



## Extrusion – Profile – Shutdown/Startup: 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.

### **When running high temperature engineering resins you can enhance the performance of Dyna-Purge by following these four tips:**



a. Run Dyna-Purge at the lower end of the temperature range for the processing resin. b. When purge is exiting the machine, the following will help to reduce fumes and the potential for auto ignition:

- Purge piles should be collected as small, flat, thin shapes or thin strands to allow for rapid cooling
- Purge into cold water
- Make sure the melt temperature does not exceed 715°F (379° C); if necessary, reduce screw speed.

c. Keep the barrel full to minimize degradation. d. If shutting down, decrease temperatures as quickly as possible. If temperatures are still above 600°F (316°C) after 15 minutes, displace the Dyna-Purge with another barrelful as temperatures continue to come down. Repeat if necessary.

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**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 visco seal of the pump), it helps to vary the inlet pressure.

**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).

**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.

**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.

**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.

**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.

**If experiencing contamination during start-up, make sure to keep the barrel full to eliminate oxidation.**



Oxidation is a primary source of degradation. During shutdown, filling the barrel with Dyna-Purge, a thermally stable compound, will minimize this risk.

**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.

**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.

## 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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