Dyna-Purge® D2

Performance test results comparing three commercial purging compounds:

- Dyna-Purge® D2 – Mechanical Purging Compound
- Chemical/Mechanical Purging Compound
- Mechanical Abrasive Purging Compound

Conducted by:
The Polymers Center of Excellence, Charlotte, North Carolina

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

Comparative Testing with Dyna-Purge® D2

Processing information for Dyna-Purge® D2:

Applications	**Injection molding, extrusion, compounding and blow molding**
Temperature range	**300°F – 600°F (149°C – 316°C)**
Types of resins	**All types**
Minimum clearance	**0.025 inch (0.65mm)**
Amount needed	**Approximately 1 to 2 times barrel capacity**

Abstract:

The Polymers Center of Excellence in Charlotte, NC conducted an extensive independent study in December 2018. The study was commissioned by the Dyna-Purge division of Shuman Plastics, Inc. to compare the most commonly used commercial purging compounds in the industry. All trials were conducted on a 55 ton Arburg injection molding machine using ABS and polycarbonate (PC).

Types of Commercial Purging Products Used:

Dyna-Purge® D2 (Mechanical/Non-Abrasive): The latest technology breakthrough working to scrub, clean and remove contamination effectively, without leaving a residue. Proprietary components possess 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 element targets degraded materials 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 without the need for process adjustments.)

Chemical/Mechanical (alternative): A polyolefin compound with chemical additives. The chemical ingredients work by breaking down the polymer chains of the resident resin. Note: Required accommodations including raising the temperature and in some cases, adding a soaking phase to the process.

Mechanical Abrasive (alternative): A mineral filled styrene based resin. The compound functions as a mechanical agent with the base resin melting and the filler abrasively cleaning the surface of the screw and barrel. Note: Abrasive purging compounds may cause wear to the process equipment.

Processing Resins: Acrylonitrile butadiene styrene (ABS) – Processing temperature 450°F (232°C)
Polycarbonate (PC) – Processing temperature 500°F (260°C)

Trial Protocol:

1. Set temperature to appropriate level for resin and clean hopper
2. Introduce 100g of black resin, starve the screw
3. Clean hopper
4. Add 300g purge material
5. Screw forward
6. Set shot size to 50% and purge until compound is consumed; place purge piles in water to solidify
7. Clean hopper
8. Introduce 100g of natural resin, starve the screw

Evaluation Criteria:

In an effort to control variables and validate results, each of the 3 commercial purging compounds followed the same trial protocol. Upon completion of each trial, the inspectors reviewed the "post purge resin" assigning a "Pass" or "Fail" rating based on the presence of contamination and assessing the degree of visual purity or purge success.

Trial 1: Acrylonitrile Butadiene Styrene (ABS)

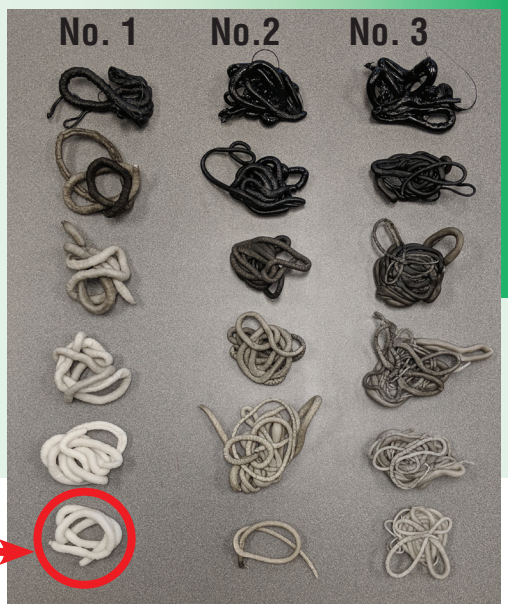
No.	Purge	Rating	Comments
1	Dyna-Purge® D2	Pass	After 300g of purge, both the purge compound and the post purge resin were clean and free of contamination.
2	Chemical/Mechanical	Fail	After 300g of purge, traces of black ABS still present
3	Mechanical Abrasive	Fail	After 300g of purge, traces of black ABS still present

RESULTS:
Only Dyna-Purge® D2 received the "Pass" rating.

Trial 2: Polycarbonate (PC)

No.	Purge	Rating	Comments
1	Dyna-Purge® D2	Pass	After 300g of purge, both the purge compound and the post purge resin were clean and free of contamination.
2	Chemical/Mechanical	Fail	After 300g of purge, traces of black PC still present
3	Mechanical Abrasive	Fail	After 300g of purge, traces of black PC still present

RESULTS:
Only Dyna-Purge® D2 received the "Pass" rating.



The Polymers Center of Excellence is a not-for-profit 501(c)6 organization created by the state of North Carolina to increase knowledge, provide technical support, and assist in the development of emerging technologies in the plastics industry. For over 20 years, the Polymers Center has continued to support economic development through education, research and development, and trial production.

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