# New Dyna-Purge® D2 vs. other commercial purging compounds

## Performance test results comparing commercial purging compounds:

- New Dyna-Purge® D2 (Mechanical/Non-Abrasive)
- Mechanical (Abrasive) Purging Compound
- Chemical Purging Compound

Conducted by The Institute of Polymer Science and Polymer Engineering
at The University of Akron in Akron, Ohio.
*Commissioned by Shuman Plastics, Inc., Dyna-Purge® Division, Depew, New York*

# Comparative Testing with Dyna-Purge D2

## Processing information for New Dyna-Purge D2

| | |
|---|---|
| Applications | Injection molding, extrusion, compounding and blow molding |
| Temperature Range | 350°F - 625°F (177°C – 329°C) |
| Types of Resins | All types |
| Minimum Clearance | 0.025 inch (0.65 mm) |
| Amount needed | Approximately 1 to 2 times barrel capacity |

## Abstract

The Institute of Polymer Science and Polymer Engineering at the University of Akron conducted an extensive independent study in April 2014. The study was commissioned by the Dyna-Purge® division of Shuman Plastics, Inc. to compare the most widely used commercial purging compounds in the industry. The independent study was overseen by Dr. Mark Holtman, Assistant to the Director at The Institute of Polymer Science and Polymer Engineering at the University of Akron. All trials were conducted on a 55 ton Van Dorn injection molding machine using 3 different resins: PP, ABS and PA 6.6

## Types of Commercial Purging Compounds Used

**New Dyna-Purge D2 (Mechanical/Non-Abrasive):**Is the latest technology breakthrough working to scrub, clean and remove contamination effectively, without leaving a residue. A proprietary component possesses high shear tolerance creating a more viscous flow to the boundary layers, while another acts as a pressurizing agent allowing for the purge to reach stagnation points. In addition, an encapsulated fine targets degraded material adhering to the surface. This dynamic “triple action” innovation thoroughly cleans and removes material from the screw and barrel as well as the tool or die.

**Mechanical Abrasive:**A talc filled styrene based resin. The compound functions as a mechanical agent with the base resin melting and the talc 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 chemical additives, including inorganic salts and organic acids, as well as a glass component. The chemical ingredients work by breaking down the polymer chains of the resident resin. However, it requires accommodations including raising the temperature and in some cases a soaking phase.

## Processing Resins

- Polypropylene (PP) - MI 13; Processing temperature: 400°F (204°C)
- Acrylonitrile butadiene styrene (ABS) - MI 13; Processing temperature: 450°F (232°C)
- Polyamide (PA) - Nylon 6.6 glass filled, processing temperature: 500°F (260°C)
- Post purge resin - Polypropylene (PP)

## Trial Protocol

1. Set temperature to appropriate level and clean hopper
2. Introduce 100 g of black resin, starve the screw
3. Clean hopper
4. Add 150 g purge material for PP and ABS or 200 g purge material for PA
5. Set shot size to 50% and purge until compound is consumed; place purge piles in cold water to solidify
6. Clean hopper
7. Introduce 100 g PP, starve the screw

## Evaluation Criteria

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

## Trial 1: Polypropylene (PP)

**Processing temperature 400°F (204°C)**

| | Purge | Rating | Comments |
|---|---|---|---|
| 1 | Chemical | Fail | After 150 g of purge, traces of black PP were still present |
| 2 | New Dyna-Purge D2 (mechanical/non-abrasive) | Pass | After 150 g of purge, both the purge compound and the post purge resin were clean and free of contamination |
| 3 | Mechanical (abrasive) | Fail | After 150 g of purge, traces of black PP were still present |

### Results

Only New Dyna-Purge® D2 received a “Pass” Rating

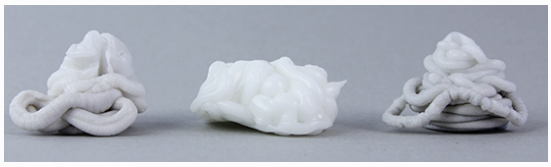
## Trial 2: Acrylonitrile butadiene styrene (ABS)

**Processing temperature 450°F (232°C)**

| | Purge | Rating | Comments |
|---|---|---|---|
| 1 | Chemical | Fail | After 150 g of purge, black ABS was still present |
| 2 | New Dyna-Purge D2 (mechanical/non-abrasive) | Pass | After 150 g of purge, both the purge compound and the post purge resin were clean and free of contamination |
| 3 | Mechanical (abrasive) | Fail | After 150 g of purge, black ABS was still present |

### Results

Only New Dyna-Purge® D2 received a “Pass” Rating



## Trial 3: Polyamide (PA)

**Processing temperature 500°F (260°C)**

| | Purge | Rating | Comments |
|---|---|---|---|
| 1 | Chemical | Fail | After 200 g of purge, black PA was still present |
| 2 | New Dyna-Purge D2 (mechanical/non-abrasive) | Pass | After 200 g of purge, both the purge compound and the post purge resin were clean and free of contamination |
| 3 | Mechanical (abrasive) | Fail | After 200 g of purge, black PA was still present |

### Results

Only New Dyna-Purge® D2 received a “Pass” Rating

The Institute of Polymer Science and Polymer Engineering at the University of Akron provides research support and technical service for the graduate research programs in the Department of Polymer Science and the Department of Polymer Engineering. The university's tradition as a leader in polymer science and polymer engineering began over 100 years ago with the foresight of a faculty member. Since then, Akron and the surrounding area have become known as the "Polymer Valley." In 1988 both the Polymer Science and Polymer Engineering departments were combined, creating the largest program of its kind, partially under the auspices of "The Institute of Polymer Science and Polymer Engineering."

Recognized as a world leader, the faculty members have generated over 160 active patents and have licensed technologies that have been commercialized worldwide. The Institute of Polymer Science and Polymer Engineering at the University of Akron conducts its research on thermoplastics in the "Sidney L. Olson Research Center," a 70,000 sq. ft. facility that includes advanced laboratories for injection molding, extrusion, compounding, blown film and blow molding.

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