

# PVC Injection Molding Processing and Troubleshooting

## **Processing Guidelines**

Successful processing of flexible PVC compounds by injection molding is dependent on a wide range of variables such as mold design, screw geometry, machine size, and shot size. While it is up to the processor to determine exact machine conditions for optimum processing, the following information may be used as a guideline:

### **Mold Temperature**

Inlet temperature should be between 70-100°F. The ejector side should be 10 to 20 degrees colder to help in part removal.

### **Melt Temperature**

Melt temperature will be controlled by a combination of heater band settings, screw RPMs and screw back-pressure. Consult the TDS for recommended melt temperature.

### **Heater-Band Settings**

For starting purposes, set barrel temperatures 20 degrees less than the recommended melt temperature. Set nozzle temperature 10 degrees less than recommended melt temperature.

### **Screw RPM**

A rotation speed of 35-50 RPMs should be satisfactory for most applications

### **Screw Back Pressure**

This will vary from machine to machine. Generally, 60-100 psig is recommended.

### **Injection Speed**

Slow to moderate speed for start-up is recommended. Then increase speed for the production run (moderate to fast).

### **Injection Pressure**

Typically, 20-40 percent of the maximum available should yield the best consistency.

### **Holding Pressure**

Usually 50 percent of the injection pressure. Use just enough to maintain a full part.

## **Troubleshooting**

Troubleshooting for injection molding requires a systematic approach with proper observation and documentation.

Best practices include:

- Define the problem
- Develop a method to isolate the problem
- Test one item at a time to verify results.
- Monitor the final solution to verify the problem has been solved.
- Document the solution - this can ease similar problems in the future.

While each molded part is unique and there is no universal remedy for all molding defects, there are common quality-related issues which can be resolved with simple adjustments to either the machine conditions or the mold design. Following are five (5) common injection molding defects and their probable causes. This resource can assist you in determining and correcting the issue to ensure a quality molded part.

While this guide can be helpful once a defect has occurred, many common molding issues can be avoided by a proper setup procedure including reviewing historical information and verifying all job settings in advance. If you have specific questions about processing your molded part, please feel free to contact us.

Defect	Caused by Mold	Caused by Machine
<b>Sink Marks</b> Small depressions in the material resembling dimples	-Inadequate cooling time -Mold temp too high -Gates or runners too small	-Mold temp too high -Gates or runners too small -Improper gate location
<b>Flow Lines</b> Discolored lines or patterns on the finished product	-Inadequate injection pressure -inadequate residence time -Barrel temp too low	-Mold temp too low -Gates or runners too small -Inadequate venting
<b>Splay</b> Also called “silver streaks”. A splash-like appearance or spray pattern on the surface of the molded part.	-Barrel temp too high -Excessive screw speed -Nozzle too small, too hot, or obstructed	-Obstruction in the gate or runner -Gate too small -Cracks in mold
<b>Burn Marks</b> Small dark brown or black discolorations on the surface of the molded part.	-Injection speed or pressure too high -Barrel temp too high -Screw speed too fast	-Gates too small -Inadequate venting -Clamping force too high
<b>Flash</b> The thin layer of plastic that flows outside of the cavity where the two halves of the injection mold meet.	-Clamping force too low -Injection pressure too high -Injection speed too high	-Clamping force too low -Damaged mold -Inadequate mold supports

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