

MOLDING STUDY PUTS PURGING COSTS IN PERSPECTIVE

As molders become more cost conscious and business savvy, practices and products that were not standard procedure in the past are under increasing consideration. One such example is the use of purging compounds rather than regrind to cut down the time between color and resin changes and to reduce the scrap that can build up as a result of incomplete purging.

According to Shuman Plastics, makers of Dyna-Purge, regrind resin was never designed to clean process equipment. "While it may remove some of the offending resin," says Tim Cutler, business manager, "it will not clean carbon deposits and negative flow areas. Regrind has more value being reworked into finished parts or sold as surplus."

To illustrate that the use of purging compound is no longer a luxury, Cutler sometimes takes potential customers through a cost-to-purge analysis (see sidebar, opposite). "Although regrind looks like a bargain, it ends up costing processors more in terms of time and labor," he says. "Commercial purging products work faster using less material."

Why is the need to purge quickly and effectively rising among custom molders? Cutler believes JIT demands are one reason, calling for more frequent resin and color changes. Also, molders are no longer tolerant of the amount of scrap produced by ineffective purging methods.

It is important to note that there are many possible combinations of resin, equipment, and processing conditions, and that no one product, particularly

A two-cavity, hot runner mold (right) produces the throwing discs at Aakron Rule. Frequent color changes are the norm for this application, and the cost to purge using PP had reached \$8000 annually.



Color changes—such as going from dark blue to neon pink—using the neat resin as a purge produced up to 400 to 500 scrap parts.

regrind, can meet the requirements for all of these situations. As a result, purging compound suppliers should offer numerous products to fit different applications.

FIELD USE

To determine the effectiveness, economy, and ease of use of the nine most widely promoted purging compounds currently available on the market, Shuman Plastics commissioned a third-party independent study. The lab that conducted the study either purchased or obtained sam-

ples of the best grade from each supplier to purge ABS, PC, and nylon 6/6. All trials were run on an 83-ton Battenfeld press with a cold runner mold.

Each trial was identical, and included a molding step with black resin, a purging step per the supplier's instructions until clean, and a post purge with natural resin until purging compound is eliminated and the machine is able to run production-quality parts. Actual cost to purge for each trial was then calculated using the cost-to-purge analysis sheet.

Although Shuman's Dyna-Purge mechanical/nonabrasive product ranked first overall for economy, Cutler says, "What's most important is that molders who see this chart now realize that the commercial alternatives to homemade or regrind purging are actually more cost effective."

Bob Williams, injection molding manager for Aakron Rule, a New York-based custom molder, recently sampled Dyna-Purge for a troublesome application. Aakron Rule produces nine different colors of the Flyer, a polypropylene aerodynamic throwing disk, at a rate of approximately 2000 per day. The disks are molded on a 375-ton Cincinnati Milacron press using a two-cavity hot runner mold.

This project required an extensive amount of downtime and there was a good deal of waste associated with each color change. In order to purge

Table 1.
Results of independent study comparing costs of purging compounds

Purging compound*	Mechanical/nonabrasive	Mechanical/abrasive	Chemical/mechanical	Chemical
Resin type**				
ABS	\$6.67	\$5.94	\$7.44	\$15.82
PC	\$7.07	\$6.18	\$7.47	\$13.54
Nylon	\$5.12	\$9.26	\$7.88	\$13.83
Average cost	\$6.29	\$7.13	\$7.60	\$14.40

*purging compound prices based on minimum quantity

**virgin resin prices per lb: ABS \$.73; PC \$1.70; nylon \$1.61; July 2001 *Plastics News*

Note: Study assumes combined, average machine and labor cost of \$54/hr

manufacturing

HOW TO CALCULATE YOUR COST TO PURGE

COST-TO-PURGE ANALYSIS SHEET

STEP 1: Calculate cost of purging compound

Amount of compound used	_____ lb/kg
x Price of compound per lb/kg	\$ _____
= Cost of purging compound	\$ _____ (1)

STEP 2: Calculate the cost of machine downtime

Time to mix and prepare material	_____ min.
+ Time purge is activating machine	_____ min.
+ Time for actual purging	_____ min
= Total machine downtime	_____ min
x Machine and labor cost (one operator)	\$.90/min*
= Cost of machine downtime	\$ _____ (2)

STEP 3: Calculate the cost of carrier resin

Amount of carrier resin used	_____ lb/kg
x Price of carrier resin per lb/kg	\$ _____
= Cost of carrier resin used	\$ _____ (3)

STEP 4: Calculate post-purge costs

Amount of resin needed to eliminate purging compound	_____ lb/k
x Price of resin per lb/kg	\$ _____
= Cost of post-purge resin	\$ _____ (4)

STEP 5: Calculate cost of post-purge time lost


Amount of time for post purge	_____ min
x Machine and labor cost (one operator)	\$.90/min*
= Cost of post-purge time	\$ _____ (5)

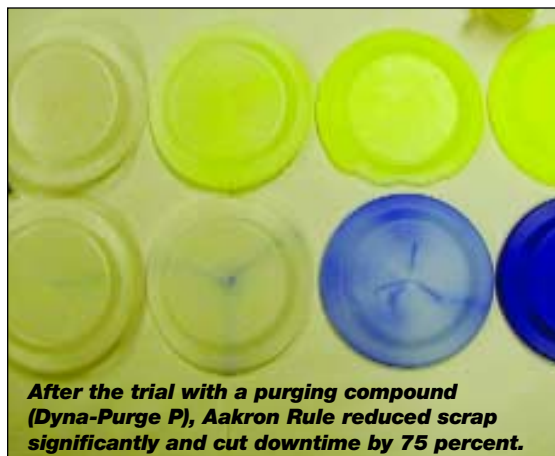
ACTUAL TOTAL COST TO PURGE = 1+2+3+4+5 = \$ _____

*Assumes combined, average machine and labor cost of \$54/hr

the old color out, Williams formerly used approximately 110 lb of PP. This took at least 2 hours to run and resulted in 400 to 500 defective parts being produced. As a result, it cost approximately \$150 in lost material and labor every time the color changed. On an

annualized basis, this equates to almost \$8000 in purging costs.

Using 15 lb of Dyna-Purge P, Aakron Rule was able to clean out both the barrel and hot runner system in less than 30 minutes. This represented a significant savings, bringing the entire purging cost down to \$70 per purge, with a \$4000 annual savings or a 53 percent cost reduction vs. purging with its own resin.—
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