



Global Laboratory & Trial Capabilities

for EDI® Extrusion Dies, Feedblocks, & Fluid Coating Systems

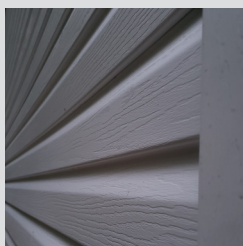
At a time when outside trial facilities are increasingly scarce, Nordson's process laboratories enable customers to do application development and test runs without sacrificing productivity in their own plants. Using commercial-scale equipment for lab functions disrupts your operation, incurs high raw-material costs, and sacrifices output. Our laboratories provide you with the peace of mind to try new process options, optimize your operation, or develop new products.

Use of Nordson laboratories is available on a rental basis and is open to existing and prospective customers.

Expand your product offering without compromising your existing business.

Precision Technology Solutions. Every day. Everywhere.





Extrusion Die Trial Capabilities

Chippewa Falls, Wisconsin, USA

The EDI® Technology Center at Chippewa Falls, Wisconsin has served film, sheet, and extrusion coating processors around the world for many years. Our experienced team has successfully worked with customers to develop separator films for batteries, barrier sheet for thermoforming, puncture-resistant packaging films, barrier films for food packaging, decorative film and sheet products, layer-sequencing techniques for changing stripes, films for renewable energy/solar applications, window films, and optical-grade films. In addition to working with commercial customers, our team has used the laboratory to fulfill multiple U.S. government contracts for development of barrier packaging for the military and of components for lithium-ion batteries.

Customers interested in using the Chippewa Falls lab have the option of running their product on our:

- ***Six Extruder Sheet Pilot Line.*** Our pilot line can be configured for a variety of processing parameters, including mono-layer, coextruded, or multiplied sheet, ranging in thickness from 0.178mm (0.007") to 2.54mm (.100").
- ***Four Extruder Cast Film & Sheet Laboratory Line.*** Our cast film and sheet lab line is also capable of producing small proof-of-concept samples of mono-layer, coextruded, or multiplied film or sheet, but is best suited for trial applications requiring a product thickness range of 0.127mm (0.005") to 0.381mm (0.015").

The Chippewa Falls laboratory makes possible demonstrations, trial runs, process optimization, and training with any of the dies produced by Nordson.

We offer a range of die manifold, or flow channel, designs for use on the pilot sheet line – by using a die with exchangeable manifold cartridge bodies. Laboratory trials assist our engineers in designing the most appropriate manifold for the materials and production rates anticipated in your application.

For customers hoping to improve the durability or effectiveness of their product, a special “layer multiplier” system for film and sheet generates structures that are of standard thickness but have numerous microlayers.

Available Extrusion Equipment

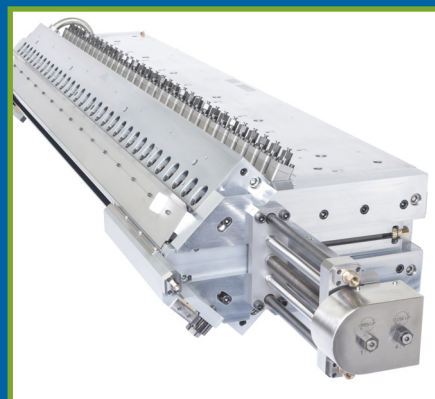
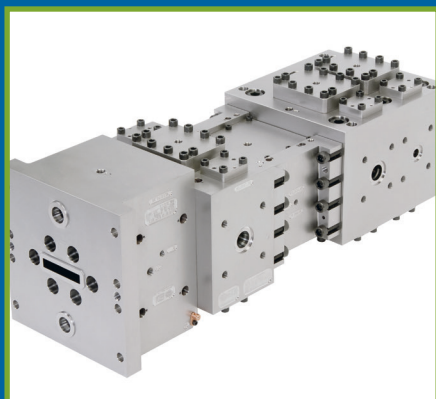
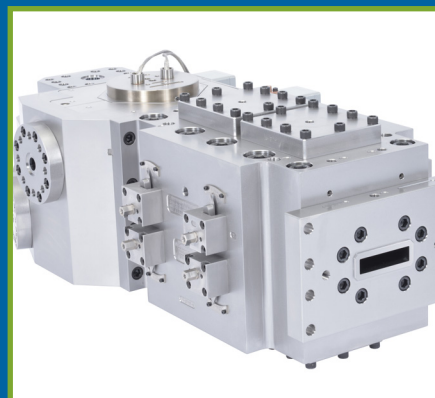
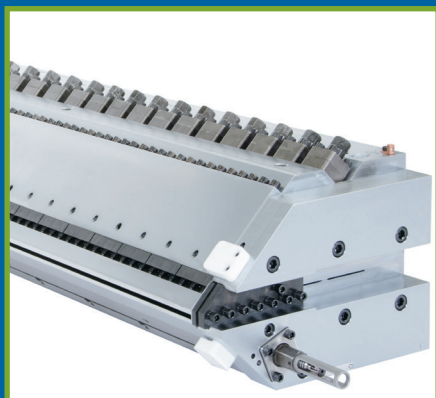
Six Extruder Sheet Pilot Line

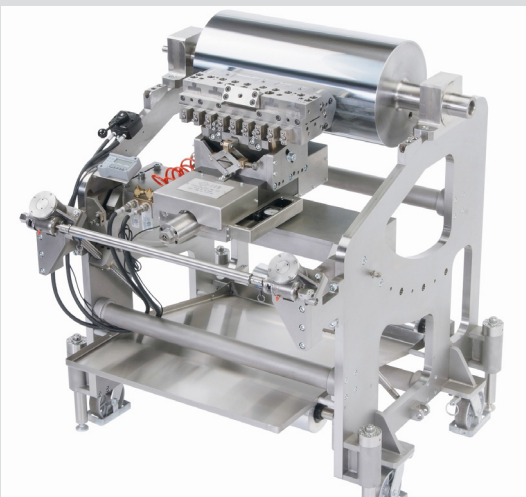
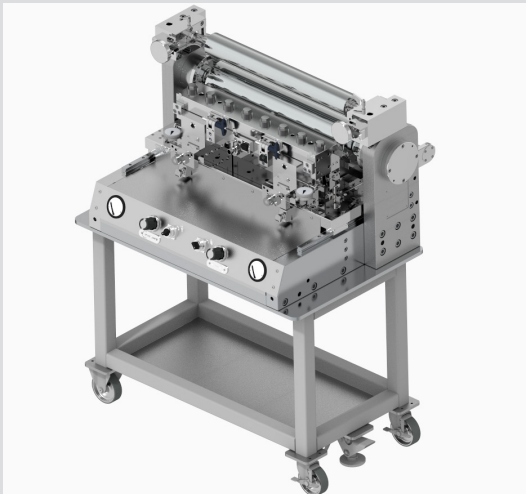
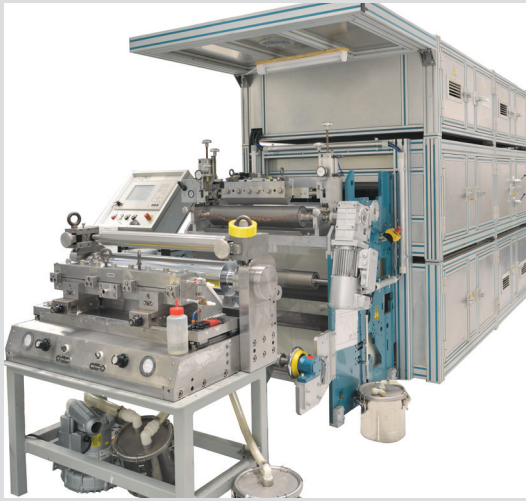
<i>EDI® Extrusion Die Technology</i>	<i>Lip Opening Range</i>	<i>Additional Capabilities</i>
812.8mm (32") Ultraflex™ H40 Die	0.254-1.27mm (.010-.050")	Exchangeable Multiflow™ manifolds Single point adjustment sliding lip design Optional FastGap™ assembly may be installed
812.8mm (32") Ultraflex™ H40 Die	0.762-1.778mm (.030-.070")	
812.8mm (32") Ultraflex™ LRC100 Die	0.0254-7.62mm (001-.300")	
812.8mm (32") Ultraflex™ Die	0.0254-10.16mm (.001-.400")	Features the SmartGap™ Lip & Land Positioning System

<i>EDI® Coextrusion Technology</i>	<i>Additional Capabilities</i>
3 Layer Ultraflow™ V Feedblock	Adjustable feedblock allows for layer thickness changes
3 Layer Ultraflow™ V-T Feedblock	Adjustable feedblock allows for layer thickness changes and individual skin layer profiling capabilities
FastSelect™ Layer Sequencing Adaptor	Allows layer structures to be switched without shutting down production
Layer Multiplication Technology	Multiplication capabilities incremental up to 1,792 layers

Four Extruder Cast Film & Sheet Laboratory Line

<i>EDI® Extrusion Die Technology</i>	<i>Lip Opening Range</i>	<i>Additional Capabilities</i>
203.2mm (8") Ultraflex™ 40 Die	0.0254-1.016mm (.001-.040")	
<i>EDI® Coextrusion Technology</i>	<i>Additional Capabilities</i>	
3 Layer Ultraflow™ I Feedblock	Fixed feedblocks allow for highly precise layer ratio changes	
5 Layer Ultraflow™ I Feedblock		
Layer Multiplication Technology	Multiplication capabilities incremental up to 1,792 layers	





Slot Coating Trial Capabilities

Chippewa Falls, Wisconsin, USA

While most other slot die suppliers do not offer laboratory services, our fluid coating laboratories in Chippewa Falls and Shanghai offer you the opportunity to improve your existing slot die coating operation, try alternative slot die coating techniques, or investigate the switch from an altogether different process like roll coating. In all cases, you can run trials before investing in new equipment.

At the laboratory in Chippewa Falls, customers can take advantage of a multitude of tooling options to establish their desired ambient temperature coating process or use the installed Nordson VersaBlue® melter and lamination capabilities for hot melt, water-based, and solvent-based adhesive trials.

Chippewa Falls Laboratory Information

Processing Capabilities

Water-Based Solutions, Solvent-Based Solutions, UV Curables, Hot Melts

Line Speed

**Limited by dryer capacity*

1-40 meters/minute
(1-131 feet/minute)

Maximum Coating Width

Premier™ Fixed Lip Die

533mm (21")

Ultracoat™ Flexible Lip Die

400mm (16")

Maximum Substrate Width

584.2mm (23")

Maximum Unwinder Roll Diameter

600mm (23.6")

Fluid Delivery System Pump Options

Northern gear pump, Zenith gear pump, Waukesha lobe pump, progressive cavity pump, micro-gear pump, & pressure pot

Nordson VersaBlue® Melter

Maximum Melter Temperature

200°C (392°F)

Maximum Die Temperature

232°C (450°F)

Slot Coating Trial Capabilities

Shanghai, P.R. China

The global Nordson team has worked successfully with customers in developing coated products for pharmaceutical, textile, solar, window, battery, flooring, tape & label, filter membrane, optical display, biodegradable, and automotive applications.

The PPS Shanghai laboratory features a full-scale coating line with different tooling options, providing customers with an alternative option to shutting down their production to test a new coating or process. In addition, the Shanghai laboratory includes a laminating system and a delamination unit for adhesive coating applications.



Shanghai Laboratory Information

Processing Capabilities

Water-Based Solutions, Solvent-Based Solutions, UV Curables

Line Speed

**Limited by dryer capacity*

0.5-40 meters/minute
(1.6-131 feet/minute)

Maximum Coating Width

Premier™ Fixed Lip Die

533mm (21")

Ultracoat™ Flexible Lip Die

355mm (14")

Maximum Substrate Width

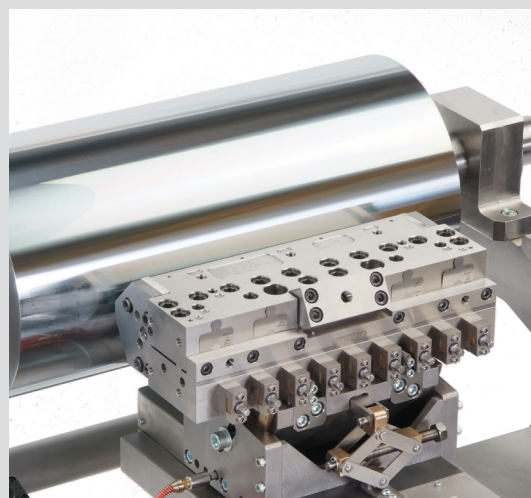
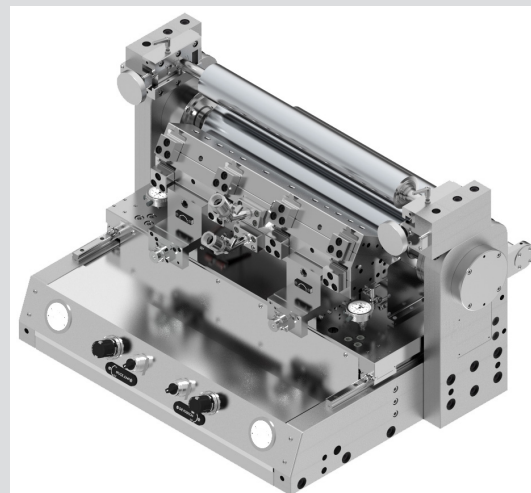
584.2mm (23")

Maximum Unwinder Roll Diameter

500mm (20")

Fluid Delivery System Pump Options

Barmag gear pump, Waukesha lobe pump, progressive cavity pump, micro-gear pump, & pressure pot



Slot Coating Trial Capabilities

Mobile Trial Equipment

Nordson offers a selection of mobile fluid coating units that may be rented for production or trial use. Customers looking to refurbish their existing slot coating system may benefit from using a Premier™ or Ultracoat™ rental unit to avoid lost production time, whereas companies interested in updating from their existing process to slot coating may test capabilities in their own controlled environment.

All coating units are available for global rental and shipment.

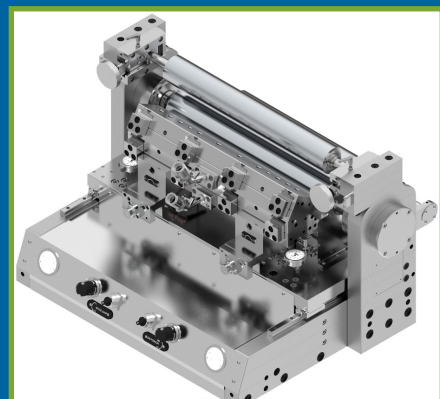
China

355mm (14") Ultracoat™ System

- Single Layer Flexible Lip Slot Die
- Modular Coating Station
- Suited for On-roll Coating (with Vacuum) or Tension Web Coating

533mm (21") Premier™ System

- Dual Layer Fixed Lip Slot Die
- Positioner
- Suited for On-roll Coating (with Vacuum) or Tension Web Coating
- Cored Holes
- Maximum Operating Temperature: 80°C (176°F)



Japan

355mm (14") Premier™ System

- Single Layer Fixed Lip Slot Die
- Dual Layer Fixed Lip Slot Die
- Positioner
- Suited for On-roll Coating (with Vacuum) or Tension Web Coating
- Cored Holes
- Maximum Operating Temperature: 80°C (176°F)



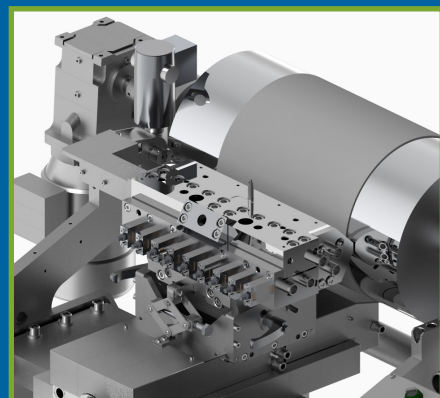
USA

355mm (14") Premier™ System

- Single Layer Fixed Lip Slot Die
- Positioner
- Suited for On-roll Coating (with Vacuum) or Tension Web Coating
- Cored Holes
- Maximum Operating Temperature: 80°C (176°F)

400mm (15.7") Ultracoat™ System

- Single Layer Flexible Lip Slot Die
- Modular Coating Station
- Suited for On-roll Coating (with Vacuum), Tension Web Coating, or Hot Melt Coating

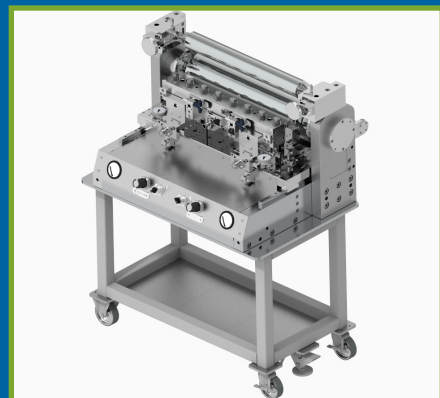


533 (21") Premier™ System

- Dual Layer Fixed Lip Slot Die
- Positioner
- Suited for On-roll Coating (with Vacuum) or Tension Web Coating
- Cored Holes
- Maximum Operating Temperature: 80°C (176°F)

550mm (21.6") Premier™ System

- Single Layer Fixed Lip Slot Die
- Positioner
- Suited for On-roll Coating (with Vacuum) or Tension Web Coating
- Cored Holes
- Maximum Operating Temperature: 80°C (176°F)



Several smaller single and dual layer slot dies are available in the USA and may be rented for use with a customer's installed positioning system.

Other Testing Services

EDI® Extrusion & Fluid Coating Die Systems

Nordson labs utilize analytical tools to provide customers with a full summary of trial findings. This includes equipment for analyzing film and sheet thickness, software for cross-sectional analysis, moisture measurement, and drying resin.

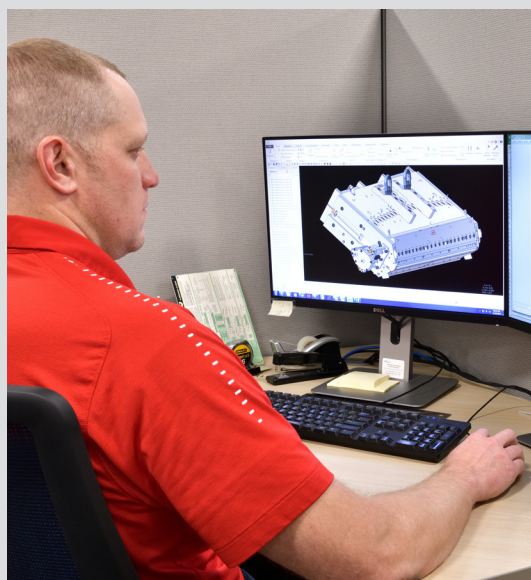
In addition to the equipment used for lab trials, our laboratories house the latest technology to ensure our equipment is built to the specifications necessary to provide the expected performance of your end product.

Dual Capillary Rheometer

- Dual bore capabilities allow for efficient rheological testing with an emphasis on the application of the Bagley Correction, as well as other rheological testing methods.
- With the ability to test for extensional/elongational viscosity, we can account for unique flow behavior materials with similar shear viscosities.
- We are better able to account for wall slip for some applications, such as PVC, which may include a range of plasticizers, oils, lubricants, and other additives, potentially affecting flow distribution and back pressure.
- The inclusion of advanced analysis software allows for detailed review of the rheological data, which ensures the accuracy of results while allowing for common corrections and fitting equations to be applied.
- With each application, material is tested and rheology data is used to ensure a proper mechanical design.

Whether designing a die system or assisting with a lab trial, Nordson provides the extensive knowledge necessary to help optimize your coating or extrusion process.

Your Process.
Our Technology.



Additional Technical Support Available from Nordson

Extrusion and fluid coating die systems are not only a strategic investment, but also a critical aspect in the overall success of your business. Nordson employs a team of field service technicians to offer processors and converters both on-site and remote technical support. The technical service team offers seven days a week scheduled or emergency call service based throughout the world to provide regional service and support.

These services include:

Installation & Start-up Assistance

Our technicians are available to assist with start-up, commissioning and process optimization.

On-site Inspections and Repairs

Our team provides on-site inspections, repairs and replacement of components and parts.

Operation and Maintenance Training

Profit from our experience and know-how in plastics processing by having our professionals train your staff. A team of Nordson experts tailors each program to fit your requirements. Training courses can be held at one of our technology centers or at your location.



Nordson Polymer Processing Systems Global Technology & Training Centers

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