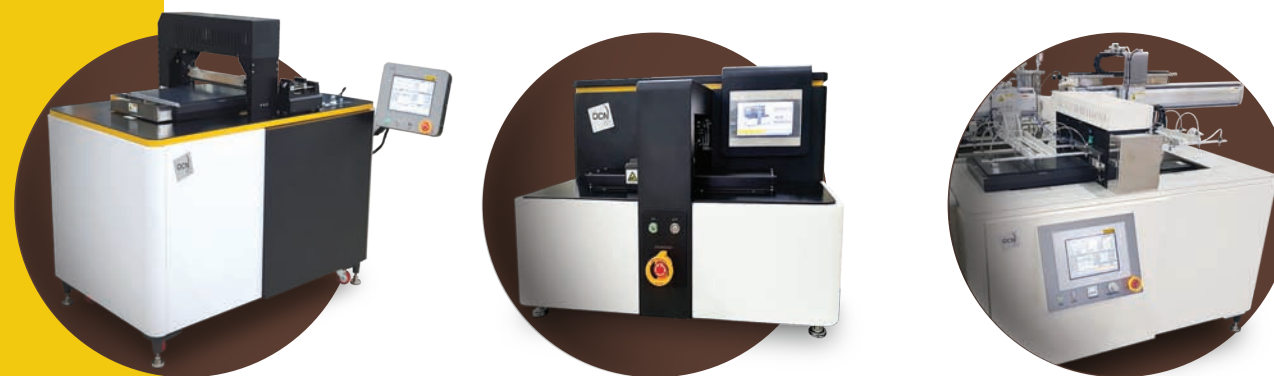




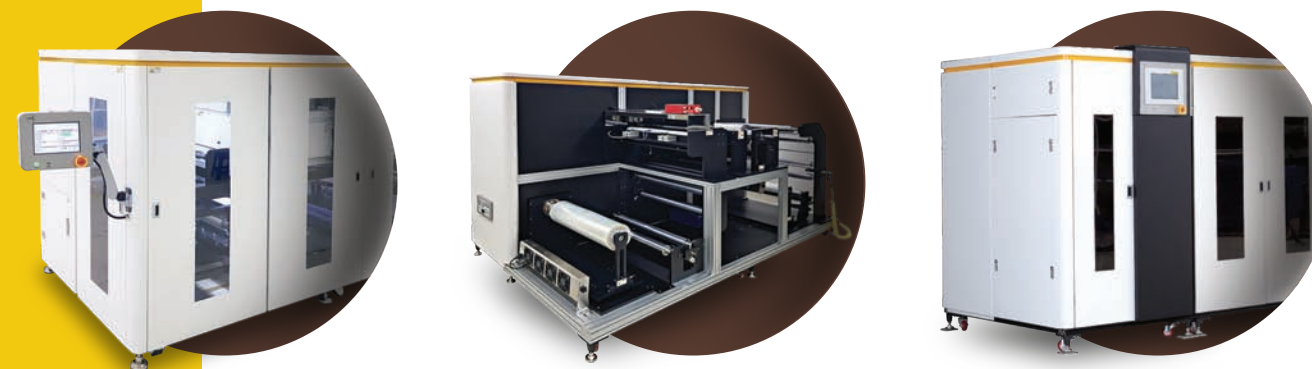
13-19, Techno 2-ro, Yuseong-gu, Daejeon, Republic of Korea

TEL : 82-42-933-7970 | FAX : 82-42-862-7973 | E-MAIL : dcn-sales@dcnano.com

www.dcnano.com



SLOT DIE COATING SOLUTION



LAB, Pilot & Mass Production / Sheet & R2R Type Equipment

www.dcnano.com

DCN Co., Ltd. has the best specialists in the slot die, coater design, and manufacturing.

Since its foundation in 2007, DCN Co., Ltd. has challenged the global printing equipment market through ceaseless technical development and innovation. We always think of our customers' needs and strive to solve them for sustainable growth.

Based on the best slot die design and manufacturing technology, we have directly designed and manufactured sheet type and R2R continuous process equipment by applying various printing processes.

We have secured world-class technical capabilities in the coater field such as slot die coating and micro gravure coating, and our patented slot die design and manufacturing technology has been recognized for its performance and expertise.

Based on our passion, DCN Co., Ltd. will continue to set out the vision of connecting our knowledge, technology, and solutions with our customers to be an optimal printer, and will move forward with to become the best coater company in Korea.

DCN Co., Ltd. will do its best to grow into a company that puts the value of its customers first, create happiness for employees and their families, and for the community.

Thank you.

HISTORY

| | |
|------|---|
| 2020 | Selected as a promising small and medium-sized enterprise for export by the Ministry of SMEs and Startups |
| | Delivery of R2R Micro-gravure coating system for secondary batteries & hydrogen fuel cells |
| | Delivery of R2R slot die coating system for ESS |
| | Export of smartphone back cover deco film mass production equipment (Vietnam-2nd) |
| 2019 | Delivery of R2R System for holographic coating for security |
| | Export of smartphone back cover deco film mass production equipment (Vietnam-1st) |
| | Selected as a company specializing in material parts by the Ministry of Industry, Trade and Resources |
| 2018 | Hyundai Mobis company registration |
| | Delivery of R2R System for Quantum Dot displays |
| | Design registration (R2R System, LAB coater) |
| 2016 | Delivery of PI coating R2R system for mass production |
| | Delivery of R2R Dip Coating System for manufacturing ion cured film |
| 2015 | LG Chem manufacturer partner registration |
| 2014 | Samsung Electronics partner registration |
| 2013 | Hyundai Motor partner registration |
| 2012 | Slot Die patent registration |
| | Slot Coater patent registration |
| | Table Slot Die Coater development |
| 2011 | R2R Slot Coating System development |
| 2010 | Kolon Industry partner registration |
| | Samsung Electro-Mechanics partner registration |
| 2008 | Relocation of head office (Daedeok Techno-Valley) |
| 2007 | DCN Co., Ltd. incorporated |
| | R&D Center established |
| | Venture company registration |
| | Gold prize winning for RED DOT DESIGN AWARD |



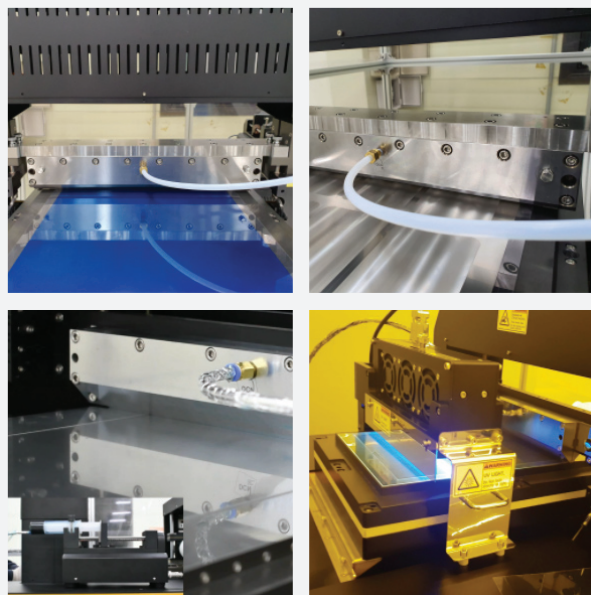
SHEET TYPE TABLE SLOT DIE COATER

INFORMATION

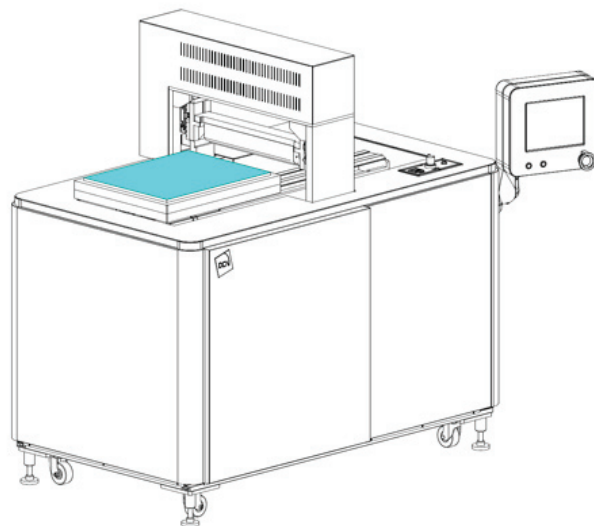
- Sheet type precision coater with accumulated core technology and patented technology for slot die coating
- Applicable to various industrial fields such as secondary battery, FCCL, optic, display, PSV, Perovskite, OPV and mobile Deco film
- A wide range of coatings including low-viscosity (10 cps) thin-film coatings and to high viscosity (100,000 cps or above) by manufacturing the slot die itself through CFD flow analysis.
- Realization of high-precision coating function with ultra-precision plate and motion drive and coating-dedicated control technology
- Able to provide metering pump solutions suitable for coating solutions

SPECIFICATION

| MODEL | TSDC210 | TSDC370 |
|----------------|-----------------------------------|----------------------|
| SUBSTRATE AREA | 210 x 297 | 370 x 470 |
| COATING WIDTH | 200mm | 360mm |
| SPEED | 200mm/sec | 200mm/sec |
| PUMP | Syringe Pump | Syringe Pump |
| SIZE | 1250 x 800 x 1300(H) | 1250 x 940 x 1470(H) |
| OPTION | Metering Pump, UV Cure, Hot Plate | |



SCHEMATIC DRAWING



SHEET TYPE LAB SLOT DIE COATER



INFORMATION

- Sheet type small coater that is easy to install, move, and operate and is optimized for Lab Scale
- Available for slot die coating at low (10cps) and medium viscosity (1000cps) coating solution, minimize material loss and secure economics
- Available for easy coating and acquiring process condition data with several touch operations
- Available for Glove Box integrated model to maintain experiment environment
- Reproducibility through precise stage position control by servo motor and automatic height adjustment of slot die
- Application of slot die design through CFD and built-in precision Syringe pump

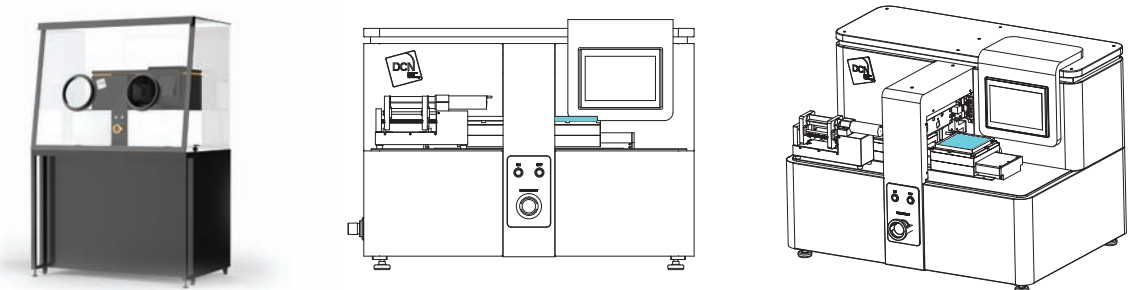
SPECIFICATION

| MODEL | LSDC100 |
|----------------|--------------------|
| SUBSTRATE AREA | 100 x 100 |
| COATING WIDTH | Max. 90 |
| SPEED | Max 50mm/s |
| PUMP | Syringe Pump |
| SIZE | 825 x 600 x 600(H) |
| OPTION | Bar. Blade |

* Glove Box built-in model available



SCHEMATIC DRAWING



SHEET TYPE PILOT SLOT DIE COATER

INFORMATION

- Sheet Type coater applicable in high-speed mass production lines
- Optimization of automatic process function for mass repetitive production process and application of automatic cleaning function of slot die discharge parts
- High-speed and precision coating for pilot & mass production process
- Providing an automated system for all processes such as loading - pre-treatment - coating - drying/curing - unloading
- Optimization for easy and stable precision pump system for intermittent and sheet coatings
- Optimization of high-speed coating process for Tact Time management

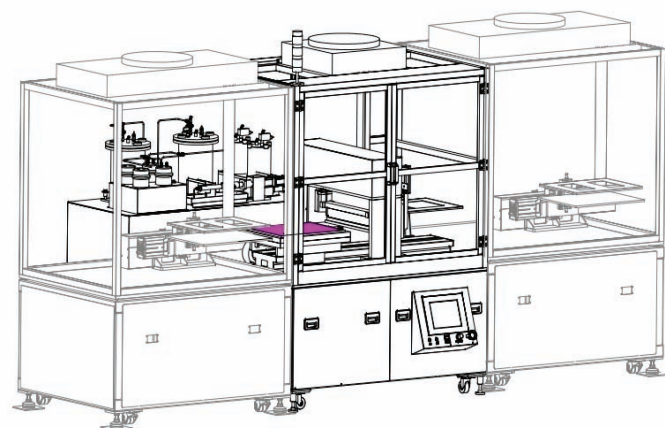
SPECIFICATION

| MODEL | PSDC500 |
|----------------|---|
| SUBSTRATE AREA | 500 x 500 |
| COATING WIDTH | 490 x 480 |
| SPEED | 200mm/sec |
| PUMP | Metering Pump |
| SIZE | 1760 x 1550 x 1500(H) |
| OPTION | Syringe Pump, Solution Tank, Lip Cleaner, Degassing System, Clean Booth |

* Granite surface plate type available



SCHEMATIC DRAWING



SHEET TYPE GANTRY SLOT DIE COATER

INFORMATION

- Precision coater with 2-axis precision synchronous gantry column for large area, high-precision sheet type coating
- Optimization of automatic process function for mass repetitive production process and application of automatic cleaning function of slot die discharge parts
- High-speed and precision coating for pilot & mass production process
- Prevention of deformation and vibration as plate and gantry stage are manufactured with a granite surface plate
- Applicable in mass production lines

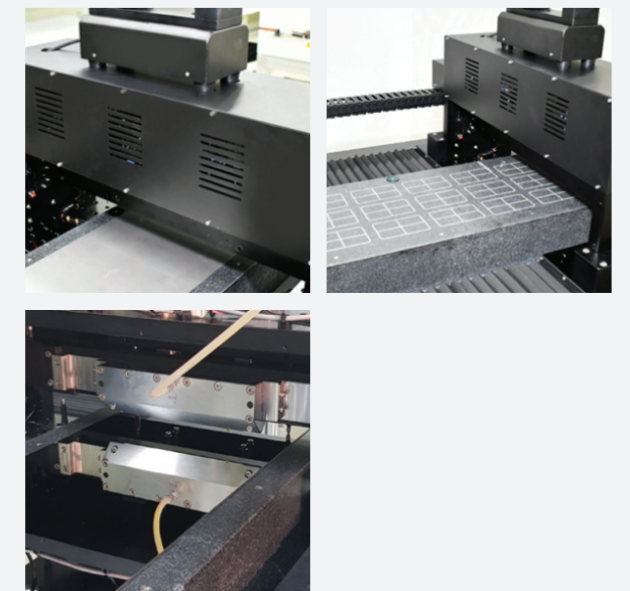
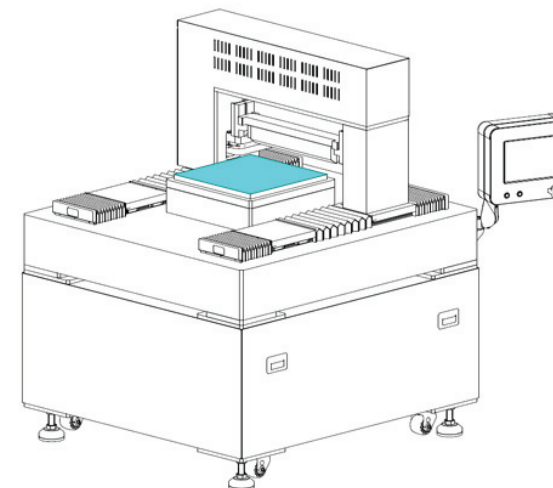
SPECIFICATION

| MODEL | GSDC1000 |
|----------------|---|
| SUBSTRATE AREA | 1,000 x 1,900 |
| COATING WIDTH | Max. 990 |
| SPEED | 200mm/sec |
| STROKE | 1,900mm |
| SIZE | 2500 x 2000 x 1500(H) |
| OPTION | Solution Tank, Lip Cleaner, Degassing System, Clean Booth |

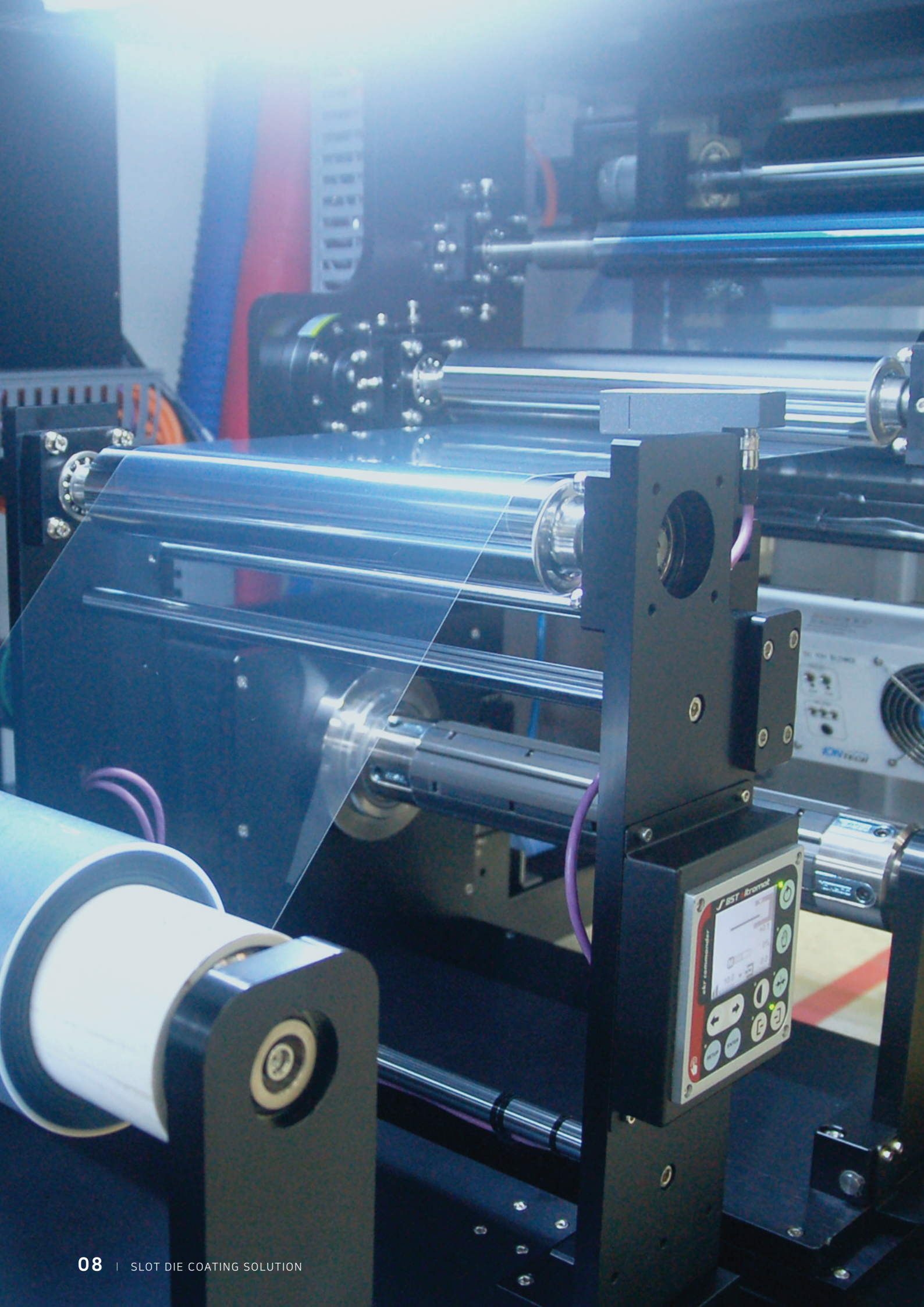
※ Pump Type : Metering Pump

* Optimization available according to customer request

SCHEMATIC DRAWING



R2R TYPE STANDARD R2R COATER



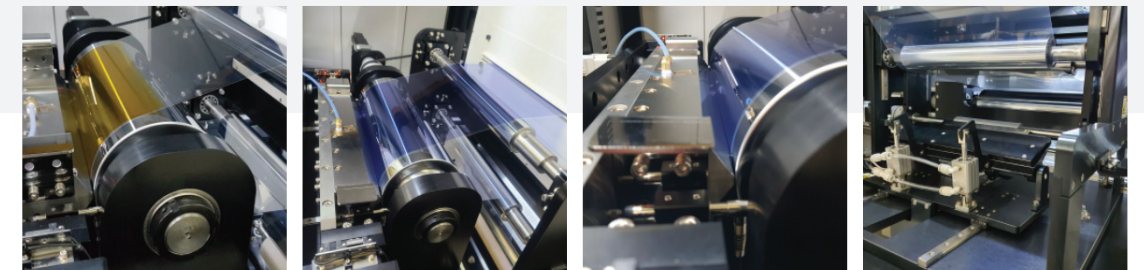
INFORMATION

- Maximum usability with materials and process development for R&D and pilot equipment in R2R process
- Available for various coating processes (Slot Die, Micro Gravure, Comma, Blade etc.), process optimum design according to customer needs with excellent economics and effectiveness
- A wide range of coatings including low-viscosity thin-film coatings to high-viscosity by manufacturing the slot die itself through CFD flow analysis
- Various coating thicknesses by providing standard micro gravure roll
- Realization of precise web transfer through speed synchronization and Ability to maintain uniform web tension and control tension by section through integrated speed & tension control
- Stable winding system application by applying accumulated winding control technology
- High temperature hot air dryer with patented technology applied and options such as UV curing, IR heater and laminator can be selected
- Various pump system options available according to the physical characteristics of the material and process conditions

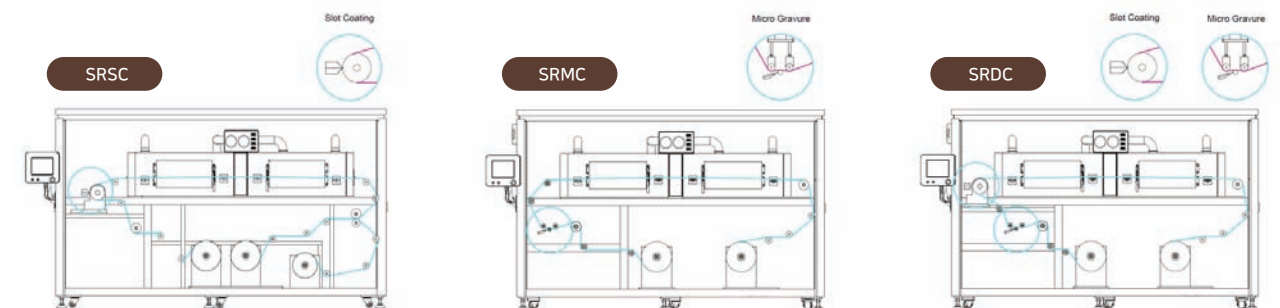


SPECIFICATION

| MODEL | SRSC150 | SRSC300 | SRMC150 | SRMC300 | SRDC150 | SRDC300 |
|-----------------|----------------------|----------|---------------|----------|--------------------------|--------------|
| COATING PROCESS | Slot Die | | Micro Gravure | | Slot Die & Micro Gravure | |
| WEB WIDTH | Max. 150 | Max. 300 | Max. 150 | Max. 300 | Max. 150 | Max. 300 |
| COATING WIDTH | Max. 140 | Max. 290 | Max. 150 | Max. 300 | Max. 140/150 | Max. 290/300 |
| WEB SPEED | 0.1~10m/min | | | | | |
| WEB TENSION | Max. 30kgf | | | | | |
| DRY TYPE | Hot Air, IR, UV cure | | | | | |



SCHEMATIC DRAWING



OPTIMIZED R2R SYSTEM PILOT R2R COATING SYSTEM

OPTIMIZED R2R SYSTEM UV IMPRINTING SYSTEM



INFORMATION

- Large area coating and high-speed coating available for secure mass production
- Various coating processes available such as slot die, micro gravure, comma, and gap coating
- Applicable to all applications such as secondary battery, optic, display, OPV, and PSV etc.
- Applies all core technologies of R2R Coater such as speed synchronization, web transfer, winder system, feeder system, and tension control
- Minimization of ancillary facilities by applying patented hot air-drying system
- Various types of dryers available according to coating material and process conditions (hot air, IR Ceramic, and UV Cure)
- Splicer and Auto Turret options available for automatic web replacement

SPECIFICATION

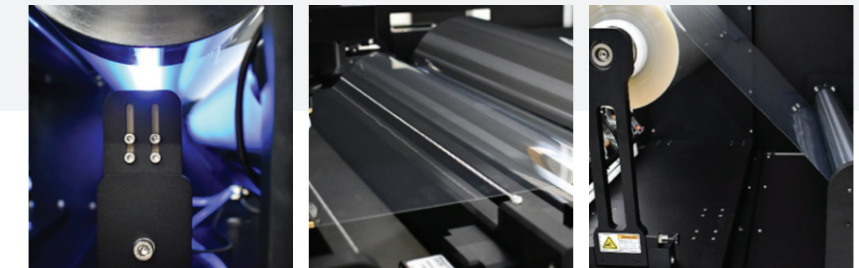
| | |
|--------------|---|
| COATING TYPE | Slot Die, Micro Gravure, Comma, Gab |
| SPEED | Max 20m/min |
| WEB TENSION | Max. 30kgf |
| DRY | UV Cure, Hot Air Dryer, IR Heater |
| PUMP | Metering Pump |
| OPTION | Plasma processor, Accumulator, Online thickness measuring instrument, Auto Turret, Corona processor, Laminator & De Laminator, Foreign matter inspection machine, Web Cleaner, Splicer, and Slitter |

INFORMATION

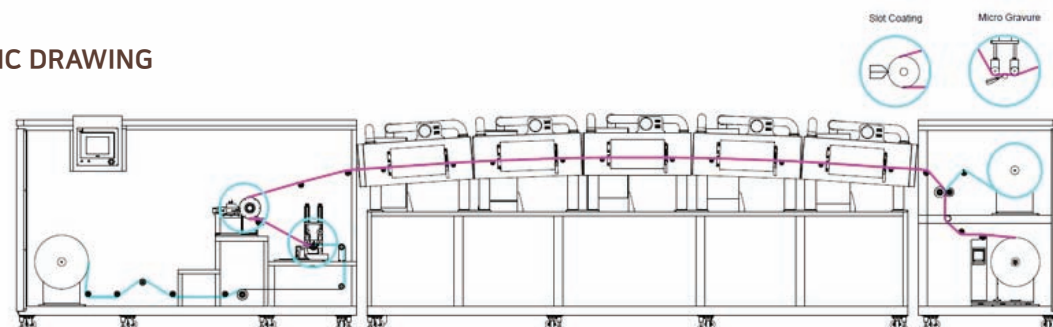
- By coating and curing UV curable resin, various types of micro patterns are formed on the transparent film
- Application of all core technologies of Standard R2R Coater such as speed synchronization, web transfer, winder system, feeder system, and tension control
- Automated systems such as gap control and tension control for various pattern thicknesses
- Metering pump available according to the physical characteristics of the material and process conditions
- Various drying and curing methods available according to the materials used and process conditions (IR Heater, hot air drying, UV curing)

SPECIFICATION

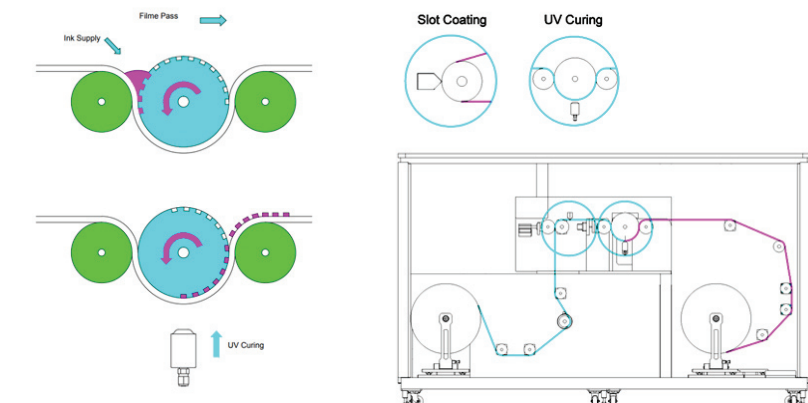
| | |
|--------------|--|
| COATING TYPE | IMPRINTING |
| SPEED | 0.1~5m/min |
| WEB TENSION | Max. 30kgf |
| DRY | UV Cure, Hot Air Dryer, IR Heater |
| PUMP | Metering Pump |
| OPTION | Coating Process (Slot Die, Blade, Bar) |



SCHEMATIC DRAWING



SCHEMATIC DRAWING



OPTIMIZED R2R SYSTEM
DIP COATING R2R SYSTEM



INFORMATION

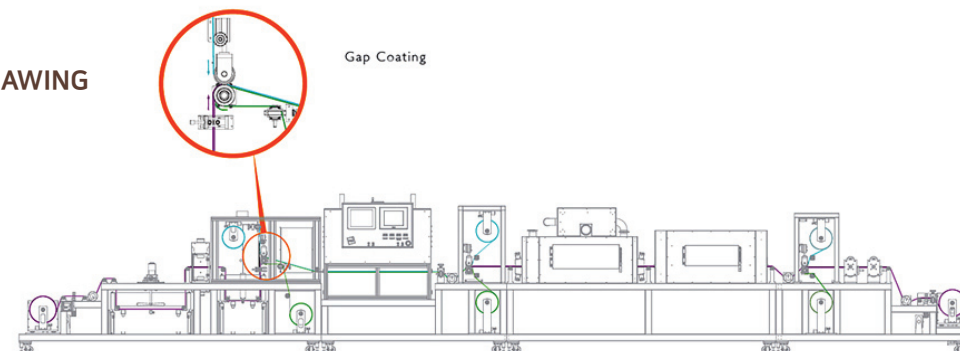
- **Porous membrane** (Non-solvent induce phase separation) : ultrafiltration, microfiltration, protein filtration, virus filtration, suspension filtration, support membrane for NF/RO thin film composite membranes
- **Ion exchange membrane** (pore filling membrane) : hydrocarbon ion exchange membrane, nafion ion exchange membrane
- Coating the coating solution or slurry and firing while passing through a water bath to form a coating film
- Application of all R2R core technologies such as speed synchronization, web transfer, winder system, feeder system, and tension control
- Application of dip coating water tank and Roll Blade with adjustable coating thickness and laminating technology
- Structure that reduces costs by minimizing the volume of the water tank. Facilitates water tank replacement and cleaning
- Selection of hot air drying, IR ceramic drying, and UV curing depending on coating material

SPECIFICATION

| | |
|--------------|--|
| COATING TYPE | Dip Coating |
| SPEED | 0.1~10m/min |
| WEB TENSION | Max. 25kgf |
| DRYER | UV Curing, Hot Air (Max. 150°C), IR Ceramic (Max. 200°C) |



SCHEMATIC DRAWING



OPTIMIZED R2R SYSTEM
MULTI LAMINATION R2R SYSTEM

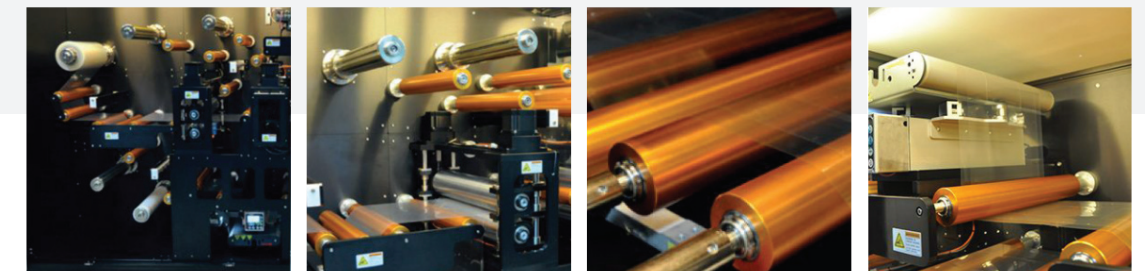


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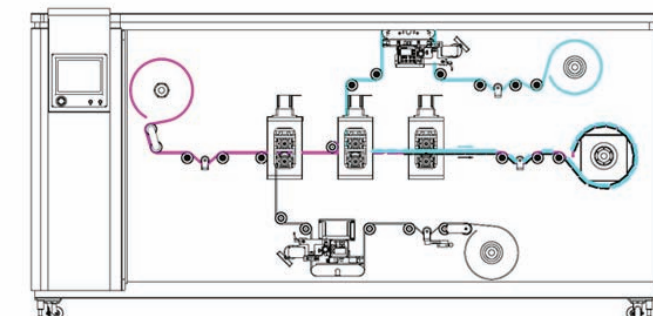
- R2R system that carries out double-sided laminating and double-sided de-laminating at the same time
- Pilot equipment for manufacturing secondary battery MEA
- Application of MD direction and TD direction align system to match patterns during top and bottom laminating
- Automatic pressure control (max. 200kgf) through motorization of laminating roll
- Heating roller (max. 180°C)

SPECIFICATION

| | |
|--------------|---|
| COATING TYPE | Double side Laminating, Double side de-laminating |
| SPEED | 0.01~5m/min |
| WEB TENSION | Max. 25kgf |
| HEATING ROLL | Max. 180°C, Pressure : Max. 200kg.f |



SCHEMATIC DRAWING



OPTIMIZED R2R SYSTEM DOUBLE SIDE R2R COATING SYSTEM

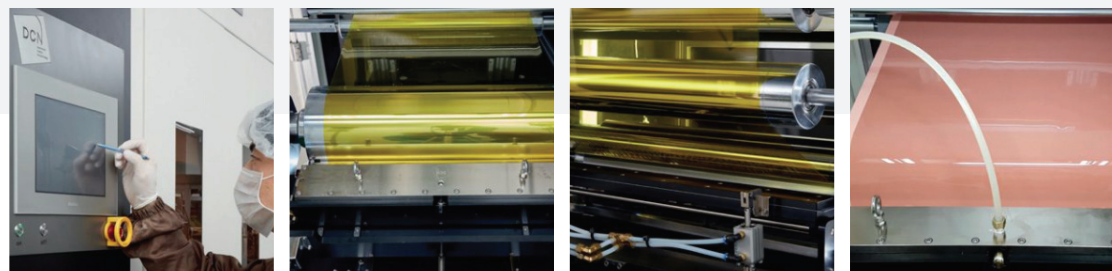


INFORMATION

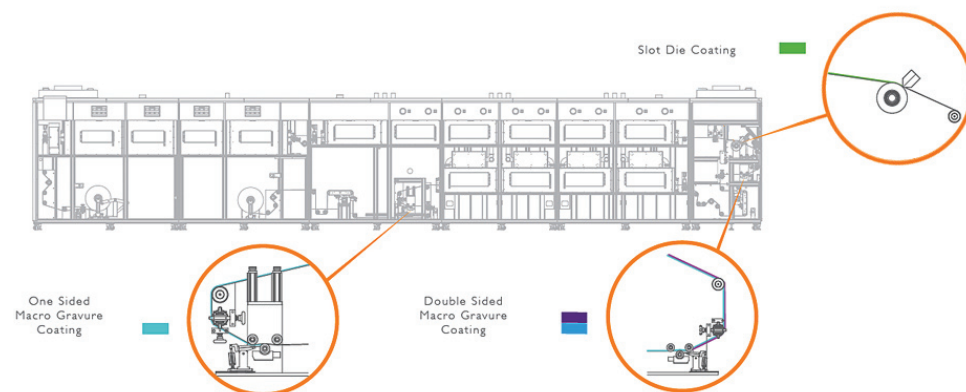
- Double-sided continuous coater utilizing slot die coating and micro gravure coating
- Application of all the core technologies of R2R coating such as speed synchronization, web transfer, winder system, feeder system, and tension control
- High-speed coating process that minimizes wrinkles in the MD direction of the thin film
- Application of various types of films such as PET Film, PI Film, and Copper Film with precision tension control
- Minimization of ancillary facilities by applying patented hot air drying
- Various types of dryers available according to the coating material and process conditions (hot air, IR Ceramic and UV Cure)
- Splicer and Auto Turret options available for automatic web replacement

SPECIFICATION

| | |
|--------------|-----------------------------------|
| COATING TYPE | Slot Die, Micro Gravure |
| SPEED | Max 30m/min |
| WEB TENSION | Max. 30kgf |
| CURING | UV Cure, Hot Air Dryer, IR Heater |
| PUMP | Metering Pump |



SCHEMATIC DRAWING

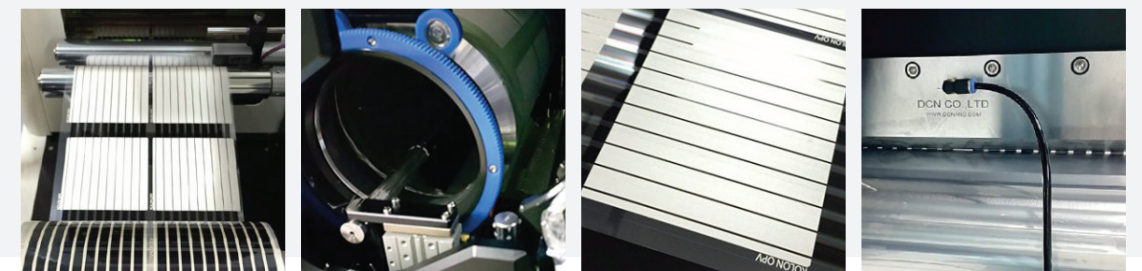


OPTIMIZED R2R SYSTEM MULTI LAYER R2R SLOT DIE COATING SYSTEM

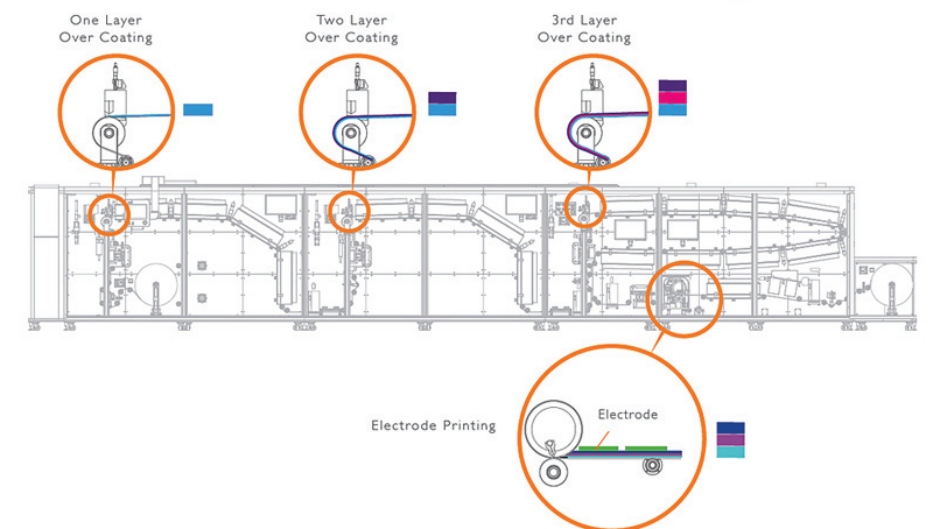


INFORMATION

- R2R coating equipment capable of overlapping slot die coating of 2 layer or more
- Application of all core technologies of R2R Coater such as speed synchronization, web transfer, winder system, feeder system, and tension control
- Performance record of multi-layer continuous process R2R coater by combining slot die 3 layer overlap coating and rotary screen printing
- Applicable layer-by-layer coating alignment system for overlap coating
- Patented high temperature hot air dryer application and options such as UV curing, IR heater, and laminator



SCHEMATIC DRAWING



OPTIMIZED R2R SYSTEM ROTARY SCREEN R2R PRINTING SYSTEM

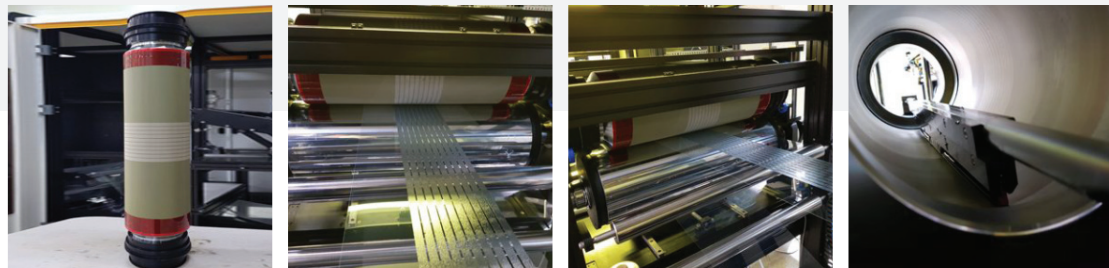


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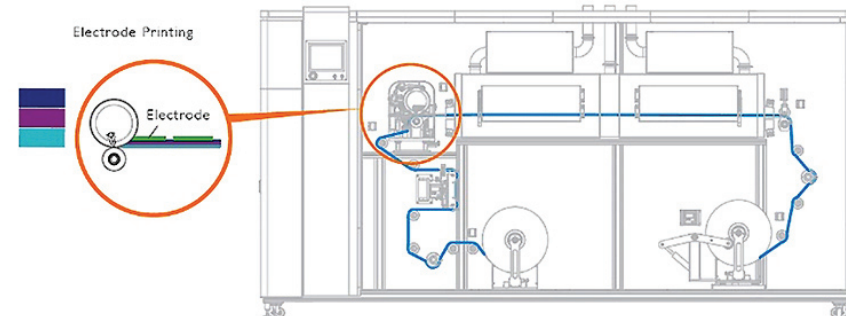
- Specialized equipment implemented in R2R process by replacing screen printing with rotary type
- Electrode and pattern printing can be implemented continuously
- Realization of fine line width through various standard mesh
- Overlap printing available through alignment correction function
- Application of all core technologies accumulated in Compact R2R Coater such as speed synchronization, web transfer, winder system, feeder system, and tension control
- Patented high temperature hot air dryer application and options such as UV curing, IR heater and, laminator

SPECIFICATION

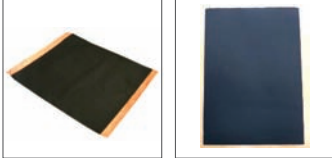
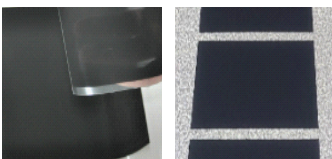
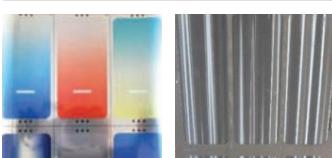
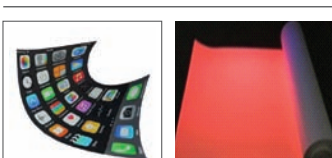
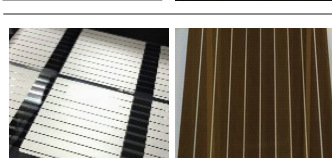
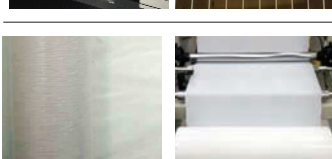

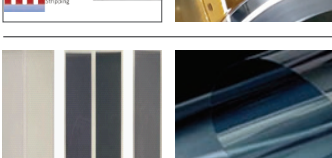
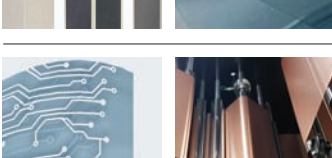
| | |
|---------------|-----------------------------------|
| PRINTING TYPE | Rotary Screen |
| SPEED | Max 10m/min |
| WEB TENSION | Max. 30kgf |
| CURING | UV Cure, Hot Air Dryer, IR Heater |
| PUMP | Metering Pump |



SCHEMATIC DRAWING

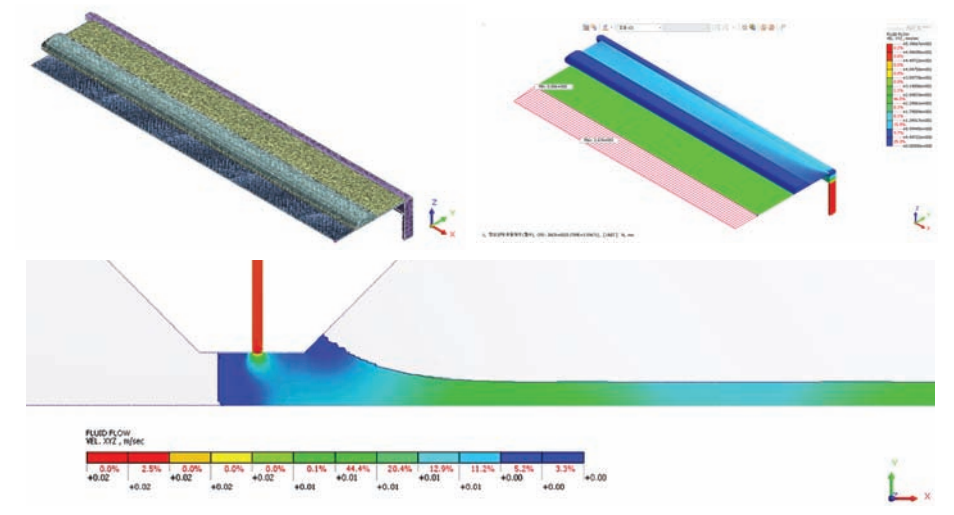


APPLICATION & PRODUCTS

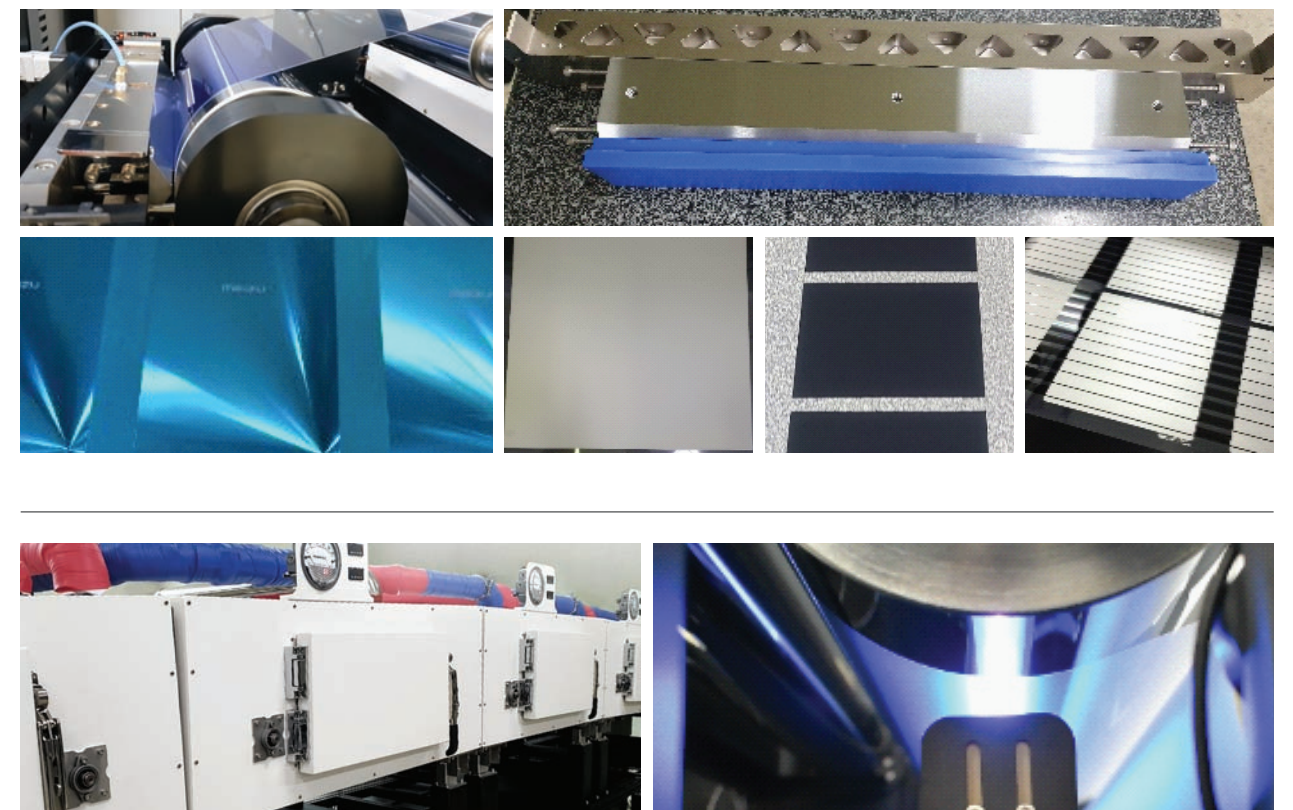
| | |
|---|---|
|  | <p>SECONDARY BATTERY Slurry, Carbon Black, Graphite, Vanadium Redox etc. Metal(Al , Cu) Foil, Plastic Film, Ion Transfer Membrane</p> |
|  | <p>FUEL CELL MEA Coating, MEA Transfer</p> |
|  | <p>MOBILE / TOUCH SCREEN Metal Mesh Film, Back Cover Deco Film</p> |
|  | <p>FLEXIBLE DISPLAY Flexible Printed Circuit Board, Rigid Printed Circuit Board, Casting Film, Film Condenser</p> |
|  | <p>SOLAR CELL OPV, Perovskite</p> |
|  | <p>MEMBRANE Filtration (Ultra, Micro, Protein, Virus etc.), Support membrane for NF/RO Hydrocarbon ion exchange membrane, Nafion ion exchange membrane</p> |
|  | <p>PR COATING Photolithography</p> |
|  | <p>OPTIC Optical Film, Color Filter, Protective Film, Photo mask, Electromagnetic Prevention Film</p> |
|  | <p>FCCL PI Coating</p> |

TECHNOLOGY

Flow analysis using midas NFX software



Optimized slot die structure design through CFD flow analysis
Uniformity with world-class technology
Patented original technology



Drying process required for thin film in solution process
Hot air, IR and UV and composite structures available