

### Semi-Permanent Mold Releases

Semi-permanent mold releases are reactive resin solutions designed to cross-link and cure on mold surfaces providing a durable and inert release film. The mechanism by which these materials cure is either by exposure to atmosphere, temperature, or both. Depending on the particular semi-permanent mold release, these products may be applied and cured at ambient temperature, applied on warm molds, or can, particularly in the case of many water-based products, require a heat cycle to cure.

The cure profile of the particular semi-permanent mold release product impacts the way in which these materials should be handled. In all cases, care must be taken to insure that mold surfaces are totally free of contamination before applying the mold release and that adequate time is permitted for the release to cure before beginning to mold. Here then, are some helpful guidelines in handling this type of mold release.

### Storing & Dispensing Semi-Permanents

Solvent-based semi-permanent mold releases, particularly those that are intended for application at ambient temperature, are often quite sensitive to moisture. Leaving these products open, or repeatedly exposing them to the atmosphere, can cause polymerize in the can. This degradation can be quite invisible and can totally compromise the performance of these release products.

One way to reduce risks when using moisture sensitive mold releases is to dispense the release into heavy duty HDPE bottles with flip top "shampoo style" caps (See illustration. NOTE: these are available from AXEL) or hand pump type spray bottles and use these in your daily operation. Siphon type bottles are not suitable, as they draw in lots of air each time they are squeezed. Open trays of release should definitely be avoided. Large containers of semi-permanent mold release can be conserved with desiccant drum driers (see illustration -available from [www.drierite.com](http://www.drierite.com)) or by purging with nitrogen after dispensing.

### Never Pour Release Back Into the Can

Dispense semi-permanent mold release based on immediate needs only and discard what is not used. Returning unused material to the container can be a source of contamination and also can initiate harmful polymerization in the remaining stock.



Desiccant drum driers and appropriate bottles will conserve solvent-based semi-permanent mold releases.

### Cutting or Diluting Semi-Permanents

Semi-permanent releases, especially solvent-based products, are balanced, low solids formulas that can be damaged by attempting to dilute them. While there are some water-based formulations that can be diluted, most cannot; at minimum, there is a risk that the release will no longer properly wet the mold surface. The best practice is do not dilute semi-permanent mold releases unless the product expressly states that it is acceptable to do so.

### Mold Preparation

To assure maximum performance of semi-permanent mold releases, molds must be thoroughly cleaned before application of release. Follow manufacturer's guidelines for removing whatever type of release or coatings that are currently on the mold. Older molds that have significant buildup of releases, and molds that have been coated with paste wax, should be cleaned with heavy duty cleaner/strippers such as AXEL's CW-10NC, followed by a warm water wash, and then cleaned again with a good general purpose solvent cleaner, such as AXEL's CX-500. It is always a good practice to both water and solvent clean molds; this will insure removal of water-soluble contaminants that a solvent cleaner alone may not remove. A clean mold should be streak free and masking tape should adhere well to the surface.

## Use Proper Equipment & Procedures to Apply

### Hand Wiping

Semi-permanent releases are best applied by using a clean, woven, lint free cloth, such as the Scott Shop Towels On A Roll®, Kimberly-Clark WorkHorse® rags or WypAll® wipes, or even a good, heavy-duty plain white paper towel. Release is wiped onto mold surface using smooth even strokes. The goal is to apply a thin, uniform coating and allow the release to evaporate. Do not overwork the area or continue to wipe. Simply wipe on, and allow to dry. If your cloth dries out, or appears contaminated in any way, dispose of it and use a clean, fresh cloth. When working on a large surface area, apply to one section at a time, working from one end of the tool surface to the other.

The application technique described in pictures (opposite), employs two paper towels folded in quarters rather than a single towel or a bunched up cloth. Because more release is soaked into this pad of towels it is possible to treat a larger area without having to re-wet a single towel. This application technique, makes it possible to deposit a light consistent film of release on the mold surface that will evaporate faster, reducing the potential for streaking, particularly on large molds.

***Never pour release directly on to the mold. Always use an applicator to apply.***

Some molders prefer to apply the semi-permanent release with a hand pump spray bottle. Using this method, a 3 square foot (1 sq. m) area can be misted and then lightly wiped with the cloth to distribute the release consistently across the surface. This is a highly effective method of application, especially on large or difficult surface areas. Natural bristle brushes and most foam paint applicators can also aid in smoothing out the coatings or working them into textured or hard to reach areas. When working with sprayers or brushes, avoid pooling the release in any one spot.

***To determine the best drying and cure times, follow the recommendations for your molding conditions and the specific release you are using. For semi-permanent releases that cure at ambient temperature, 15–30 minutes between coatings is generally sufficient, but remember, the longer you can wait, the better the cure will be., under high humidity conditions, and when there is poor air circulation. Temperature, humidity, and airflow will all impact the cure of the mold release; for this reason it is always wise to allow for longer cure times at low temperature***



1. Two paper towels are folded in quarters to create a pad.



2. Release is applied to the pad of paper towels



3. The towels should be thoroughly wet, but not dripping.



4. Work the release into the towels by squeezing.



5. Squeeze out any excess release.



6. Unroll the towels; the pad should be uniformly saturated, but not dripping – now it is ready for use.

*For most semi-permanent mold releases (again, follow the instructions specific to the product that you are using) initial preparation of a clean well-conditioned mold should include application of 2 coats of sealer and a minimum of 3-4 coats of release . New or green tools should be handled with special care (see Focus On: New & Green Molds).*

*Always use a fresh, clean set of cloths for each coat of release. If streaking occurs, replace your set of cloths with clean ones. Also make sure that the cloths are not dripping wet, as heavy applications of release can streak and cure poorly.*

## HVLP Application

Some semi-permanent mold releases lend themselves to spray application. When using these products, HVLP spray guns are far better choices than other types of equipment. Because many solvent-based semi-permanent mold releases are sensitive to atmospheric exposure, it is important to use a dry air source for spraying; this is easily accomplished by equipping air lines with moisture traps.

Pressure pots (illustrated page 4), rather than siphon feed pots or vessels, are far better for spraying semi-permanent mold releases because they use very minimal air pressure to push the liquid up the feed tube to the spray head. By contrast, siphon pots venturi the liquid, introducing considerable air into the liquid mix and increasing the likelihood that the release will degrade while in the pot. When a true pressure pot, like the one illustrated on page 4, is equipped with an air/water separator located directly at the air inlet on the pot, it is possible to hold the semi-permanent mold release in the pot for an extended period of time.

**REMEMBER:** *The pot must be left pressurized with dry air.*  
**NOTE:** *The low pressures required do not pose safety risks.*

Gravity feed systems do not create the same problems as venturi systems, however they do not permit a way to adjust fluid pressure – the fluid simply drops into the stream of air and is propelled onto the mold. Another drawback of gravity fed systems is that the spray gun must be held upright and this can make it difficult to apply release to complex mold cavities.

When spraying a solvent-based semi-permanent release, the gun should be held 10 -18 inches (25 -45cm) from the mold surface. Air and liquid controls should be adjusted to provide a light, uniform coating that remains wet 6-8 inches (15-20cm) behind the spray head. Typically, air pressure in the 30-40 psi range will yield a non-fogging film of release. In difficult application areas, lowering the air pressure will produce a wetter film that is easier to see and allow for a more uniform coating.



A Binks HVLP equipped with a fluid tip ranging from 1.0-1.8 mm



A pressure pot, rather than a gravity feed or siphon setup is the preferred equipment.



A pressure pot equipped with regulator valves to control air intake and pot pressure.

NOTE: the air/water separator located directly behind the air regulator valve



Disposable HDPE pot inserts make cleanup easy.

## Typical Settings Are:

FLUID PRESSURE - (pressure at the pot gauge) should be set between 3 – 8 psi.

AIR PRESSURE - (the atomizing air pressure) The air gauge should be set to 30 – 50 psi.

FAN KNOB - should be turned ½ a turn from left to produce a slight cigar shaped pattern.

FLUID KNOB – start with fluid off; turn ½ to 1 full turn open.

Smaller molds, or molds with complex geometry, use lower pressure; larger tools require higher pressure.

**NOTE:** *These are guidelines only. Spray application is an art that requires fine tuning. Spray application will also vary considerably depending on the operator, the operation, and on the specific release product that is being applied.*

To begin, it is particularly beneficial to set up a large sheet of cardboard as a test surface. Triggering the gun at the cardboard will make it easier to see and to adjust air pressure and spray pattern before spraying directly on the mold. The photos on page 3 describe an ideal spray system from Binks, although the basic instructions will apply to the use of HVLP apparatus from other manufacturers as well.

### **Tape Testing - Before and After**

A simple tape test can serve several purposes. It can be used to test if the mold is sufficiently clean before applying release (if the tape adheres very well, your mold is usually clean) and it can be repeated after applying release to confirm that you have coated the mold adequately (tape releases easily). To properly perform this test, a good quality 1" wide (2.5cm) masking tape should be used. To assure reproducible results, the same brand and grade of tape should always be employed. To perform the test, a strip of tape approximately 8" (20cm) long should be applied to the mold surface at ambient temperature and then pulled off. When applying, it is important to rub the tape down with consistent pressure. When removing, the tape should be pulled at a consistent 45° angle. Remember to check in several locations on the mold surface. Tape tests can also be helpful within the production cycle; if tape releases poorly in one area compared to others, it can indicate an area that needs more frequent maintenance.

**NOTE: Do not tape test release or sealer until they have fully cured.**

### **Shelf Life**

Mold releases should be maintained in tightly sealed original containers and protected from temperature extremes. Semi-permanent mold releases can have limited shelf lives, so consult the data sheet for the product that you are using and rotate stock accordingly.

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Axel Plastic Research Laboratories, Inc.  
Box 77 0855 Woodside, NY 11377 USA  
Phone: 1-718-672-8300  
Fax: 1-718-565-7447  
E-mail: [info@axelplastics.com](mailto:info@axelplastics.com)  
**[www.axelplastics.com](http://www.axelplastics.com)**