



EDI® Die Solutions for Extrusion Coating & Laminating

Extrusion Die Systems Designed to Optimize Production Efficiency

The Challenge

Delivering a Quality Product Without Producing Excessive Scrap

Processors have long tried to solve the problem of ensuring their product receives the proper amount of coating or laminating material without flooding or starving the edges of the substrate. Too much or too little polymer at the edges results in an increased amount of scrapped material, reducing the operation's overall profitability.

The Importance

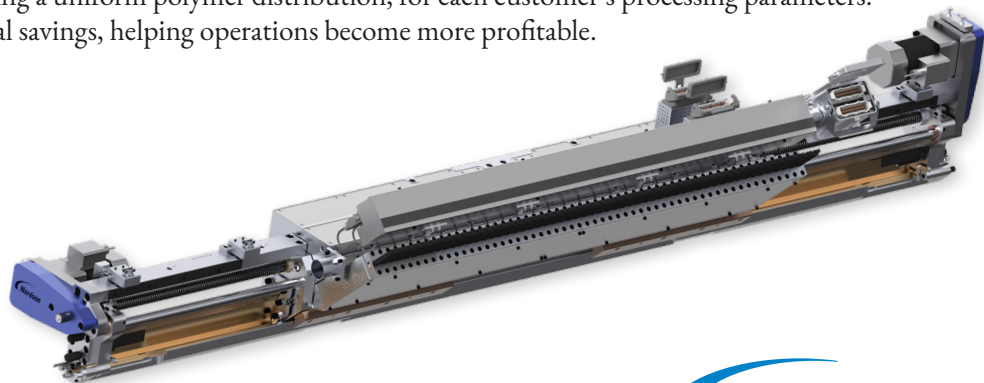
Reducing Scrap Lowers Operation Costs

By effectively controlling the coating or laminating material's thickness across the width of the substrate, as well as the flow to the edges, processors are able to reduce the amount of trim required for their product. To do this, it is critical that the proper extrusion equipment designed for each operation's specific application and materials be utilized.

The Nordson Solution

EDI® Die Systems for Extrusion Coating & Laminating Processes

Nordson is committed to providing the most innovative solutions that enable processors to optimize production. Our die systems for extrusion coating and laminating applications are custom designed with the goal of decreasing the amount of trim required, while providing a uniform polymer distribution, for each customer's processing parameters. These factors lead to significant material savings, helping operations become more profitable.

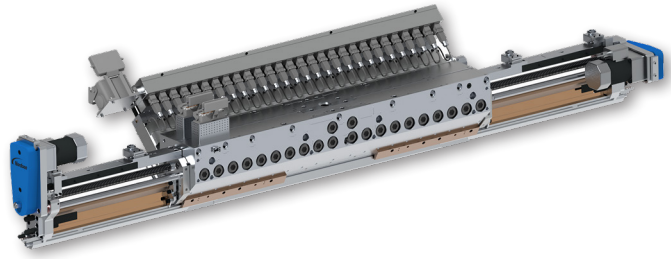


Precision Technology Solutions. Every day, Everywhere.



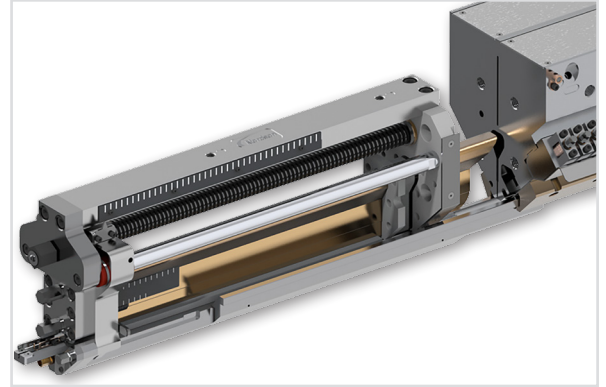
EDI® EPC™ Extrusion Die Systems

The EPC™ die system is Nordson's answer for maximizing production efficiency and uptime. Understanding the needs of operation and maintenance personnel led to this innovative and robust system that provides superior edge profile control and is easily operated.



Save Material Costs

- The EPC™ die allows producers to quickly adjust the product width by moving the internal deckle blade system to open or restrict flow to the ends of the die
- By adjusting individual components within the deckle blade assembly, edge beads can be reduced to a miniscule amount
- Optional motors are available for the EPC™ deckle system, providing the most accurate and repeatable results



Improve Production Output

- EDI® dies feature optimized lip lands, designed to create uniform flow orientation and reduce die swell
- Adding the optional Autoflex™ automatic lip adjustment system reduces gauge variation and helps further increase product yield



Quickly & Easily Maintain the Die

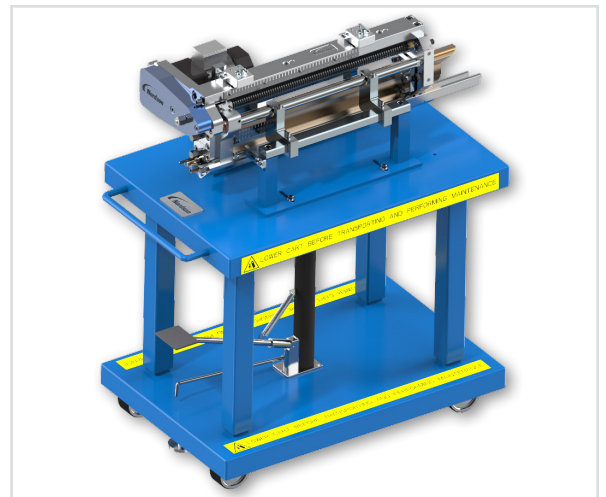
- EPC™ deckle assemblies are designed so production teams can quickly retract all deckle components to insert a simple brass scraper into the die lip gap for cleaning
- The brass scraper is custom manufactured to fit in the specific die and reaches beyond the lip opening, into the secondary manifold, to easily clean away carbonized polymer which may cause die lines

Increase Extruder Uptime

- The EPC™ deckle has a limited number of fasteners that need to be removed in order to access the die bodies, ensuring downtime is as minimal as possible
- The deckle components are lighter in weight than other industry models, making them easier for operators and maintenance personnel to handle

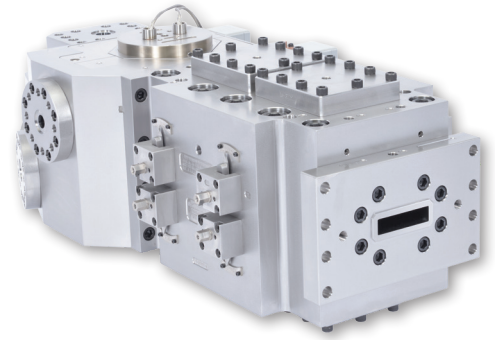
Improve Efficiency & Safety During Maintenance

- The EPC™ Deckle Maintenance Cart allows the deckle assembly to be removed from the die without use of a hoist or overhead support
- Deckle Maintenance Carts are custom-designed to fit each system, ensuring maintenance work can be performed at a safe and comfortable height, while reducing the potential for damage to critical deckle parts



EDI® Coextrusion Technology

Nordson provides processors with options for further improving their coextruded layer uniformity and count. The EDI® coextrusion feedblocks and layer multiplication systems enable operations to increase the durability and strength of their final product.



Ultraflow™ Adjustable Coextrusion Feedblocks

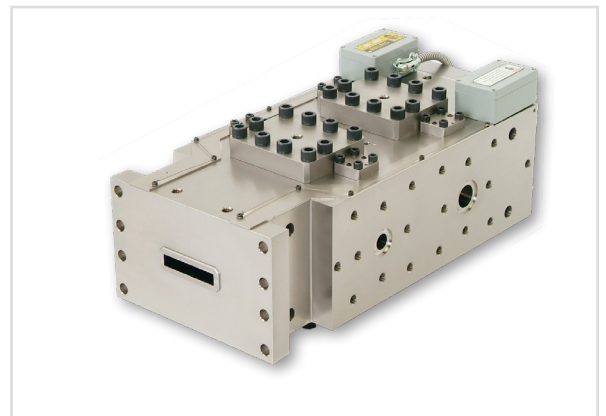
US Patent 10,442,126

- Nordson's adjustable feedblock combines polymers in a parallel path manner, achieving optimal layer ratio stability throughout the structure
- Large diameter profiling actuators provide highly effective tuning lands, which can be positioned at the combination point or significantly upstream to refine the layer distribution
- "On-the-fly" layer ratio adjustability increases uptime and precision, while allowing for greater end-product versatility
- Optional selector spool feature allows layer sequence to be prearranged upstream of the combining point, all without removing the feedblock from the production line



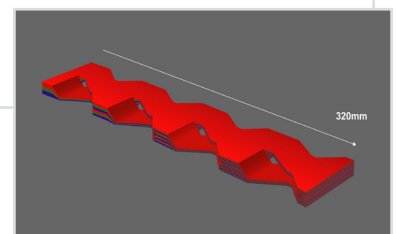
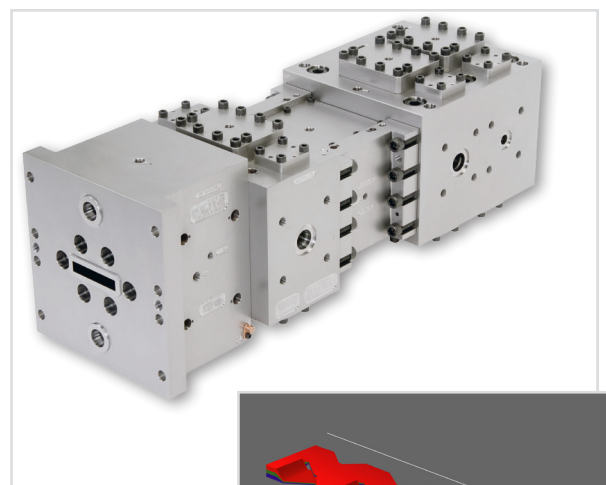
Ultraflow™ Fixed Geometry Coextrusion Feedblocks

- Nordson's fixed geometry feedblocks are the industry-proven results of over 30 years of coextrusion expertise from our world-class design facilities
- Multiple design options ensure there is a fixed geometry feedblock to fit your production requirements



Layer Multiplication Technology

- Nordson's streamlined and versatile layer multiplication technology (LMT) is a special tool that can be engineered to multiply some or all of the layers within a coextrusion "sandwich" provided by a feedblock
- The Nordson LMT design features inserts that are easily changed, allowing for layer multiplication levels to be altered quickly
- No matter how many microlayers there are in the structure, the overall thickness is no greater than that of a conventional coextrusion, and the structure contains the same amount of raw material
- When used for food packaging, shelf life may be prolonged by reducing the OTR and total oxygen ingress over an extended period
- By utilizing LMT, barrier properties may be better maintained when packages are flexed, since thinner EVOH layers tend to develop fewer pin holes



Case Study: Korea Aluminium Co. Ltd. Installs an EDI® EPC™ Die

An advanced extrusion coating die designed to reduce edge bead enabled one leading producer of aluminum foil and foil-laminate flexible packaging to actually eliminate edge bead, as well as reduced coat width variation by half or more.

After a die for applying LDPE on an existing production line for flexible food packaging caused problems with die lines and leakage, Korea Aluminium replaced it with an EDI® EPC™ die. The new die not only eliminated the previous problems but addressed the issue of edge bead and the waste of coating and substrate material that results from it, according to the senior manager of Korea Aluminium's headquarters facility in Chungbuk.

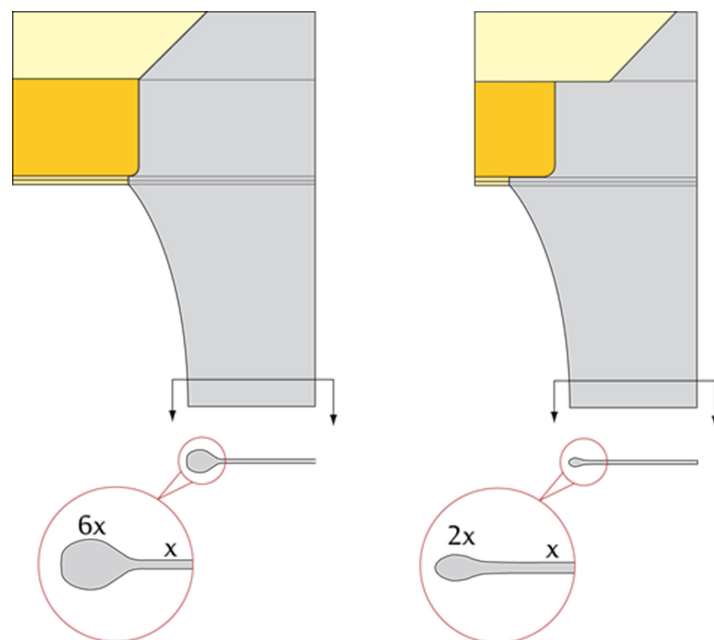
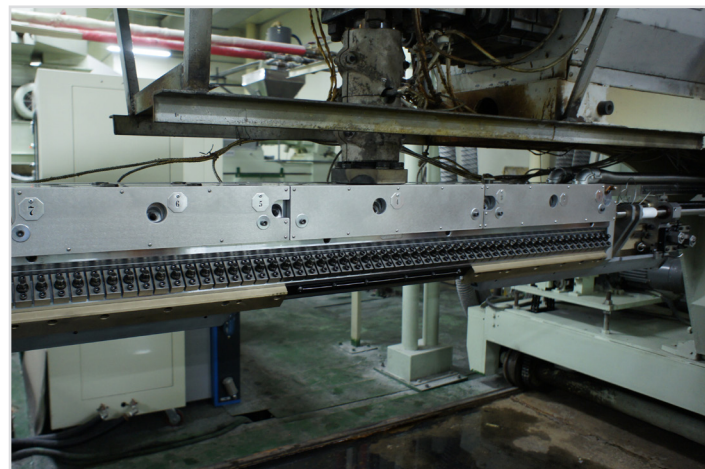
While the degree of edge bead reduction achievable with the EPC die depends on a number of factors, the reduction in the Korea Aluminium coating line was 100%. "We are now manufacturing product with zero edge bead," they reported.

In addition, the EPC die reduced coat weight variation by 50 to 60%: "Thickness uniformity was +/- 2 or 2.5 microns with the old die, but with Nordson's EPC™ die uniformity has been improved to almost +/- 1 micron."

The EPC™ unit installed on Korea Aluminium's coating line was a manual die. While the 4 to 5% range of variation from target coat weight is very good for a manual die, the range could easily be cut in half with an automatic die.

An EPC™ die includes an external deckle as a secondary seal to prevent leakage and an internal deckle system that sets coat width and seals polymer at the die exit. Internal deckle parts provide independently adjustable components that seal off the internal flow channel and can be positioned to set the overall coating width and to minimize edge bead. Similarly, a manual or automated system for adjusting a flexible lip of the die makes it possible to maintain coat weight uniformity.

Internal deckle systems used for fine-tuning the edge profile of a coating are effective because of the tendency of molten polymer to exhibit transverse flow if lateral barriers to flow are removed at the die exit. In the EPC™ die, the internal deckle components for adjusting the edge bead profile are located upstream of the lip land—one in the primary manifold section, the second in the preland area. By adjusting the positions of these components relative to the deckle rod, it is possible to reduce the flow of polymer at the extreme edges of the coating, thereby minimizing edge bead.



Schematic shows how the internal deckle system (orange and yellow components) of the EPC™ extrusion coating die can be adjusted to reduce edge bead in a coating (shown in gray). In this example, edge bead is reduced from six times the target coating thickness to twice that thickness.