

AUTOMOTIVE & INDUSTRIAL TIPS AND TECHNIQUES



Mold Release Tips & Techniques

Poor mold release has over the years been the single highest or most common cause of rejects on all lines. Factors that cause this problem are as follows:

	Problem	Solution
A	Marginal Amount of Mold Release in Plastisol	Call Rutland immediately - Add mold release to plastisol if necessary
B	Final Cure Oven Temperature Too High	Lower final cure temperature in 10°F increments or speed up conveyor.
C	Molds Too Hot or Cold	Adjust cooling process - Molds should be between 100°F–130°F at demold.

De-Molding Tips & Techniques

	Problem	Solution
A	Dirty Molds	Periodically clean molds.
B	Inexperienced Operators	Eliminate damage caused by poor handling through training

Comments

Moldable plastisols are formulated to provide good internal mold release, and as such the supplier is responsible for the amounts that are added during the manufacture of the plastisol. The cause of poor mold release within the compound needs to be investigated by the manufacturing chemist.

If the final cure oven temperature is too high the binding will have an over cured appearance: very high gloss with exaggerated foam structure and holes a rippled textured effect will be present extremely dry surface the paper will have a brown cast to it.

If this condition is observed, lower the final cure oven temperature by 10°F degrees and observe the line for 45 minutes. If further action is required, reduce the oven temperature in 10-degree increments, or check your line conveyor speed and *reduce* the time.

General Maintenance -Tips & Techniques

Some important facts to remember are:

- **Never** put **water** into the plastisol.
- **Avoid** handling without gloves, as they are difficult to clean off your skin or clothing.
- **Avoid** storing in hot areas, as they will attempt to turn solid.
- Plastisols are formulated to work in your process. If problems occur, refer to the following technical service guide and contact us at Rutland as soon as possible.

Maintenance and good work practice

Maintaining good operating controls on your ovens is essential. It is important to know what temperatures and speeds you are running, not only when you are having problems but also when you are running well.

It is equally important that a limited number of personnel have the ability to change the oven temperatures or speeds. The person charged with this responsibility must also allow enough time for the ovens to balance themselves before making further adjustments.

Due to the handling the filters receive during manufacturing, your assembly people and molders are critical to good-looking filters.

Probably the most important factor to be addressed and continually maintained for good processing are the setup sheets. Factual and actual dispense weights must be recorded and maintained. Once you can establish the minimum plastisol weight that is realistic, then the “mean” gel and final cure temperatures can be established. Upon completion of this step, we suggest a control chart be established for each oven and each filter family group. This would take the guess work out of running as well as help with problem solutions.

Molding II -Trouble Tips & Techniques

Blemishes or Sags

Blemishes or sags in the bindings may occur at any time or any filter type. They are one of the most difficult problems to correct only because there are many causes. To further complicate the problem, they may occur on only the gel side or both sides. They rarely, if ever, occur only on the second side. The most common causes are as follows:

	Problem	Solution
A	Too High Gel Temperature	Reduce the gel oven temperature in 10°F increments - This is probably the most common cause of this problem
B	High Paper Volatility	Run a 10 minute paper volatility. If the volatility exceeds 6%, contact paper supplier
C	Improper Handling By Molder	Provide training for molders.
D	Plastisol With a Very Fast gel Rate	Reduce the gel oven temperature.

Comments

Periodically during the shift especially during the spring and fall months, the gel should be checked at the middle molders station. An optimum gel will be a soft solid, roughly appearing like the consistency of peanut butter. If the paper pack can be pulled out with the plastisol molded to it, the gel is too hard, and remedial action is to be taken.

If the volatility of the paper exceeds 7%, you should contact the paper supplier. Providing the gel is not too hard, increasing the gel temperature can often correct this problem. Care must be taken or too hard a gel will occur and blemishes can be caused again. If the paper to be used is known to have a high moisture or ethanol content, an additive can be used in the holding tanks for a short term. If long term usage is required, a plastisol formulation change could be made.

“Setting Molds” can be difficult to learn, and some size filters are difficult to do under the best of conditions. Care should be taken not to dip the pack into the plastisol or excessively move the paper pack on the gelled side.

The gel rate should not vary once the formulation is established. This can only be controlled by the plastisol manufacturer.

Rutland Automotive & Industrial Tips & Techniques

Both Sides - Bindings

	Problem	Solution
A	High Paper Volatile Content	Check volatility content. This condition usually occurs when the content is over 7%.
B	Too Low Final Cure Temperature	Increase the final temperature in 10°F increments.
C	Improper Welding of Retainer	Check and adjust arbor.
D	Excessive Mold Release	Raise the final cure by 20–25°F. Notify Rutland.
E	Moisture In The Plastisol	Notify Rutland. An additive can be used in the holding tanks for a short term solution

Comments

If the problem with high paper volatility is spotty, a reduction in the final cure oven of 10–15°F will help. However, if the problem is severe and encompasses the entire binding raising the final cure oven 20–30°F will hide the problem. Care must be taken when trying to run under these conditions because other side effects such as drying up mold release and exaggerating the foam may occur. The normal paper volatility should run between 2–4%. Contact your supplier if high volatility occurs. Improper alignment or tight fitting can cause warping during the oven cycle. The result is allowing the mold release to prematurely activate thereby causing a sag.

NOTE: Some specialty papers because of their finish, etc., will tend to cause blemishes. If Rutland is notified in advance of their use, a special blend can be made to facilitate their usage.

Molding IV -Trouble Tips & Techniques

Pinholes

“Pinholes” can appear on both the top and bottom binding. They can be found in a deep seal, at the paper stop, or on the flat part of the binding.

	Problem	Solution
A	Pinholes On The Paper Stop	Check paper volatility.
B	Pinholes At The Seal	Preheat the molds
C	Pinholes Anywhere	Lower plastisol viscosity
D	Too High Viscosity	Add diluents to day tanks or return to Rutland
E	Dirty Molds	Clean molds periodically.
F	Air In Plastisol	Notify Rutland who can add surfactant to following lots and return to de-air.
G	Clogged Showerheads	Remove and clean showerheads
H	Air Introduction From Dispense Equipment	Repair dispense equipment.

Comments

Pinholes at the paper stop are usually caused by either paper movement or high paper volatility (Moisture). Due to the thinness at this point, there is not enough scavenger in the plastisol to absorb these excess volatiles. Reducing both the gel and final cure ovens can improve this condition.

However, care must be taken to prevent runs or under curing. Pinholes in the seal can be caused by mold design, moisture, or by a build up of mold releases. By preheating the molds, we are actually lowering the viscosity to allow the material to flow into The seal or eliminating moisture in the molds that is present from long term storage. The two most common causes of pinholes that are plastisol related are high Brookfield Viscosity and air entrapped in the plastisol.

If the viscosity has thickened out of specification, it would be apparent on all lines. The short-term solution would be for the customer to add our recommended a diluent to the holding tanks and replacement of storage tank material would begin.



Rutland Automotive & Industrial Tips & Techniques

Another problem is caused by the material being in specification but used in dirty molds and ones with a deep seal. The obvious solution would be to clean the molds, and for those with deep seals to preheat the molds.

Air in the plastisol will also cause pinholes. This can be removed by small additions of surfactant to the plastisol.

Clogged and misaligned showerheads will also cause pinholes. Cleaning the showerheads and re-aligning them will correct this problem.

Oversized wire will also cause pinholes. Welding arbor should be adjusted to correct this problem.

Molding V-Tips & Techniques

	Problem	Solution
A	Clogged Showerheads / Nozzles	Excessive trash in the plastisol. Notify Rutland immediately.
B	Paper Wicking	Very low plastisol viscosity.
C	Unlevel Conveyors	Check and adjust levels
D	Excessive Paper Movement	High moisture content of paper.
E	Uneven Wire	Check welders.

Feathers

While not necessarily a cause for rejects, feathers is a costly time consuming problem

	Problem	Solution
A	Misaligned Showerheads	Reset alignment.
B	Thick Or Thin Plastisol	Check and adjust viscosity—call Rutland.
C	Showerheads	Check design and construction.

Comments

Feathers are usually the result of poor alignment during setup or if the stops and guides are worn. If the viscosity is too thick or thin, the plastisol will not cut off or suck back properly.

Poor design or construction will also cause feathers, especially if the orifices are sized wrong or if they are improperly drilled.

Molding VI-Tips & Techniques

Flashing

Usually this problem is process related. The only time plastisol can be a cause is if the viscosity is very low.

	Problem	Solution
A	Leading Edge	Poor alignment of showerheads
B	Plastisol On One Side	Uneven conveyor belt.
C	Poor Molding	Paper being dipped.
D	Plastisol Being	Paper set under too much pressure.

Running Plastisol (Runs)

Runs only occur on the gel side of the filter. Although the cause seems obvious, several items must be eliminated to determine the actual cause.

	Problem	Solution
A	Too Low Gel	Raise gel oven temperature. Before Temperature adjusting temperature make certain the gel oven or hot plate is set correctly
B	Too Fast Line Speed	Slow down gel oven conveyor. Check setup sheet to assure the right speed is set for that particular family group.
C	Dipping By Molder	Assure the molder is not double dipping or pushing down on filter too hard.

Comments

If the gel oven is at the correct temperature for the amount of plastisol dispensed, and the conveyor speed is correct, the plastisol should be checked for water contamination. One of the effects of moisture in the plastisol is the retardation of the gel rate. Severe blemishes should be present at demolding.

Molding VII-Tips & Techniques

Adhesion Problems

Bonding to a metal end cap is the most critical function of an adhesive plastisol. There are several factors affecting adhesion of plastisols to metal:

	Problem	Solution
A	Insufficient Cure	Increase oven temperature or increase cure time.
B	Contamination of Metal	Clean end caps. With Processing Oils & Silicone

Insufficient Bond To Media

	Problem	Solution
A	Insufficient Cure	Increase oven temperature or cure time
B	Not Wetting Into Media	Viscosity of plastisol too high.

Comments

To reach ultimate fusion and adhesion to both the media and metal end caps, the internal plastisol temperature should reach 350°F for a minimum of 30 seconds. However, it is possible to over cure an adhesive. Some attributes of over cure are as follows:

- Distorted surface of plastisol.
- Gassing – cross section of plastisol has the appearance of foam or distorted cell structure.
- Excessive smoke from curing process.