

Purge This!

If you don't like this article, we would simply ask you to purge it from the record. Or, put the purges in your record if you feel they have tested well enough to warrant a purchase. Purging compounds are another one of those necessary evils. Efficiency can be greatly improved by using one pound of purging compound as opposed to several pounds of resin. Not to mention the frustration of having color in your parts from the previous material you thought was expunged. Finally, time wasted on changeovers is probably the largest issue. Necessary evils are often overlooked, but these "boring" products have a hidden potential for cost cutting.

Z-Clean and PekuTherm© are the purging compounds brought to the scouting combine for this review. Z-Clean is marketed by Chisso America Inc. of Schaumburg, Illinois and produced by the Chisso Corporation based in Japan. UniTemp®, based in Saint Joseph, Michigan manufactures the PekuTherm© product line.

This article will cover some basic information on different purging compounds and then jump into the test results.

Basic Information on Purging Compounds

There are basically four main methods of purging material from your barrel, listed in no particular order:

1. The most inefficient way is to use the incoming material, or another resin, to purge the old material from the barrel. This is a method often used for its simplicity, but it is not as effective as a purging compound.

2. Another method is to use a chemical purge. A chemical purge is designed to change the molecu-

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lar makeup of the existing polymer and produce a slurry of material. This type of process has its advantages and can work quite well. The main disadvantage can be that the chemical stays in the barrel longer than needed and can end up in the parts of the next molding run.

3. A third method of purging is the "additive" method. For this method a small amount of purging compound is added to standard resin. The two are mixed together and now form the new purging compound. This method of purging can be quite cost effective, but may not work as well on troublesome material and carbon build up.

4. The final method of purging consist of a physical purge where the barrel is actual "polished" free of unwanted materials. This method consists of a material that scrubs the inside of the barrel as it travels towards the nozzle and removes undesirables. According to their manufacturers, both of the products contained in this issue are of the physical type. Note that the line between physical and chemical purging compounds is a fine one because physical compounds do undergo a chemical change as they are heated. PekuTherm© uses a material that does not melt, but heats up to an elastic state and scrubs clean the inside of the barrel. Z-Clean is a compound that expands under heat and uses this effect to provide a more subtle rubbing action as it is purged.

When looking at a purging compound there are different types of "undesirable" material. The most

obvious would be the previous resin in the barrel, but there are other troublesome problems a good purging compound should address. These include hardened polymers that have been in your barrel for some time, carbon build up, and gas residue. All of these additional problems are not as prevalent, but they can cause rejects nonetheless.

Test Results

Number of Shots Needed to Purge Material. This test purges into and out of four different materials in different combinations ensuring that every possible combination is covered. Overall, PekuTherm© removed the material quite impressively in an average of 2.6 shots. This level was even better for three of the four materials. The only time PekuTherm© averaged higher than two shots per purge was when purging from ABS into a new material. ABS was the first material tested in the first test run, therefore, PekuTherm© may have also been removing material built up by the molder over a period of time. This would explain the noticeable difference between the ABS and the other materials. Either way, it fared remarkably well. Z-Clean's number of shots for a complete purge was higher in three of the four materials. Its average number of shots per purge was six, almost four shots more than the PekuTherm's© average.

Conclusions

In this case, it is quite clear that the PekuTherm© material excelled in our testing. We do not consider Z-Clean's purging compound a failure by any means; six shots is a perfectly acceptable value for a complete purge from material

material. Rather, we view the PekuTherm® average of 2.8 shots per purge to be quite noteworthy and, based on this data, it is worth purchasing a bag to try out in your facility. As you know, participation varies in our testing anywhere from 20 (molding machines) to 2 (purging compounds). The fact that only two committed to having their products put toe to toe without asking "is so and so going to be tested as well, because I'm in if they're in" is a testament to their product confidence in itself.

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How We Test Purging Compounds

What We Test

Number of Shots for a Complete Purge- A purging compound is designed to speed a material change. We measure speed as a function of the number of shots it takes to completely purge the old resin and come in with the new. Out with the old, in with the new.

How We Test

Number of Shots for a Complete Purge- To test the purging compound we use four different materials: ABS, HDPE, PMMA, and PP. Each material is run into the other, and vice versa, so that all possible combinations of material changes are covered. When testing the purging compound we follow the manufacturer's recommended specifications and instructions. Only the recommended amount of purging compound is used, no more, no less. After the purging compound is run through the barrel, the new material is introduced. PPR begins collecting the shots and conducts both a visual and part weight inspection. Only when the new material color is pure, and the part weights of the new material are consistent, is the old material considered to be completely purged.

Purging Compound Testing

Shots for a Complete Material Change After Purge

| From Original Material | To New Material | PekuTherm® "SK" | Z-Clean PS-11 |
|---|-----------------|------------------------|---------------|
| ABS | HDPE | 7 | 4 |
| ABS | PMMA | 2 | 8 |
| ABS | PP | 7 | 4 |
| HDPE | ABS | 1 | 8 |
| HDPE | PMMA | 3 | 4 |
| HDPE | PP | 2 | 7 |
| PMMA | HDPE | 3 | 3 |
| PMMA | ABS | 2 | 5 |
| PMMA | PP | 1 | 7 |
| PP | HDPE | 4 | 6 |
| PP | ABS | 1 | 8 |
| PP | PMMA | 1 | 8 |
| Average Number of Shots For a Complete Purge | | 2.833 | 6.000 |
| Purge Type | | Physical | Physical |
| Cost Per Pound | | \$5.50 | N/A |
| Amount Used Per Purge | | 20-30% Barrel Capacity | 5 to 20 Shots |