

## **Implementing effective mold cleaning**

Effective mold cleaning is important to consider when trying to meet increasing standards of manufacturing quality. Many molding manufacturers clean molds inefficiently, which can result in more costs related to scrap issues. High production, sophisticated manufacturing operations typically have defined cleaning cycles, might use chemical cleaning aids and have identified a cleaning process. Cleaning effectiveness is worth thinking about regardless of the organization's size or sophistication.



Best practice cleaning solutions, generally, have multiple step processes. Sometimes a chemical cleaner is applied followed by an abrasive treatment. The chemical cleaner is used to make the abrasion step effort easier and more efficient.

Chemical cleaners work by dissolving or absorption, which can cause dimensional changes in the buildup. This action tends to cause the buildup to "lift" from the surface. Abrasives then can then act on the buildup. Common abrasion techniques include blasting, scrubbing or grinding. When blasting is done some typical media forms are calcium carbonate, sand, walnut shells, dry ice and/or high pressure water. These materials are blasted onto the surface of the mold using specialized electric or air powered systems. Scrubbing, grinding or wiping is accomplished using wire brushes or common scrubbers like Chore-girl or Brass or SOS pads, wood or plastic scrapers. Some of these abrasives may be manual, but power tools can be used with wire brushes. A mold conditioning step allows the mold to quickly assimilate back to successful production. Here are some thoughts to consider when trying to optimize your cleaning process:

- **identifying when to clean**
- **knowing what you are cleaning**
- **selecting the best cleaner**
- **finding the correct balance in cleaning**

Let's examine these issues one by one.

1. **Identifying when to clean** appears straightforward. Perhaps the requirement is: "Clean just before the build up on the mold interferes with making quality parts." Regular cleaning intervals can become a process, and not a surprise or an emergency reaction to sticking problems. However, success in identifying when to clean begins with monitoring the performance of your molds over time or for a specific number of manufactured parts. Establishing a cleaning cycle, whether you use the length of time or the number of quality parts as your standard, provides a target for manufacturing and engineering. Sometimes charting the number of parts made in a cleaning cycle can provide effective targets for improvement. Identifying an effective cleaning cycle can minimize scrap. As part of any analysis operator input should be considered to recognize and resolve mold maintenance that occurs between the cleaning cycles.

2. **Knowing what you are cleaning** involves analyzing the build up on the mold and then planning for the appropriate techniques to use for the removal of material building up. The build up on the mold generally results from: (A) the polymer material when is ripped or torn from the molded part during demolding, (B) a residue formed when the uncured polymer first interacts with the mold release film or (C) an excess release agent film retained over time. It is important to take the time to analyze buildup to

identify the most efficient cleaning methods to use. Huron Technologies can assist in making this analysis on request.

Parts ripping or tearing causing material to stick to the mold, requires troubleshooting, since there are many possible causes. Mold temperatures, release agent dry times and insufficient cure times are just a few factors to consider. For the second type of build up in which there is interaction of the part material with the release agent, you must understand the chemistry. Precise analysis can be very helpful. This may include evaluating both the chemical composition and compatibility of the parts material with the release agent components. Finally, removing the excess build up which consists simply of layers of release agent film can be done with a regular cleaning schedule. Huron Technologies assists customers in evaluating cleaner compatibility and offers recommendations for the most effective cleaning aids.

**3. Selecting the best cleaner** means less time and trouble in cleaning your molds, less scrap and a longer cleaning cycle. The best cleaner is one that has the formulation needed to loosen or dissolve the grime or buildup. The mold material needs to be considered, as a cleaner intended for use on a steel mold would most likely be formulated differently than a cleaner for use on an epoxy mold. Consider the composition of the build up. High polymer buildup residue requires a different strength and type of cleaner than the more common wax or silicone residues. When needed, cleaners can be custom formulated to work for specific applications.

Other parameters include the type of polymer material molded and the temperature of the mold in molding and during the cleaning process. Usually a warm mold is easier to clean than a cold one but too much heat can cause the cleaner components to evaporate before they have time to work effectively. Finally, the dimensions of the mold can also be important. For example, molds with extreme vertical cavity walls may need a higher viscosity product to remain on the vertical surface. The best cleaner minimizes the time and effort to clean the mold. Huron Technologies supports customers by analyzing their build up and then considering the other manufacturing parameters to recommend the best cleaner from Huron's cleaning products.

**4. Finding the correct balance in cleaning** is the final issue to continue to evaluate performance measures to find ways to improve. This step is a variation on the beginning step. As there is continued evaluation of the scrap, you could conclude that improvement in a cleaner/cleaning process might be improved in combination with a more refined mold release agent.

Continued evaluation effort verifies that the cleaning cycle you have defined continues to be effective. Whether your cleaning cycle is based on the number of quality parts manufactured or a specific amount of time, tracking success on an ongoing basis is a necessary part of the process. Although a seven day cleaning cycle may not be as easy to implement as a two week cycle logistically, the scrap percentage proves the validity of the cycle. But only when scrap is measured. Doing it right the first time: avoiding repair and rework; measuring the number of times the mold produces quality parts with minimal scrap means you've found the correct balance with your cleaning products, process and cycle.

A planned approach to effective mold cleaning means better parts and less scrap. As you evaluate the cleaning solutions for your molds or seek to improve your cleaning processes, please give the Huron Technologies an opportunity to assist in your project. Call **1-800-275-4902** today!

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