

New Dyna-Purge[®] A

For purging polypropylene (PP)

Performance test results comparing commercial purging compounds and an in-house resin:

- New Dyna-Purge A - Hybrid Purging Compound
- Mechanical Purging Compound
- Chemical Purging Compound
- Polypropylene Resin



Conducted by The School of Engineering, Plastics Engineering Technology at Penn State Erie, The Behrend College in Erie, PA.

Commissioned by Shuman Plastics, Inc., Dyna-Purge[®] Division, Depew, New York

Comparative Testing with Dyna-Purge® A

Processing information for New Dyna-Purge A

Applications	Injection molding - cold and hot runners; Extrusion - profile, sheet and cast film
Temperature range	320°F – 500°F (160°C – 260°C)
Types of resins	Polypropylene (PP)
Minimum clearance	None
Amount needed	Approximately 1 to 2 times barrel capacity

Abstract

Penn State Erie, The Behrend College, of Erie, PA conducted an extensive independent study in March 2016, at the Burke Center - School of Engineering. The study was commissioned by the Dyna-Purge® division of Shuman Plastics, Inc. to compare the most widely used commercial purging compounds and resin for purging polypropylene.

The independent study was overseen by Jonathan Meckley, Program Chair, Associate Professor, Plastics Engineering Technology. All trials were conducted on a 170 ton Cincinnati Milacron injection molding machine with a two cavity, valve gated mold. The molded parts were cellular phone casings made from polypropylene resin.

Types of Commercial Purging Products Used

New Dyna-Purge® A: The first hybrid purging compound to combine the key features found in both mechanical and chemical products. This new technology is ideal for eliminating color streaks and other forms of contamination often associated with purging polypropylene out of the screw and barrel as well as the tool and die.

Mechanical Abrasive: A mineral filled polyolefin based resin. The compound functions as a mechanical agent with the base resin melting and the mineral filler abrasively cleaning the surface of the screw and barrel.

Note: Abrasive purging compounds should not be used in hot runners and frequent use in the machine may cause excessive wear.

Chemical: A polyolefin compound with active chemical additives, including inorganic salts and organic acids. The chemical ingredients work by breaking down the polymer of the resident resin. **However, it requires accommodations including raising the temperature and, in some cases, a soaking phase.**

Resin: A natural polypropylene resin, for purging purposes. **Since in-house resins are not formulated to clean the machine, they are usually ineffective when used for purging.**

Processing Resin: Polypropylene (PP) - black and natural; Processing temperature: 400°F (204°C)

Trial Protocol

1. Clean hopper
2. Introduce 150 g of black PP resin, starve the screw
3. Clean hopper
4. Add 600 g purge material (2 times barrel capacity)
5. With the screw in the forward position, purge continuously, stopping only when purge piles reach approximately 100 g; place purge piles in cold water to solidify
6. Clean hopper
7. Introduce 200 g natural PP
8. With the screw in the forward position, purge continuously to displace the purge with natural resin; place “post purge” piles in cold water to solidify

Evaluation Criteria

In an effort to control the variables and validate the results, each of the purging compounds and the resin followed the same trial protocol. Upon completion of each trial, the inspectors reviewed the purge piles and the PP post purge, assigning a “Pass” or “Fail” rating based on the presence of contamination and the degree of visual clarity.

Purging Results

No.	Purge	Rating	Comments
1	Mechanical (abrasive)	Fail	After 600 grams of purge, black PP was still evident.
2	Chemical	Fail	After 600 grams of purge, black PP was still evident.
3	New Dyna-Purge® A (hybrid)	Pass	After 600 grams of purge, clean and free of contamination.
4	Resin	Fail	After 600 grams of resin, significant black PP was evident.



Mechanical



New Dyna-Purge A



Chemical



Resin

Results: Only New Dyna-Purge® A received a “Pass” Rating.

“Post Purge” Results

No.	Purge	Rating	Comments
1	Mechanical (abrasive)	Fail	After 200 grams of natural PP, some black PP and purge compound were evident.
2	Chemical	Fail	After 200 grams of natural PP, a significant amount of purge compound was evident.
3	New Dyna-Purge® A (hybrid)	Pass	After 200 gram of natural PP, clean and free of contamination.
4	Resin	Fail	After 200 grams of natural PP, a significant amount of black PP was evident.



Mechanical



Chemical



New Dyna-Purge® A



Resin

Results: Only New Dyna-Purge® A received a “Pass” Rating.



Discover the Difference with **New Dyna-Purge A.**

Penn State Behrend has the only plastics-specific majors available within Penn State and one of only four accredited programs in the United States. The school has the largest plastics lab dedicated to undergraduate studies in the country, with multimillion dollar state-of-the-art computer, materials, and processing labs.

Ranked among the top 50 undergraduate engineering programs in the country by U.S. News & World Report, the School of Engineering offers both engineering and engineering technology programs.

Study commissioned for use by:



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