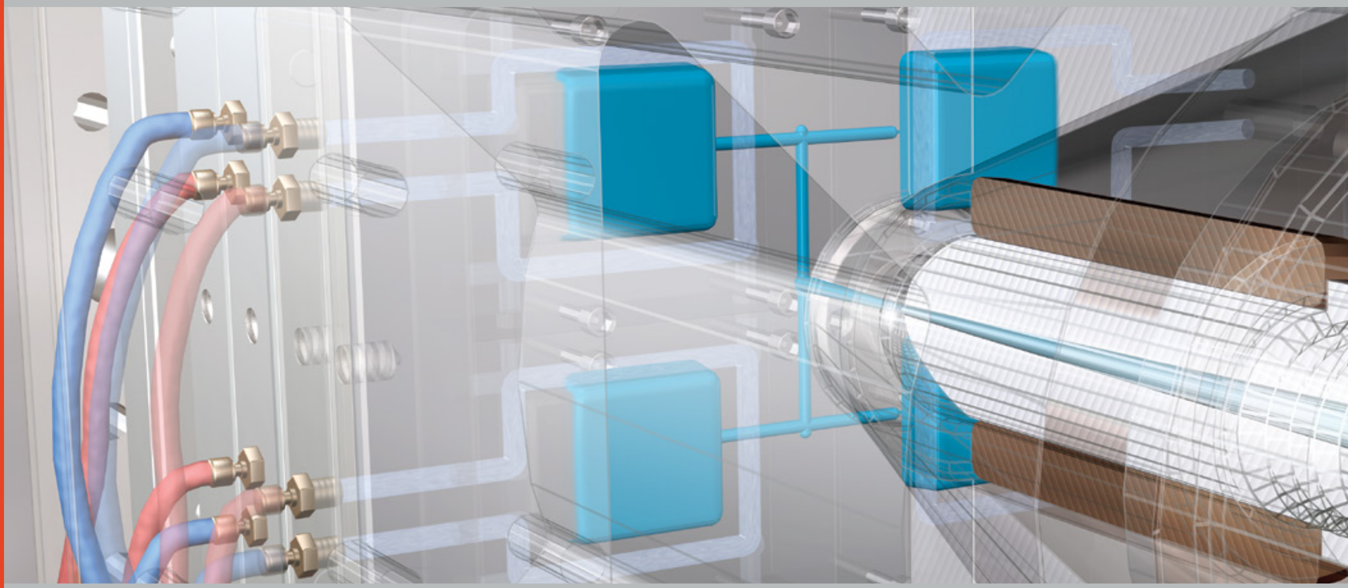
REFERENCE SERIES: PROCESSING

Scientific Troubleshooting: Burning



nexeo plastics

Created exclusively for **Nexeo Plastics** by Routsis Training, this free guide contains excerpts from Routsis's ***Scientific Molding Courses***.

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TROUBLESHOOTING BURNING

Burning, or dieseling, appears as a black, gray, or brown discoloration on the surface of the part. This is the result of gases and volatiles becoming trapped in the mold.

When gas and volatiles become compressed and heated, they will actually burn the front of the polymer flow front. This typically occurs near the end of fill, or where the flow ends – such as the bottom of a boss or rib.

Burning can be caused by one of five major factors:

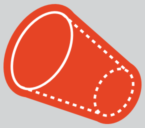
- Material Temperature
- 1st Stage Injection
- Clamp Tonnage
- Mold Damage
- Mold Design

Material Temperature

Burning is often the result of degradation caused by excessive material temperature.

Excessive **Melt Temperature** and **Back Pressure** often cause material additives to burn and degrade. This degradation creates gases and volatiles — which can become trapped in the mold, resulting in burning on the part.

When burning occurs, it is critical to ensure that the Melt Temperature and Back Pressure are at the documented setpoint.

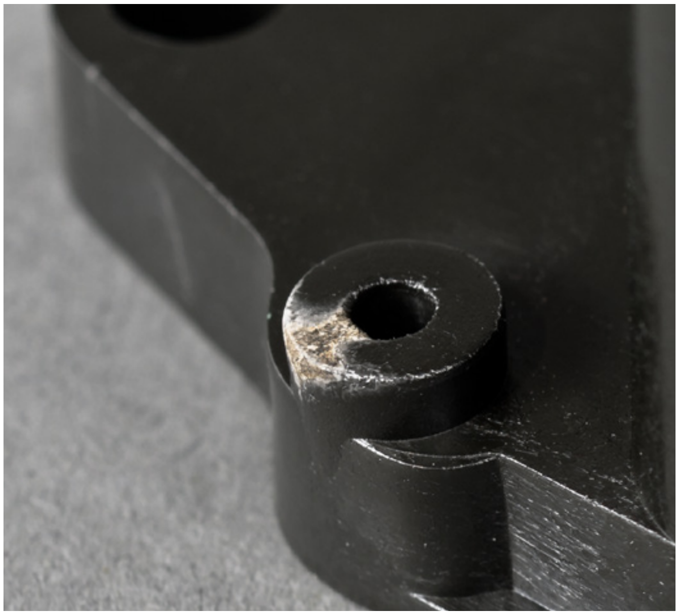


1st Stage Injection

There are several factors during 1st Stage Injection that may cause or contribute to burning. If a high plastic flow rate is being used during injection, the polymer may displace more air than can be removed through the vents. Gases trapped in the mold during injection due to blocked vents can also be a cause for burning.

Verify the **Plastic Flow Rate** matches the documented standard by turning off 2nd Stage Packing to ensure **1st Stage Fill-only Part Weight** and **1st Stage Injection Time** are correct.

Using a lower **Injection Velocity** at the end of fill often helps the gas escape. When burning occurs, always check the mold vents to ensure they are clean and free of blockages and increase the venting if necessary.



Clamp Tonnage

Burning can result from a High Clamp Tonnage. If excessive Clamp Tonnage is used, the mold vents can become compressed and prevent gases and volatiles from escaping.

Verify that the Clamp Tonnage setting matches the documented setpoint.

You should also reset the Clamp Tonnage if a toggle clamp is being used.

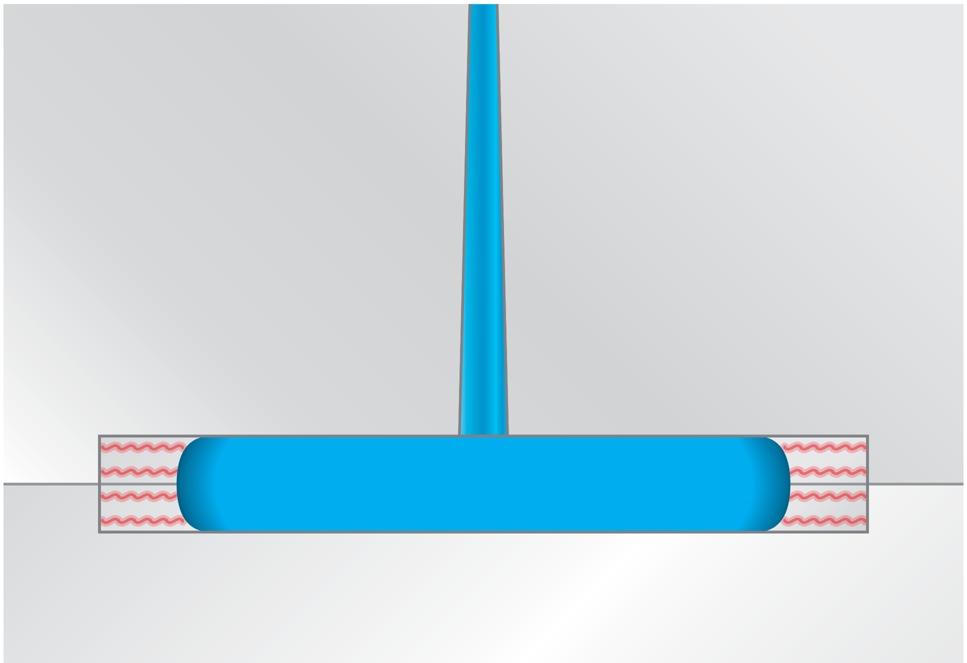
Mold Damage

Burning may be the result of mold damage — particularly damaged vents.

Excessive parting line and component wear will reduce the effective vent depth. If you suspect vent damage or wear, an experienced technician or mold maker should measure the vent depths and determine whether mold repairs may be necessary.

Mold Design

Burning can also result from a poor mold design with inadequate venting. Since burning is caused by trapped and compressed gas, inadequate venting will always contribute to the presence of burning. As a result, increasing the number of vents will always reduce the amount of gas entrapment. Although deeper vents may contribute to flash, increasing the number of vents will not have a negative effect on the molding process.



Static vents can be machined on the sides of stationary components such as inserts and core pins. Dynamic vents can be added to moving mold components such as lifters, slides, and ejector pins. Porous steels, which allow air to pass through the cavity surface, can be inserted into cavity areas where burning is very likely to occur.