

PROTECT YOUR ASSETS

*Troubleshooting Extrudate Issues:
Orange Peel*

Practical Content Delivered by EDI® Extrusion Die Experts

Many of the processors that we've worked with have developed and diligently adhere to a strict Preventive Maintenance (PM) schedule. This process has enabled them to reduce downtime and avoid costly repairs, especially when it comes to their extrusion die system.

But sometimes even the most organized operations can face unexpected production stoppages that require extensive troubleshooting to solve issues related to product quality. Unlike many routine maintenance practices that may only require adjusting or changing a singular component, issues with the appearance of your film or sheet could result from one or more factors that are often not related to the die.

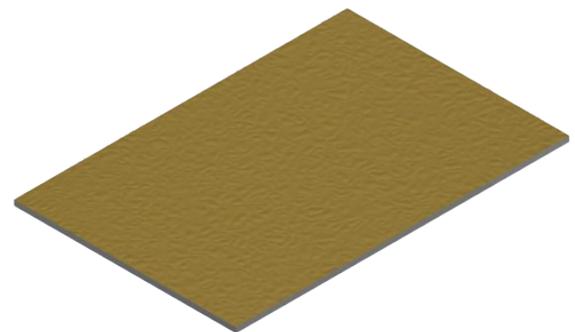
By using a systematic approach to define the problem, sort through possible causes, and then develop a solution, future product quality issues may be minimized. Our service and technical support experiences in the field have enabled us to identify some common causes for these variances in product aesthetics, helping to fast track your troubleshooting process.

Dealing with Orange Peel (Grainy Surface)

Note: Depending on your process type, it can be difficult to visually confirm if a grainy appearance is on the surface of your extrudate or if it's part of the internal layer structure (in coextrusion processes). To confirm the location of the haze, you can wipe oil on the surface of the plastic. If the haze disappears once oil is applied, the issue can be found on the surface layer only. If the haze does not disappear once the oil is applied, the issue is part of the internal layer structure.

A grainy surface, also known as orange peel, can appear for a variety of reasons. If the melt is too cold, the sheet surface texture may freeze too soon, reducing the overall effectiveness of the polishing rolls.

In other cases, air, moisture, or contamination could be interfering with the extrusion process. The table on the next page provides some possible reasons why orange peel may appear and provides suggested actions to correct the issue to get back to quality production once again.



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Possible Causes of Orange Peel (Grainy Surface)

Possible Factor	Process Adjustment Needed	Additional Notes for Your Team
<i>Low Die Temperature</i> <i>Very Common Issue</i>	Increase the die temperature zone setpoints.	
<i>Low Melt Temperature</i> <i>Very Common Issue</i>	Increase the melt temperature.	
<i>Contaminated Melt</i>	Change the screens in the filtration system, possibly with a finer mesh pattern to trap more debris.	Need new screens? The BKG® filtration team can help! Visit our website for details.
<i>Die Gap</i>	If the haze appears on the surface and the line does not have gear pump(s), the die gap should be decreased. If the haze appears in the internal layers, the die gap should be increased.	By decreasing the gap, you will increase the back pressure, mixing, and melt temperature. By increasing the gap, you will lower shear stress which improves coextrusion stability.
<i>Excessive Air</i>	Increase the amount of material being fed into the extruder.	Starving the extruder feed can result in additional air pockets being trapped in the melt.
<i>Excessive Moisture</i>	Polymer may need to be dried.	In many cases, a dessicant dryer may be required to reduce the amount of moisture in your polymer.
<i>Poor Contact with Chill Rolls</i>	Reduce the nip gap.	In general, the gap for the first nip should be 2% greater than the total sheet thickness. The gap for the second nip should be 1% greater than the total sheet thickness.
<i>Roll #2 Temperature</i>	Increase the roll temperature.	For the purpose of this technical tip, we are assuming a downstack line orientation, where roll #2 is in the middle.
<i>Roll #3 Temperature</i>	Increase the roll temperature.	For the purpose of this technical tip, we are assuming a downstack line orientation, where roll #3 is at the end.
<i>Insufficient Polishing Roll Pressure</i>	There are a few reasons why the polishing roll may not be receiving adequate pressure. To fix this: 1. Increase the polishing roll pressure so that the roll polishes the sheet (low pressure could allow melt bank to flow between the rolls). 2. Check that the polishing roll is adjusted correctly - it could be making irregular contact with the sheet. 3. Confirm that a good melt bank has been established at the nip.	