PROTECT YOUR ASSETS

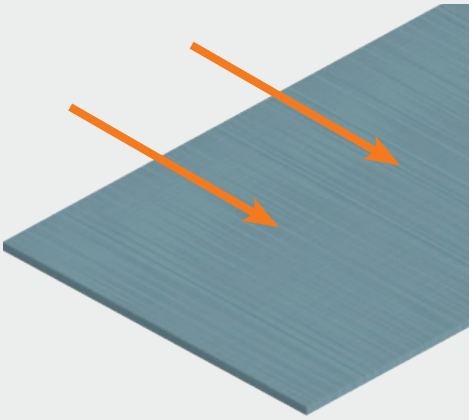
Troubleshooting Extrudate Issues:
Machine-Direction Lines

Practical Content Delivered by EDI® Extrusion Die Experts

Which type of MD line are you encountering?

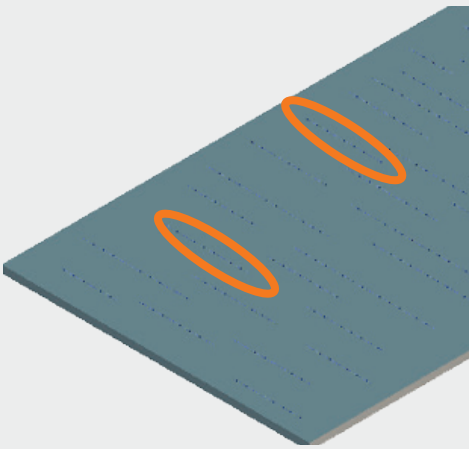
Die Lines

Die lines have a fixed location along the tranverse profile and are continuous.



Flow Lines

Flow lines, which come and go, change positions along the transverse profile and vary in intensity and width.



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 MD Lines

Machine-direction lines are one of the more common issues that processors see - and they can create an extra challenge when it comes to correcting the issue if the type of line pattern is not appropriately identified (see graphics to left).

Die lines can be caused by build-up or blockage in the die or by damage to the die's flow surfaces. Build-up can be cleaned away by opening the die lip gap and running purge material while varying the extruder rpm to allow the blockage to flow out. Otherwise, it may be necessary to carry out a "split and clean" procedure.

Flow lines have different causes than die lines and may often be the result of too much moisture in the polymer or a problem with mixing. Changes to the die gap and temperature set-points can usually remedy these issues.

In either case, there may be more than one element leading to MD lines in your film or sheet. The table on the next page provides some possible reasons why lines may appear and provides suggested actions to correct the issue to get back to quality production once again.

Do you need additional support? Scan our QR code with your phone for more details about the services offered by the EDI® Field Service team!

Troubleshooting Extrudate Issues *Machine-Direction Lines*

Possible Causes of Die Lines

Possible Factor	Process Adjustment Needed	Additional Notes for Your Team
Polymer Build-up in Die *Very Common Issue*	There are several methods that may be used to clean polymer build-up. Below are our recommendations, in order: 1. Use a shim to scrape and clean residual polymer from the die lips and preland. 2. Increase the die temperature zone set-points to prevent the polymer from stagnating and depositing on the die channel walls. 3. Use a purging compound while varying the extruder rpm to remove build-up. 4. If none of the above options work, it may be time to perform a split and clean procedure on your die.	Does your team know how to properly clean a die in order to prevent damage? Don't take chances - instead, check out our "How to Split & Clean Your Extrusion Die" video, available on the **Nordson PPS website**.
Damage to Flow Surface *Very Common Issue*	Inspect the die flow surfaces. If there is mechanical damage to these areas, have the die professionally repolished and the lip edges resharpened.	

Possible Causes of Flow Lines

Possible Factor	Process Adjustment Needed	Additional Notes for Your Team
Inadequate Mixing *Very Common Issue*	If your melt delivery system *includes* a gear pump, try finer mesh screens in your screen changer to increase the extruder melt pressure. If your melt delivery system *does not include* a gear pump, then reduce the die gap to increase back pressure.	Do you need new screens? The BKG® filtration team can help! Visit our **website** for details. Are you interested in adding a gear pump? The BKG® filtration team can help! Visit our **website** for details.
Signs of Unmelted Polymer *Very Common Issue*	Increase the melt temperature and die temperature set-points.	
Too Much Moisture in Melt *Very Common Issue*	Reduce the moisture content in your polymer.	Need a pellet dryer? The BKG® pelletizing team can help! Visit our **website** for details.
Air Entrapment *Very Common Issue*	Review the temperatures of your first and second barrels, then check the back pressure and vacuum system. Finally, check the hopper level.	

Nordson Extrusion Dies Industries, LLC
1450 Lakeland Drive
Chippewa Falls, WI 54729 USA
+1.715.726.1201 **Phone**

China
+86.21.57850918 **Phone**

Germany
+49.251.26501.0 **Phone**

Japan
+81.3.5762.2770 **Phone**

nordsonpolymerprocessing.com | info@nordsonpolymerprocessing.com