

PLASTICS

Machinery & Auxiliaries

*Microblasting for
texturing and
cleaning tools*

COMCO INC.

Tooling Corner

Microblasting for texturing and cleaning tools

Editor's note: Steve Smith is unit leader of the mold finishing department at Caco Pacific. Since this story about mold finishing is introductory in nature, it contains material that is well known to many molders. Other aspects of mold finishing may be less familiar, however. Please take from this story whatever material is beneficial to your particular situation.

Figure 1.
A typical microblasting system.

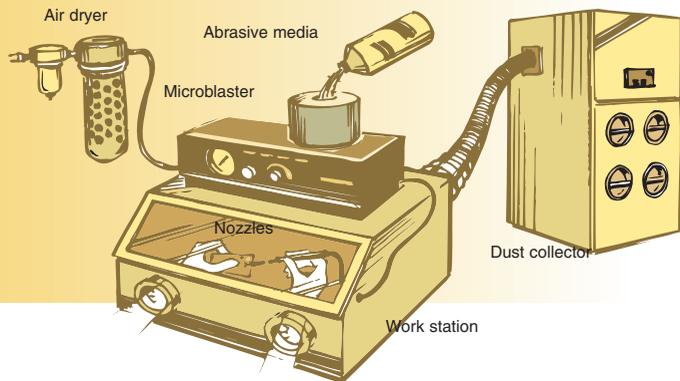
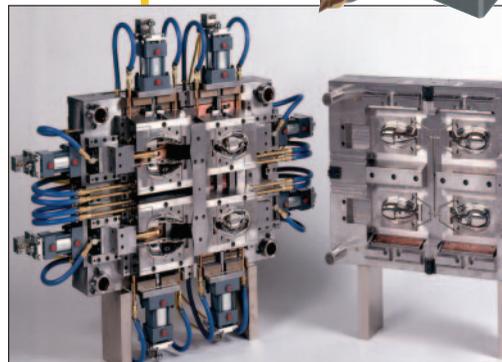
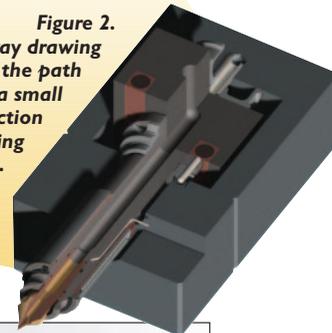


Figure 2.
This cutaway drawing illustrates the path to a small injection molding tip.



This example of a hot runner system has wires and intricate parts that require careful cleaning.



Figure 3.
Microblasting in action, shown here cleaning a corroded injection nozzle.



After a mold has been machined into a steel cavity with EDM or another method, it requires a final finish. A technology known as microblasting is used to create some of these finishes. Certain plastics release more easily from a frosty finish and some require a slick finish. Microblasting can texture small, deep cavities that larger bead blasters can't reach, but it also finds application in cleaning

resin residue from molds.

The technology consists of mixing an abrasive media in a granular form with a jet of clean, dry air, then propelling it through a pencil-like stylus tipped with a small nozzle. The surface finish on the mold depends on the type of abrasive used, the pressure of the blast, and the length of time the blast is held on the surface.

The abrasive media must be uni-



Figure 4. A closeup of pump nozzle tips before and after cleaning with the microblasting technique.

form in size, clean of contaminants, and dry and the air free of oil or water. Microblasting is done in a work chamber to keep both the operator and the surrounding area clean. An air dryer and an industrial dust collector are also used in the system (see Figure 1).

Although there is a wide range of specific and uniformly regulated abrasive media available for use in microblasting applications, glass bead and sodium bicarbonate are typically appropriate for surface texturing and cleaning molds.

Glass bead is commonly used where the preservation of tight tolerances is critical, especially when combined with the need to relieve machined stresses. Sodium bicarbonate is one of the softest abrasives available, but the particle's needle-like shape makes it an excellent choice for abrading some pliable materials. The particles cut through soft surfaces where block-like particles would tend to bounce off.

CLEANING ISSUES

Many processors maintain molds with routine cleaning. Sometimes cleaning is also needed between color changes, or occasionally, the entire mold is cleaned when it is stripped down to replace a worn component. A common cleaning method is to scrape all the parts clean—however, this is time consuming and must be done very carefully. Even with care, damage can occur to some of the threads and the steel parts when picking off plastic residue.

As molded parts become smaller and more intricate, processors have greater needs for general maintenance and cleaning. The most difficult areas to clean are small components such as injection tips, particularly where wiring or sensors are present (see Figure 2). The challenge is to clean off the plastic residue without



Parting line

Figure 5. Illustrated here is the parting line area in an injection mold manifold that can become embedded with grease and dirt while on line. This mold would be a good candidate for dry ice blasting.

damaging the mold components.

Also, modern mold systems may remain hot for a long time after they're removed from the press, often with plastic still inside. Because this plastic is held at a high temperature for a long time, it can degrade, and some materials then become sticky and difficult to remove.

Rather than risk damage to a mold with scraping, we have adapted the microblast mold surface finishing system for mold cleaning. Certain pressures and abrasives are used to clean very small molds and mold parts, or they work well with larger components that have small or hard-to-reach niches and crevices (see Figure 3). By pinpointing a fine abrasive stream that doesn't compromise actual surface tolerance in any way, microblasting becomes an effective cleaning method that is easy to use and relatively low in cost.

CLEANING TECHNIQUES

The nozzles available with the microblaster are especially effective in cleaning mold nozzles. The abrasive blast can be directed into the nozzle, cleaning out any built-up residue. For example, we used the system to clean

nozzle tips with 50- μ m sodium bicarbonate (baking soda) and 80-psi air pressure. The nozzle was approximately 1 inch from the surface. The process took 15 to 25 minutes/part (see Figure 4).

An advantage of baking soda is that it has very sharp crystals that fracture easily to cut and clean surfaces. Ground plastic works too, but sodium bicarbonate is the preferred material. There are certain kinds of plastics that microblasting may not remove efficiently, such as very soft, rubbery types. However, for most hard and semihard plastics, the method works well.

Microblasting can also support other cleaning methods used for larger manifolds and integral system equipment. Following are three examples of different types of cleaning that can be touched up with microblasting:

■ **Large cabinet blasting.** A mold can leak if it is very old or a fitting has worn out. In either case, a leak can cause the whole manifold to fill up with plastic. It would take many days to pick out the plastic with a hand tool because of all the electrical wiring and sensitive instruments inside. Without extreme care, the damage could amount to many

