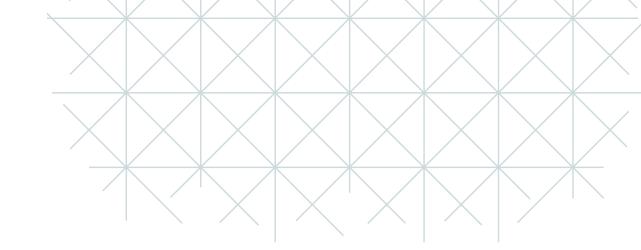


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DISCOVER SLOT-DIE COATING

Industrial history

Slot-die coating is a proven technology for the precise, scalable production of thick and thin films of almost any material. It was originally invented in the 1950's and is widely used in commercial roll-to-roll manufacturing of photographic films, Li-ion batteries, ceramic capacitors and many other products.

R&D applications

Many of tomorrow's most transformative technologies - such as perovskite solar cells, batteries, fuel cells, electrolyzers, quantum devices, biomedical and microfluidic devices - depend on the ability to deposit high-quality, uniform thin films.

Yet, most conventional lab-scale coating methods fail to deliver the precision, reproducibility, and scalability demanded by today's R&D professionals. Slot-die coating unlocks this potential — and FOM Technologies is an industry leader in making this powerful technology available from lab-scale to pilot-scale form, empowering researchers to accelerate discoveries and bring breakthrough innovations closer to reality.



Energy harvesting using solar cells and triboelectric generators



Energy storage using Li-ion and solid-state batteries as well as super capacitors



Smart thin films for optics, electronics and optoelectronics



Medical diagnostics and drug delivery using microfluidic labon-a-chip and functional coatings



Power-to-X technologies for green energy generation and carbon capture



Diverse applications in additive manufacturing, protective coating and packaging

DISCOVER SLOT-DIE COATING

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Energy harvesting

Coating thin films for next-gen solar cells like OPV and perovskites — enabling flexible, lightweight energy solutions.



Energy conversion and storage

Supporting batteries, fuel cells, and supercapacitors with precise layers for high-efficiency energy systems.



Carbon capture (D-A-C)

Enabling scalable coating of sorbent and catalytic layers for direct air capture and carbon conversion technologies.



Printed electronics

High-precision deposition for LEDs, OLEDs, semiconductors, and sensors in flexible and wafer-based electronics.



MedTech

Functional coatings for diagnostics, biosensors, drug delivery, and antimicrobial surfaces in advanced MedTech.



Paper / packaging

Barrier layers, membranes, and dissolvable films for sustainable packaging and smart paper applications.



Defense

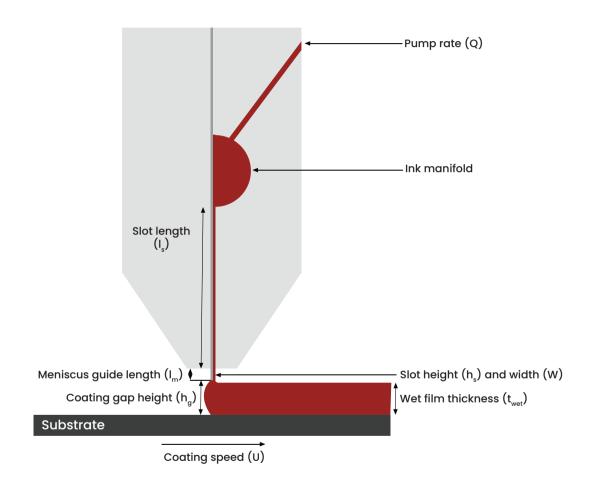
Thin-film solutions for energy storage, anti-reflective surfaces, and flexible solar in rugged, mission-critical defense systems.



Advanced materials science

Uniform coatings for SAXS/WAXS/GIWAXS and synchrotron studies — ideal for structural and insitu material charatization.

THE BASICS





How it works

Slot-die coating works by dissolving a desired thin film material into a coatable solution. This solution is pumped into the slot-die head component, where it becomes uniformly spread along the desired coating width. This results in controlled, continuous thin film production at the slot-die outlet, where the solution is received by a moving substrate. Because all of the solution that exits the slot-die ends up on the substrate, an optimized slot-die coating process affords nearly 100% material efficiency and allows us to pre-determine the film thickness simply by controlling the pump rate and substrate speed.

Our benefits in thin film R&D

- Uniform film thicknesses from 10 nm to >500 μm
- Quick to start & easy to use
- Simple, predictable film thickness control
- Easily scaled from a few cm² to tens of m² per minute
- Compatible with almost any material and viscosity
- Continuous, non-contact thin film coating process
- Closed system protects your materials
- More precise, efficient and scalable than spin coating, blade coating, screen printing, and ink-jet printing
- Compatible with R2R and S2S production methods
- Demonstrates upscaling and commercial potential for new processes
- Can downscale large processes for rapid iteration





Compared to conventional lab-scale techniques, slot-die coating offers unmatched control, flexibility and scalability for a wide range of thin film research applications.

PARAMETER	SPIN COATING	BLADE COATING	INK-JET PRINTING	SLOT-DIE COATING
Thickness range	~ 10 nm - 100 μm	~ 1 - 100 μm	10 - 300 nm	~ 10 nm - 1000 μm
Coating speed (m/min)	-	0.1 - 1,500	< 1	0.1 - 500
Max. coating area (cm²)	ca. 1500	ca. 5000	-	Unlimited in roll-to-roll process
Viscosity range (cP)	< 1,000	100 - 40,000	5 - 20	< 20,000*
Layer uniformity (%)	< 5	< 10	< 5	< 5
Web roughness effect	-	Large	Small	Small
Throughput method	Batch	Continuous	Continuous, intermittent and batch possible	Continuous, intermittent and batch possible
Delivery method	Volumetric, pre-metered	Mechanical, self-metered	Volumetric. pre-metered	Volumetric. pre-metered
Material waste	Very high	Moderate	Low	Very low
Thickness Predictability	Moderate	Moderate	Moderate	High

Best performance

^{*}Viscosity range depends on whether the application uses solution-based slot-die coating or melt-based extrusion. Extrusion, compatible with slot-die systems, handles significantly higher viscosities.



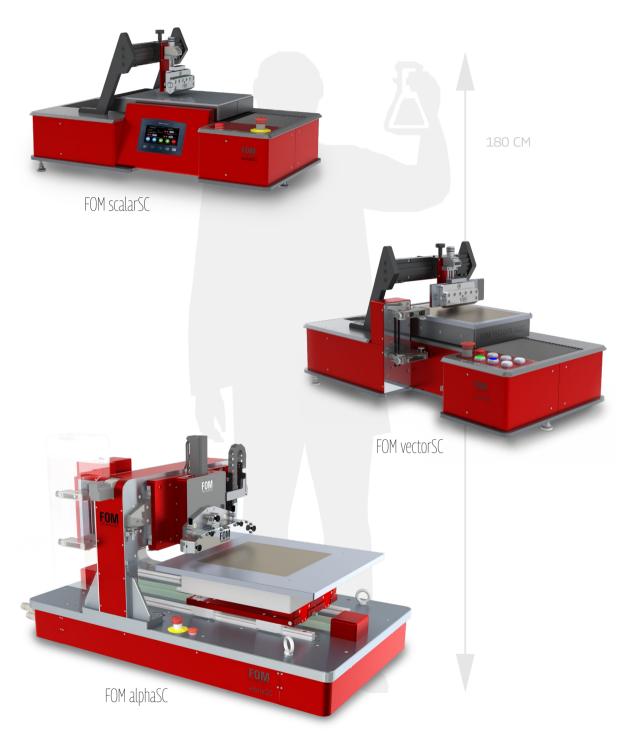
Coating solutions

High-quality sheet-based machines

FOM Technologies' sheet-based slot-die coating machines set the standard for precision and versatility in thin-film research. Engineered in Scandinavia and built from the highest quality materials, all models are easily integrated with fume hoods and glove boxes, ensuring seamless operation in advanced laboratory environments.

These systems support coating on substrates 1 mm up to 500 mm in width, and feature a microporous vacuum chuck* for optimal substrate fixation and flatness. Servo motors enable vibration-free, high-precision movement, while heated substrate holders (up to 200 °C) and heated slot-die heads (up to 80 °C)* expand process flexibility. Combined with intuitive coating software, the result is a highly flexible, precise, and user-friendly platform for reliable research outcomes.

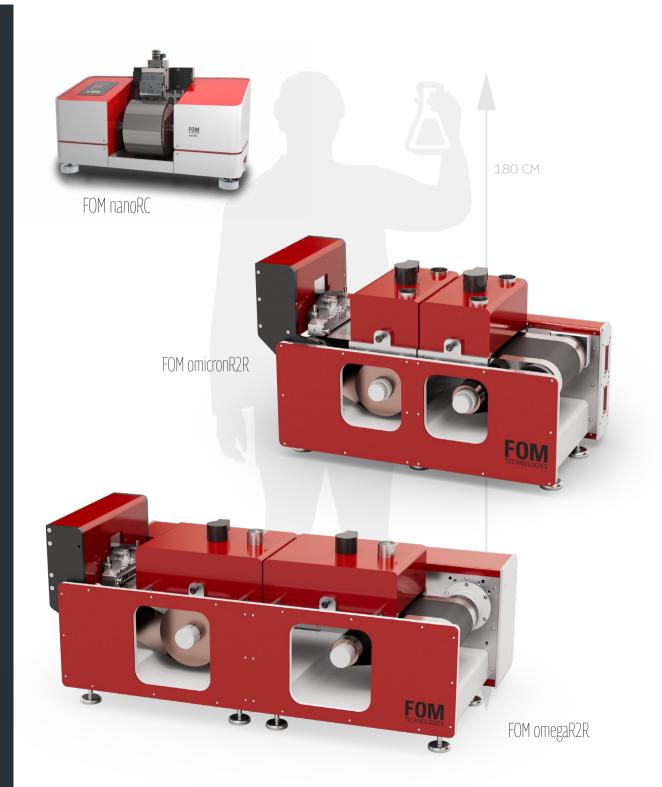
*Upgrade option for FOM scalarSC



Coating solutions

High-quality roll-based machines

FOM Technologies' roll-based and roll-to-roll slot-die coating machines are designed to bridge the gap between lab-scale research and pilot-scale production. From compact lab-scale systems for early-stage material development to larger, modular pilot-scale platforms, our equipment enables researchers to seamlessly scale their processes without compromising precision or reproducibility. Built for flexibility, all systems are highly modular, allowing easy adaptation to evolving research needs and integration of additional functionalities. With FOM Technologies, scaling up from fundamental research to pilot production becomes efficient, reliable, and ready to meet the challenges of next-generation thin-film innovation.







FOM scalarSC

Product description

The FOM scalarSC is the ideal entry point to begin scalable coating of functional thin films and devices. The FOM scalarSC has been designed to allow easy control over coating on rigid and flexible substrates while requiring a fraction of the cost and physical footprint. By leveraging years of experience in materials research and slot-die coating, the FOM scalarSC provides the necessary freedom through a simplified design for everyday experimental runs. The FOM scalarSC offers excellent precision and reproducibility for a wide spectrum of lab-scale materials and coating processes relevant to industry and academia.

Key features

- Uniform dry film thickness from nm to μm
- Coating width from 1 mm to 200 mm
- Designed for fluids up to 20,000 cPs
- Semi-automated coating via intuitive touch panel
- Designed for rigid and flexible substrates
- Built-in hotplate for drying
- Seamless fume hood and glove box integration
- Plug-and-play installation
- Integrated stand-alone syringe pump



Sheet-based 200x300 mm



≤200mm width



50 kg



Up to 2 m/min



Slot-die up to 80 °C Chuck up to 200 °C



Options available





Sheet-based 200x300 mm



≤200mm width



71 kg



Up to 5 m/min



Slot-die up to 80 °C Chuck up to 200 °C



Options available



FOM coating software



FOM vectorSC

Product description

The FOM vectorSC has been designed from the ground up to allow easy control over coating on rigid and flexible substrates. By integrating industry-grade components and user-friendly recipe features, the FOM vectorSC provides a seamless, accelerated user workflow and excellent control for coating various active materials. It is an ideal solution for users aiming to bridge the gap between fundamental research and pilot-scale production, emphasizing versatility and compatibility for various substrates and coatings.

- Uniform dry film thickness from nm to μm
- Coating width from 1 mm to 200 mm
- Microporous vacuum substrate holder
- · Automated coating via intuitive GUI
- Remote access from a PC or Tablet
- Quick-action buttons
- Designed for rigid and flexible substrates
- Integrated Pump with software-controlled wet film thickness
- Designed for fluids up to 20,000 cPs
- Built-in hotplate for drying
- Fume hood and glove box integration
- Remote support and troubleshooting
- Motorized slot-die head positioning (Option)

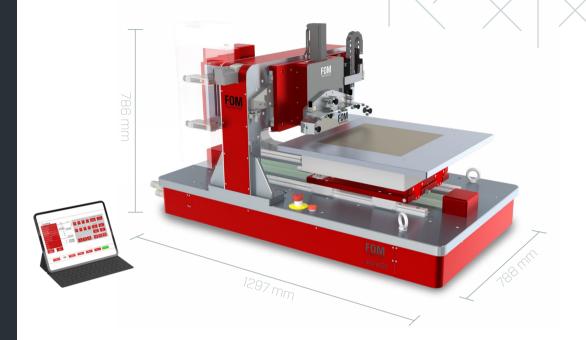
FOM alphaSC

Product description

The FOM alphaSC represents the ultimate combination of control, functionality, and versatility in thin-film research and production. All its hardware, software, and premium features have been tailored to eliminate experimental error and increase usability with flexible and rigid substrates. The FOM alphaSC provides users with unmatched versatility, precision, and process reproducibility for a broad spectrum of lab-scale materials and coating processes relevant to industry and academia.

Key features

- Uniform dry film thickness from nm to μm
- Coating width from 1 mm to 500 mm
- A microporous vacuum substrate holder
- Automated coating via intuitive GUI
- Remote access from a PC or Tablet
- Local saving of coating protocols
- Quick-action physical buttons
- Integrated pump with software controlled wet film thickness
- Designed for rigid and flexible substrates
- Substrate, slot-die head, and syringe heating
- 2-axis motorized slot-die head positioning
- Designed for fluids up to 20,000 cPs
- Fume hood and glove box integration
- Remote support & troubleshooting





Sheet-based 500x470 mm



≤500mm width



166 kg



Up to 5 m/min



Slot-die up to 80 °C Chuck up to 200 °C



Options available



FOM coating software





Roll-based ≤500mm length



≤100mm width



19 kg



Up to 2 m/min



Slot-die up to 80 °C Roll up to 160 °C



FOM nanoRC

Product description

The FOM nanoRC is the ideal entry point to begin scalable coating of functional thin films and devices. The FOM nanoRC has been designed to mimic the complex coating processes achieved on large scale roll-to-roll machines, while requiring a fraction of the cost and physical footprint. By leveraging years of experience in materials research and slot-die coating, the FOM nanoRC provides users with a simple route to precise, repeatable and scalable thin film production from any solution or slurry based precursor.

- Non-contact coating within µm precision
- Uniform dry film thickness from nm to μm
- Coating width from 1 mm to 100 mm
- Excellent layer uniformity and repeatability
- Designed for flexible substrates
- Semi-automated coating via intuitive touch panel
- Built-in hotplate for drying
- Integrated drying cartridges
- Seamless fume hood and glove box integration
- Plug and play installation

FOM omicronR2R

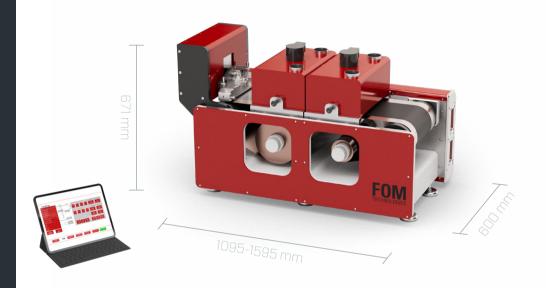
Product description

The FOM omicronR2R is a compact, versatile R2R slot-die coater. Its modular design and multiple drying options enable seamless adaptation to evolving research needs to safeguard your investment.

The FOM omicronR2R enables researchers to accelerate and perfect their processes at lab-scale using formats common to pilot-scale.

Key features

- Small footprint roll-to-roll slot-die coater
- Seamless fume hood and glove box integration
- Fully motorized coating bridge
- Non-contact coating with µm precision
- Coating width from 1 mm to 200 mm
- Intuitive coating software and recipe control
- Modular oven system (Hot air, IR, UV, hot air/IR) sections of 250 mm or 500 mm.
- Software-controlled syringe pump
- Excellent layer uniformity and repeatability
- Remote support & troubleshooting
- Broad viscosity range







≤200mm width



150-225 kg



Up to 3 m/min



Slot-die up to 80 °C Ovens up to 200 °C



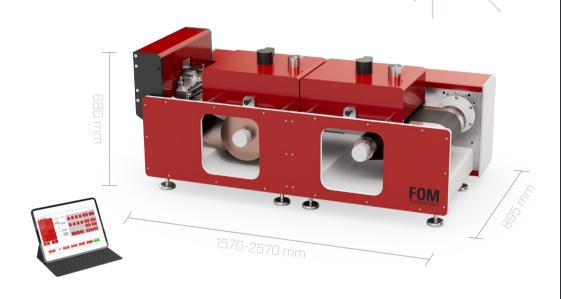
Options available



FOM coating software



Modular





Roll-to-roll



≤300mm width



265-300 kg



Up to 5 m/min



Slot-die up to 80 °C Ovens up to 200 °C



Options available



FOM coating software



Modular

FOM omegaR2R

Product description

The FOM omegaR2R is a versatile lab-scale roll-to-roll slot-die coater designed to replicate pilot-scale coating processes with precision, reproducibility, and scalability. Its modular design and multiple drying options (IR, UV, hot air) enable seamless adaptation to evolving research needs to safeguard your investment.

The FOM omegaR2R enables researchers to accelerate and perfect their processes, thereby bridging the gap between lab-scale research and pilot-scale production.

- Desktop roll-to-roll slot-die coater
- Fully motorized coating bridge
- Non-contact coating with µm precision
- Coating width from 1 mm to 300 mm
- Intuitive coating software and recipe control
- Modular oven system (Hot air, IR, UV, hot air/IR) sections of 250 or 500 mm.
- Software-controlled syringe pump
- Excellent layer uniformity and repeatability
- Remote support & troubleshooting
- Broad viscosity range

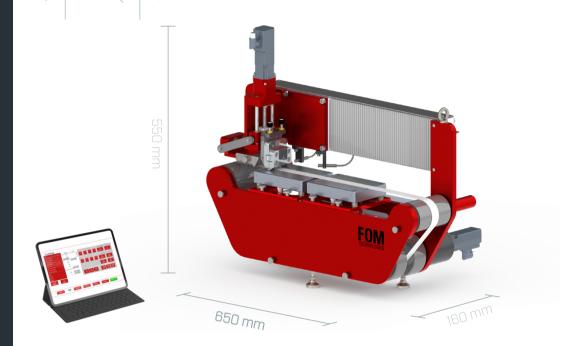
FOM photonR2R

Product description

The FOM photonR2R epitomizes the compactness, control, functionality, and versatility of slot-die coating machinery in thin-film research. Designed for placement within synchrotron beam lines, it facilitates in situ material characterization studies. Its compact size makes it suitable for fume hood use before synchrotron experiments and it can easily be moved around. All components, software, and premium features are optimized for remote control, allowing you to optimize data collection. Offering unparalleled versatility, precision, and process reproducibility, the FOM photonR2R is ideal for a wide range of lab-scale materials and coating processes relevant to both industry and academia.

Key features

- Roll-to-roll and sheet-to-sheet coating modes
- Non-contact coating within µm precision
- Uniform dry film thickness from nm to μm
- Coating width from 1 mm to 50 mm
- Microporous vacuum substrate holder
- Self-cleaning slot-die system
- Automated coating via intuitive GUI
- Remote access from PC or tablet
- Designed for both rigid and flexible substrates
- Interchangeable substrate holder, tailored to the users' needs
- Advanced liquid heating for rheology control
- Designed for fluids up to >20,000 cPs
- Excellent layer uniformity, and repeatability
- Seamless fume hood and glove box integration
- Remote support & troubleshooting





Sheet-based



Roll-to-roll



≤300mm width ≤50mm width



22 kg



Up to 5 m/min



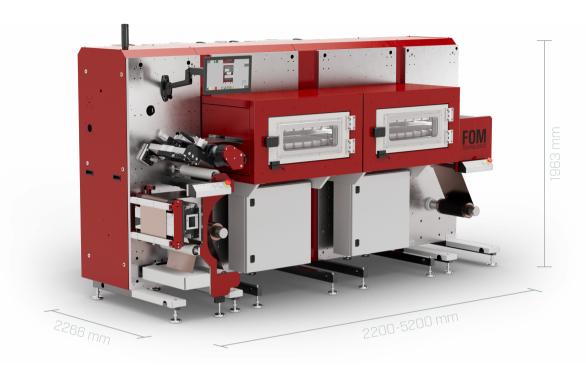
Slot-die up to 80 °C Chuck up to 200 °C



Options available



FOM coating software





Roll-to-roll



≤300mm width



300-800 kg per module



Up to 10 m/min



Slot-die up to 80 °C Ovens up to 200 °C



Options available



Modular



FOM compact moduloR2R

Product description

The FOM compact moduloR2R is a cost-efficient, high-throughput roll-to-roll slot-die coating system designed for pilot-scale R&D. Its modular design allows for selecting and integrating a broad range of pre- and post-coating options and metrology add-ons. This makes the compact moduloR2R ideal for slot-die coating a wide range of functional materials such as battery electrodes, fuel-cell membranes and flexible solar cells and other thin films up to 300mm in width. Furthermore, the compact moduloR2R can be expanded and adapted to future requirements as they evolve, which safeguards your investment also in the longer term.

- Roll-to-roll slot die coater with up to 300 mm coating width
- Continuous, non-contact coating process with μm precision
- Uniform and reproducible dry film thickness from nm to μm
- Motorized height and tilt adjustment of slot-die head positioning (+/- 1 µm)
- Adjustable coating angle (0-90°)
- Intuitive graphical user interface
- Advanced coating software
- Compact and modular design
- Multiple drying and curing options
- Bi-directional web handling and tension control
- Convenient and easy roller replacement
- Remote support and troubleshooting

FOM moduloR2R

Product description

The moduloR2R represents a highly flexible, modular R2R line that can be used as a basis for diverse pilot-scale coating applications. Ovens, web guide, web cleaners, plasma treatment, gas knives and many other printing or coating modules can be integrated and configured as required. Each moduloR2R is a unique construction built on a standardized platform, designed in close collaboration with our clients to deliver an R2R pilot line that meets their specific requirements.

Key features

- Continuous, non-contact coating process
- Coating with μm precision
- Uniform dry film thickness from nm to μm
- Adjustable slot-die head contact angle
- Double-sided coating
- Automated coating via intuitive GUI
- Local and cloud coating protocol saving
- Modular design for optimized process
- Two directional wind and unwind capability
- Full web, tension via servo-controlled system
- Convenient and easy roller replacement
- Excellent layer uniformity, and repeatability
- Alignment of multiple layers
- · Remote support and troubleshooting





Roll-to-roll



≤500mm width



300-800 kg per module



Up to 20 m/min



Slot-die up to 80 °C Ovens up to 200 °C



Options available



Modular

FOM SD 25-200 | Steel series

Product description

FOM Technologies slot-die heads are engineered for precision, durability, and seamless integration with FOM coating machines. Made from 316L stainless steel, they ensure superior flatness, thermal and mechanical resistance, and passivated corrosion protection, ideal for high-performance thin-film applications.

Available in standard and high-viscosity versions, these lightweight yet robust heads support a wide range of film types, with flexible options for size, mass flow, shim thickness, and stripe patterning, delivering reproducible, high-quality coatings with ease.

Key features

- · Outstanding precise and consistent flow control
- Designed for guick and easy installation
- Flexibility with varied shim thicknesses and stripe patterning options, facilitating different film applications
- Lightweight yet durable design without compromising structural integrity or performance
- Minimizes material waste with a low dead-volume design
- Provides uniform coatings and easily customizable coating patterns with tailored shims and guides
- Seamlessly integrates with all FOM coating machines
- Easy assembly, disassembly, cleaning, and maintenance create a hassle-free user experience
- Adaptable design with or without a meniscus guide for versatile coating applications



FOM SD 25 | Steel series Coating width 1 to 25mm







FOM SD 100 | Steel series Coating width 1 to 100mm

FOM SD 200 | Steel series Coating width 1 to 200mm





FOM SD 25 | PEEK series

Coating width 1 to 25mm





FOM SD 100 | PEEK series

Coating width 1 to 100mm

FOM SD 200 | PEEK series Coating width 1 to 200mm



FOM SD 25-200 | PEEK series

Product description

FOM PEEK slot-dies are cutting-edge solutions designed for precision coating applications in harsh conditions. Crafted from Polyetheretherketone (PEEK), this advanced FOM slot die embodies exceptional thermal stability, chemical resistance, and mechanical durability. Engineered to withstand high temperatures and harsh chemical environments, it ensures consistent, high-quality coatings while offering longevity and reliability in diverse industrial settings.

- Engineered for effortless disassembly, assembly and cleaning
- Custom shim and meniscus guide designs
- Adaptable design with or without a meniscus guide for versatile coating applications
- Facilitates precise FOM alignment design for reliable shim and meniscus guide positioning
- Includes light weight, high quality protective flight case for shipping and storage
- Exceptional thermal resistance allows the slot die to withstand high temperatures encountered during coating processes without significant degradation
- Highly resistant to a wide range of chemicals, making the slot die suitable for use with various coating materials
- Low friction characteristics reduce wear and frictional losses during coating processes, contributing to longer operational life and minimized maintenance requirements

FOM SD 300 and FOM SD 500

Product description

The FOM SD 300 and FOM SD 500 slot-die head embodies cutting-edge coating technology tailored for a wide range of ink rheology. Crafted from resilient steel for stability and precision, it features an innovative, lightweight design that enhances maneuverability. This state-of-the-art equipment available in standard and high viscocity boasts minimal dead volume, effortless coating width adjustments, and surfaces treated for chemical resistance, ensuring both durability and ease of maintenance in diverse production settings.

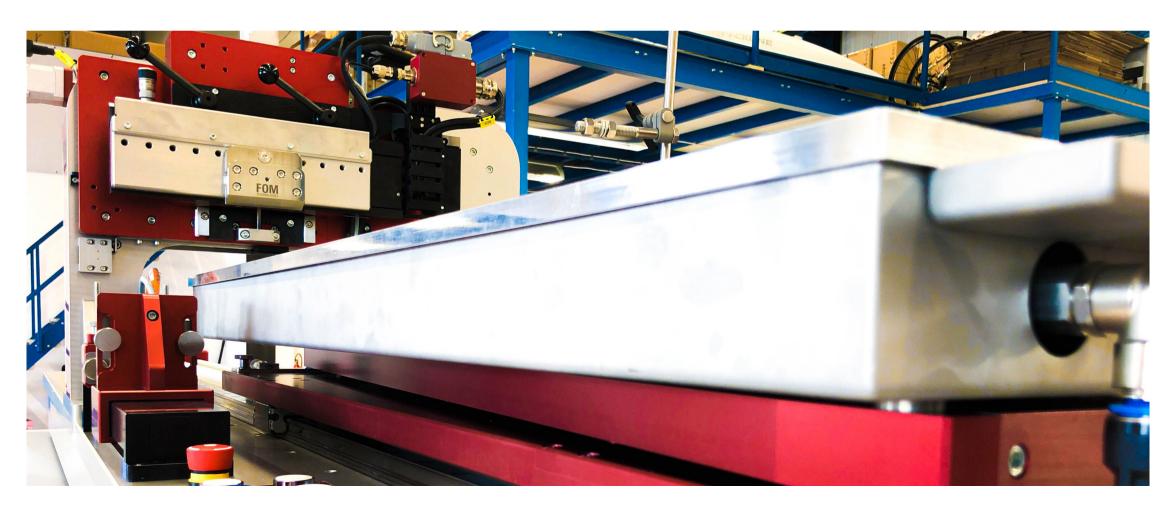
- Engineered for effortless disassembly, assembly and cleaning
- Custom shim and meniscus guide designs
- Lip protection on slot die supports self-standing feature, aiding manufacturing processes
- Adaptable design with or without a meniscus guide for versatile coating applications
- Facilitates precise FOM alignment design for reliable shim and meniscus guide positioning
- Includes light weight, high quality protective flight case for shipping and storage
- Integrated pressure gauge enhances functionality
- Cost effective large area coatings
- Built with innovative lightweight materials, allowing for easy handling and maneuvering without compromising stability or precision





Custom projects

At FOM Technologies, we understand that thin film researchers represent a huge variety of subject areas, goals and needs. We design our tools with a researcher-centric mindset to meet as many of these needs as possible with our standard configurations. Even so, customizations are sometimes required to enable processes that wouldn't otherwise be possible. In these cases, we pride ourselves on our ability to adapt our designs, or even design entirely new tools from the ground up to meet the needs of our clients. Whether you require custom dimensions, multiple coating stations, in-line processing and characterization, or something new altogether, we welcome all requests and look forward to the chance to bring your custom project to life.



Master slot-die coating with guidance from FOM's PhD experts

At FOM Technologies, we believe that mastering slot-die coating requires more than just equipment, it requires expertise. That's why our training programs are led by our team of Ph.D scientists, who bring deep knowledge and hands-on experience to help you optimize your thin-film research and production. Whether you're a newcomer or an advanced researcher, we offer tailored training and research sessions that cover everything from basic machine operation, advanced process optimization to commissioned research.

We partner with state-of-the-art research facilities around the world, offering hands-on experience with cutting-edge slot-die coating equipment. For maximum flexibility, we also provide live online training and on-site scientific consultation to support researchers wherever they are.

Whether you are looking for fundamental training, advanced process optimization, or a deep dive into thin-film deposition, FOM Technologies provides the expertise and resources to help you succeed.











Key benefits

- PhD expertise Train and consult with leading slot-die coating scientists.
- Hands-on training Practice with real equipment on-site or online.
- Tailored support Customized guidance for your materials and processes.
- Process optimization Enhance uniformity, reproducibility, and scalability.
- Flexible learning Online, on-site, or at our Copenhagen lab.
- High-Tech facilities Work with cutting-edge slot-die coating equipment.
- Faster innovation Minimize trial and error with expert insights.
- Maximized investment Unlock the full potential of your FOM machine.
- Ongoing support Continued expert guidance after training.



European collaborations & funded programs

- **SuPerTandem:** Sustainable materials and manufacturing processes for the development of high efficiency, flexible, all-Perovskite Tandem photovoltaic modules with low CO2 footprint
- **Pepperoni:** Pilot line for European production of perovskite-silicon tandem modules on industrial scale
- **Batmachine:** Boosting Europe's sustainable battery cell industrial manufacturing value chain by developing optimized machinery with intelligent control processes to minimize costs, scrap, and energy consumption
- MissionBooster: In-line characterization system to improve the quality and reproducibility of slot-die-coated polymer electrolyte membranes
- QualSurf: Focusing on quality monitoring system for roll-to-roll fabricated functional surfaces and multilayer structures.

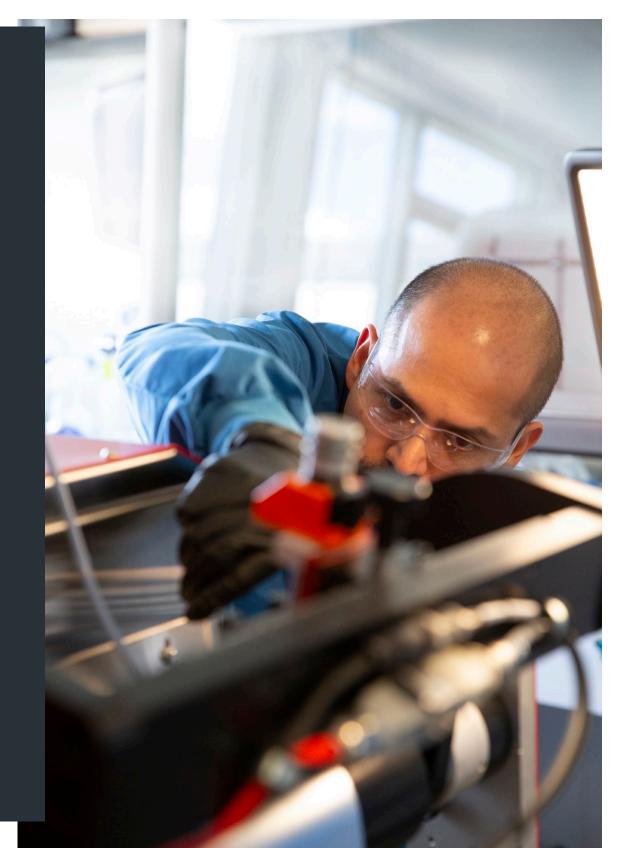








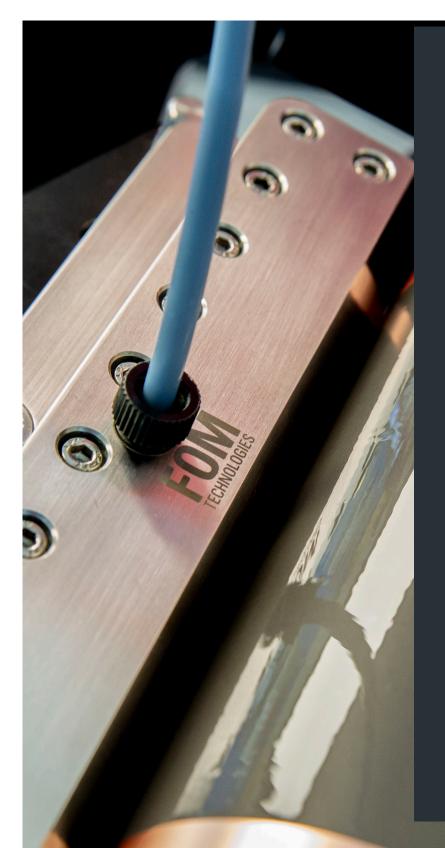
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Global partnerships

FOM Technologies supports researchers globally through a dedicated network of offices, showrooms, training facilities, and trusted distributors. From expert-led workshops to hands-on demonstrations, we ensure that scientists and engineers worldwide gain the knowledge and precision needed to accelerate their research.



HECHNOLOGIES

Scaling research & innovation of future materials

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