**



To get the optimal cleaning effect in the extruder (and some in the viscoseal of the pump), it helps to vary the inlet pressure.

### **Cleaning a vent hole can be accomplished by introducing small amounts of Dyna-Purge through the vent hole.**



During the normal purging process, place a small quantity of Dyna-Purge through the vent hole. Purging with the vent capped can also help to clean the vent hole. In this case, care should be taken not to allow pressure to build up beyond specifications.

### **Raising the temperature of the die prior to purging may help to remove excessive build up.**



If experiencing degradation and build-up around the die area, raising the temperature of the die about 30-50°F(17-28°C), while remaining within the service

temperature range of the resident resin, may help remove material deposits more quickly when purging.

**Reducing the screw speed will allow Dyna-Purge to provide extra scrubbing downstream at the end of the barrel and screw.**



By reducing the agitation and thermal heat, Dyna-Purge's unique scrubbing granule will maintain its rigidity longer and travel further downstream before completely softening (does not apply to all grades – contact your representative for additional information).

**Shutting off the machine between a resin or color change may allow for additional contamination to be removed from the barrel and screw.**



Leave a full barrel of Dyna-Purge in the machine, then turn the machine off and let it cool down. Once ambient temperature is reached, turn the machine on and raise the temperature to 50°F (28°C) above the minimum operating temperature of Dyna-Purge. When the desired temperature of Dyna-Purge has been reached, begin rotating the screw slowly to avoid too much torque. The purge may still be stiff, so do not rotate the screw at full RPM. Introduce another scoop of Dyna-Purge to push out the remaining purge and adjust temperature settings for your next production resin. Using your next production resin, flush out the remaining Dyna-Purge. This purging procedure allows for Dyna-Purge to bond with any residual contamination on the barrel and screw during cooling. As temperatures are brought up, Dyna-Purge will remove the contamination from the surface and machine.

**If experiencing problems purging out highly pigmented colors, such as blue or red, raising the temperature might help.**



Raise the barrel temperature approximately 50°F (28°C) above the normal operating temperature, so that the pigmented resin will dissolve better in the purging compound. Always work within resident resin temperature profile to minimize possible degradation of the resin. Soaking Dyna-Purge at either the standard temperature or higher temperatures may also help. In this case, begin purging until only Dyna-Purge is exiting the machine, then allow to soak for 5 to 10 minutes before continuing to purge. Purge until machine is clean and free of contamination.

### **Clumping or “balling-up” in the feed throat can be avoided by keeping the feed throat cool.**



The temperature of the feed throat coolant should be maintained at 80-120°F (27-49°C). It is best to control the feed throat temperature as close to 100°F (38°C) as possible. In humid weather, the temperature should be just warmer than the dew point to avoid condensation. Also, in some cases, keeping the screw turning at a low RPM will help to prevent bridging.

### **If experiencing contamination in the accumulator, raising the temperature approximately 50°F (28°C) and then soaking may enhance the performance of Dyna-Purge.**



Fill the accumulator with Dyna-Purge. Purge a small amount of Dyna-Purge through the die, then soak for 30 minutes. If the accumulator has internal agitation, turn on periodically while soaking. When there are more than two heads, raise the temperature of the outboard heads 50°F (28°C) higher than the rest of the system. This will compensate for the longer flow path. Empty the accumulator, adjust temperature settings and, using your next resin, flush out the Dyna-Purge.

## **What’s Your Tip?**

Do you have a performance tip that you would like to share? Submit your tips to the Dyna-Purge team by emailing us at [info@dynapurge.com](mailto:info@dynapurge.com).

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