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# Injection Molding – Hot Runner Systems – Resin or Color Change Mold Closed: 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.

### If experiencing contamination at the check ring, run several short shots.

Running several short, high velocity shots will help to dislodge and remove contamination around the check ring.

### Decreasing the barrel temperatures, while raising the temperature of the hot runner prior to purging, may help to remove excessive build up in the hot runners.

Decreasing the barrel temperature approximately 25°F (14°C) will increase the viscosity of Dyna-Purge. Raising the temperature of the hot runners 50-100°F (28-56°C) will reduce the viscosity of the resident resin. This makes it easier for the high viscosity purge to push out the low viscosity resin. Remember always to work within resident resin temperature profile to minimize possible degradation of the resin.

### Increasing back pressure can improve results by adding force and agitation to the purging process.

This is true of Dyna-Purge, because it is a mechanical purge, needing no chemical component to do its job. Be sure to use enough material to fill the barrel, so Dyna-Purge can scrub and push through contamination, including carbon build up. Increasing the back pressure between 50% and 100% will usually improve the purging experience. As with any purging application, extra caution should be taken not to exceed any of the manufacturer's operating requirements.

### 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.

### Decreasing the barrel temperatures, while raising the temperature of the nozzle prior to purging, may help to remove excessive build up in the nozzle area.

Decreasing the barrel temperature approximately 25°F (14°C) will increase the viscosity of Dyna-Purge. Raising the temperature of the nozzle 50-100°F (28-56°C) will reduce the viscosity of the resident resin. This makes it easier for the high viscosity purge to push out the low viscosity resin. Remember always to work within resident resin temperature profile to minimize possible degradation of the resin.

### 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.

### 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).

### 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 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.

**Closed mold process is made easier by spraying with mold release prior to purging.**

When purging with the mold closed, spraying the mold with mold release prior to purging ensures that parts will release easily throughout the process.

**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.

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