

UNDERSTANDING QUALITY ISSUES WITH INJECTION MOLDED PARTS

Glossary of terms used to identify defects:

Short Shot – injection of insufficient material, causing mold cavity not to pack out creating flow lines.

Flash – excess plastic, usually found around the area of the mold parting line on a molded part.

Sink – depression in a molded part caused by shrinking or collapsing of the resin during cooling.

Splay – part appears to have a streaking effect throughout caused by moisture in the raw material.

Haze – part surface has a cloud-like appearance.

Orange Peel – material may cool before the mold cavity is full, creating flow lines on the part where the last place was filled.

Contamination – parts that have foreign embedded material, dirt, grease, etc.

Distortion – visual attributes such as pulls, cracks, and ejector pin marks.

Weld Line – when plastic enters a mold cavity from two different directions, it may not fuse together properly leaving an indented line in the part.

Discoloration/Burning – material that is over heated may cause the molded part to appear with a dark tint.

Poor Color Mix – color of part has a Milky Way appearance usually caused by improperly blended colorant.

Parting line mismatch – a mold may not close properly causing the part to be misaligned along the parting line.

Process Variation for Injection Molded Parts

Most Quality issues can be resolved by monitoring and controlling variation in the process. One must first identify where the variation is occurring and then determine what is causing it. Listed below are some common places in the manufacturing process where variation may occur and possible cause for process variation.

1. **Measurement Error (Machine or Equipment)** - Measurement method and equipment selected are not capable of reproducing consistent measurements.
2. **Core/Cavity sizing** - Mold dimensions may vary from cavity to cavity.
3. **Process variation inherent to the mold design** - Improper cooling may not allow the mold to maintain a certain temperature therefore affecting the flow of plastic into the mold.
4. **Process variation caused by molding press** - Machine controls may not be sufficient to maintain a consistent plastic melt temperature therefore affecting the flow of plastic into the mold.
5. **Resin** - Viscosity of plastic resin may vary from lot to lot enough that it will affect the part. This is more common when using regrind or wide spec. material.
6. **Process variation created during value added operations** – Parts when handled multiple times throughout the manufacturing process can sometimes cause unexpected results.

