Fixed Slot Dies & Coating Equipment

The Highest in Quality, Uniformity, and Performance

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Slot Die Coating Technology

Slot coating is a “pre-metered” system that applies an adhesive or coating to the web at a constant rate and permits precise control over coat weight and the cross-web distribution. Unlike “post-metering” methods, a uniform operating pump delivers the exact volume of fluid to maintain the desired wet film thickness on the substrate to be coated. The coating fluids may contain water, organic, or inorganic solvents. They may also be used without a solvent (100% solids).

There has been a strong increase in the expectations of coated products, leading coating companies to seek increased speeds, thinner coatings, and increased functional performance. Slot die technology helps coating companies improve precision, tackle new markets, and develop new processes.

Advantages to Fixed Slot Die Coating

Slot die coating has several advantages when compared to current roll-coating methods:

- Improved coat weight uniformity
- Increased production speeds
- Since all of the coating solution is applied to the web, there are no containments or bubbles introduced into the solution or emission of volatiles
- Ability to handle a wide range of viscosities, flow rates, and percent solids
- Coating weight can easily be controlled by adjusting fluid flow rate or line speed
- Capable of applying extremely thin coatings to a wide range of substrates
- Multiple coats can be applied simultaneously
- Ability to accommodate stripe and patch coating
The Leader in Fixed Slot Die Design and Manufacturing

Each Nordson Extrusion Dies Industries—Premier Coating Division fixed slot die is engineered in accordance with the anticipated throughput rates and the rheology of the fluid. Computer-aided engineering and machining is utilized to develop the complex internal contours of the manifold. The manifold is designed to deliver a uniformly distributed flow to the coating transfer gap region.

Our experienced technicians use state-of-the-art equipment to manufacture to exact tolerances. All dies are precision ground and hand lapped to ensure die flatness and straightness. The straightness, along with uniform lip faces and edges, results in a consistently finished product.

Each die includes a flatness inspection report. Measurements are taken in a “free state condition” (not clamped or supported with magnetic chucks) using a granite inspection table and precision instruments. Customers are invited to visit and verify inspection tolerances prior to shipment.

We undertake the design and manufacturing of complete slot die coating turnkey systems including: fixed slot dies, fluid delivery systems, vacuum systems, filtration systems, die coating stations, and other ancillary equipment.

Range of Capabilities

- **Die Flatness**: Our standard is 2.54 µm (0.0001”); however, we have the capability of manufacturing to a flatness of 0.5µm (0.00002”)
- **Coating Weight Accuracy**: +/- 1-2%
- **Coating Thickness**: .1µm (0.000039”) - 2,300µm (0.091”)
- **Die Coating Station**: In and out die position and an unmatched repeatability of +/- 1.25µm (0.00005”)
- **Die Width**: 6.35mm (0.25”) to 4,750mm (187”)
- **Coating Speeds**: 152mm/min (6.0”/min) - 914m/min (3,000 ft/min)
- **Fluid Viscosity**: 1-175,000cps
- **Number of Layers**:
  - Slot Dies: 1-3 Layers
  - Slot Curtain Dies: 1-3 Layers
  - Slide and Slide Curtain Dies: 1-10+ Layers

*Note: Above specifications subject to fluid rheology, fluid delivery system, and ancillary equipment.*
**Nordson Extrusion Dies Industries’ Premier Fixed Slot Dies**

At Nordson Extrusion Dies Industries, we use the most precise manufacturing techniques and equipment for building and measuring our slot dies in order to ensure top performance. Through precision grinding and hand lapping, each fixed slot die has precise straightness and flatness, in addition to an exceptionally uniform slot gap.

Nordson Extrusion Dies Industries’ Premier fixed slot dies are custom designed for a wide range of fluids (solvent and water based coating, slurries, paint, hard coating, UV curable, photovoltaic inks, adhesives, and magnetic media, to name a few). Easily alter the coating gap and width by changing shims in the die.

Nordson Extrusion Dies Industries can design and build a slot die coating station to be placed into a new or existing coating line. Die station set-ups include: floor mount, cartridge style, or table top.

**Die options include:**
- Replaceable lip inserts
- Multiple slots
- Cored holes for liquid tempering
- Hinges and die openers for easy cleaning

**Nordson Extrusion Dies Industries’ Premier Curtain and Slide Dies**

Curtain and slide coating is a low-impact premetered application method for coating. Each Nordson Extrusion Dies Industries—Premier Coating Division die is designed and manufactured to prevent irregular wetting lines and deliver a uniformly distributed coating.

Whether it is single or multi-layer slot coating, the advantages hold true for each style of die:

- Flexibility in coating design
- Wide operational latitude in terms of coating rheology
- Avoidance of issues such as heel formation and air entrapment that are particularly important at high application speeds
Nordson Extrusion Dies Industries’ Premier Slot Die Coating Stations

Slot die coating stations are used to accurately position a slot coating die. A precise coating station achieves repeatable, uniform, and accurate coatings. A coating station allows the die gap and angle of adjustment to be adjusted in order to optimize the coating process.

Slot die coating stations are designed to be placed into new or existing coating lines. Die station set-ups include: floor mount, cartridge style, and table top.

Features:

- Four axes of die adjustment available:
  - On/Off Roll Coating
  - Splice Jump
  - Skew Adjustment
  - Lip face angle of attack
- TIR of backing roll: 2.54µm (0.0001”)
- Unmatched fixed positioning repeatability of +/- 1.25µm (0.00005”)
- Vacuum box
  - Removes air and aids in controlling the bead
  - Allows the ability to coat further away from the backing roll

Nordson Extrusion Dies Industries’ Premier Fluid Delivery Systems

The fluid delivery system has to provide a non-pulsing, constant feed of fluid to the die. This important piece of equipment works in combination with an accurate line speed control to determine coat weight of the fluid.

- Gear pump, progressing cavity, peristaltic, diaphragm or pressure pot
- Cartridge style filters with stainless steel housings
- Holding tanks sized per customer requirements
- 3-way valves at die inlet allows circulation while die is off line
- Optional flow meter for volume flow, density, and temperature
**A Complete In-House Coating Lab Line**

A complete coating lab line is located at our Chippewa Falls facility. The lab line provides opportunities for companies looking to do product development or trial runs.

Our process engineers, with experience coating many different kinds of fluids and substrates, provide expert guidance for trials and testing.

- Coating line is in a clean, temperature-controlled room
- Working width: 19.69” (500mm)
- Roller width: 23.62” (600mm)
- Line speed: 1-200ft/min (1-60m/min)
- Web tension: 25-150N
- Dryer length: 120” (3m)
- Maximum Drying Temperature: 455°F (235°C)
- Infrared heater, embossing system, UV curing unit, delamination unit
- Fluid delivery and filtration systems

**On-Site Trial and Development**

On-site trials are ideal for process demonstrations and testing. Nordson Extrusion Dies Industries can perform coating trials at your facility using one of our mobile coating systems. We can supply a single or multi-layer slot die, die station, and fluid delivery system.
**Refurbishing and Remanufacturing Services**

Nordson Extrusion Dies Industries refurbishes and reworks extrusion and slot dies, including those from other die manufacturers, to get them back to performing at optimal levels.

**Available Slot Die Services Include:**

- Diamond lapping of:
  - Flat Flow Surfaces
  - Lip Faces
- Polishing of:
  - Contoured Flow Surfaces
- Precision micro-grinding of:
  - Flow/Seal Surfaces to Remove Any Scratches
  - Faces to Remove Any Scratches
  - Angles to Restore Lip Face Dimensions

**Slot Die Equipment Leasing**

Avoid large capital purchases by leasing slot die equipment from us. Nordson Extrusion Dies Industries—Premier Coating Division has single and dual layer slot dies, die stations, and fluid delivery systems for lease. Leasing costs vary depending on type of equipment leased and the duration of the lease. Please contact your local sales representative for more information.