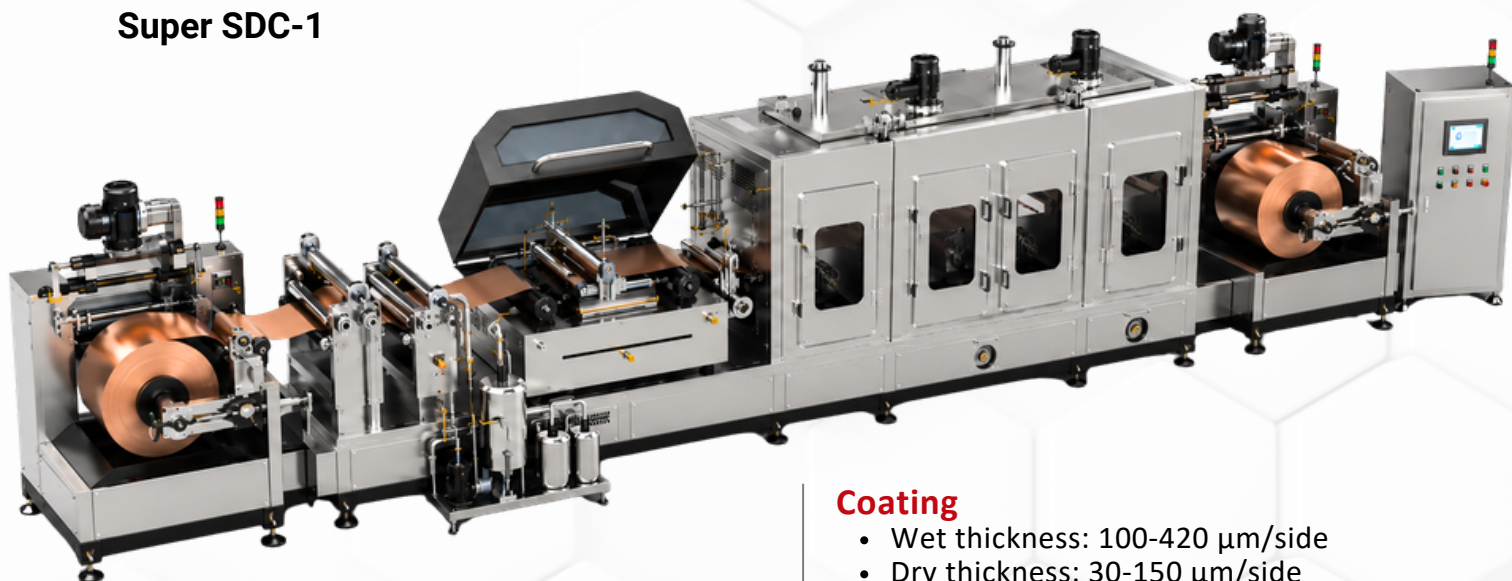


Roll to Roll Slot Die Coating Machine with ceramic coating

Super SDC-1



Features

- The machine suitable for coating processes of slurry systems such as oil-based or water-based lithium-ion cell.
- The equipment is designed for single-layer extrusion coating of lithium-ion battery positive and negative electrode sheets.
- The coating machine primarily consists of an unwinding unit, head unit, drying oven unit, traction unit, winding unit, and electrical control unit and Edge coating mechanism.
- Coating Modes: Continuous coating, one-gap coating, two-gap coating, reverse overlapping coating, reverse staggered coating.
- The machine have servo motors drive high precision lead screws to move the extrusion module, with an adjustment accuracy of 0.001mm for both forward and backward movements. 2 sets in total.

Substrate

- Substrate: Aluminum foil /Copper foil
- Width: 100-450 mm
- Thickness: 8-30 μm (Al) / 6-30 μm (Cu)
- Outer diameter: 300 mm
- Weight: 100 Kg (Approx.)

Slurry

- Solute: Lithium iron phosphate, lithium cobalt oxide, lithium manganese oxide, ternary materials and ternary mixed materials of lithium manganese oxide, sodium electro oxide cathode, sodium electro poly anion cathode.
- Solvent: NMP/DI-Water
- Adhesive: PVDF/SBR
- Viscosity (mPa.s, 25 °C): 2,000-15,000 (cathode); 1,000-6,000 (Anode)

Coating

- Wet thickness: 100-420 μm /side
- Dry thickness: 30-150 μm /side
- Coating width: 400 mm (Approx.)
- Coating speed: 0.5-3 m/min
- Mechanical speed: 0.5-6 m/min

Ceramic slurry

- Dry thickness of single-sided coating: 25-40 μm /surface (Dry state)
- Coating width: 4.5 ~ 8mm
- Number of coated strips: 2 items
- Overlapping amount of slurry: 0.5 ~ 1mm
- Coating method: 1. Continuous stripes; 2. External mode

Unwinding unit

- Type: Vertical plate structure, single axis fixed type
- Unwinding direction: Upward and downward
- Unwinding diameter: 300mm/roll
- Winding weight: 80 kg/roll (Approx.)
- Roll inner diameter: 76.2-80mm, user provided
- Fixing method: 3" inflatable shaft, manually clamped

Unwinding tension control

- Range: 10-50N/entire width
- Type: Floating roller
- Control unit: Cylinder + Precision Pressure Regulating Valve Adjustment
- Drive mode: Stepper motor

Correction device

- Type: Motor correction driver push
- Edge Sensor: Ultrasonic
- Accuracy: $\pm 0.5\text{mm}$
- Correction stroke: $\geq \pm 50\text{mm}$
- Guide roller: $\Phi 80$ mm alloy tube

Coating head part

- Coating method: a) Continuous extrusion coating; b) Intermittent extrusion coating; c) Continuous strip coating; d) Intermittent strip coating.

• Squeeze coating head:

1. Coating head length: 500mm (± 0.5 mm).
2. Mold body material: 15-5ph hardened stainless steel.
3. Polishing accuracy of channel surface: 4-6 Ra (micro inches).
4. Feeding position: back feeding.
5. Product and application: 3-300 micron positive/negative electrode slurry, lithium-ion battery application.

• Coating roller specifications:

1. Specification: 1 piece of precision ground hard chrome plated alloy steel with a diameter of ≥ 160 mm.
2. Accuracy: hard chrome plating on the surface, circular runout: $\leq 1 \mu\text{m}$.
3. Circular runout after 60 days of continuous production: $\leq 1.0 \mu\text{m}$
4. Drive mode: servo motor drive

• Specification of the clamping roller:

1. Specification: Made of $\Phi 100$ mm dia. steel roller, coated with EPDM rubber material

• Extrusion film head

1. Base drive: button operation (using a 40mm cylinder);
2. Y-axis clearance fine adjustment: Manual adjustment.
3. Gap detection: Micrometer arrangement
4. Accuracy of mold position control: $0.4 \mu\text{m}$
5. Guide roller: $\Phi 80$ mm aluminum alloy pipe
6. Wetted part MOC: SUS304 made
7. Alarm device: Sound and light alarm, buzzer

Feeding system:

- Screw pump
- Interval coating control method: high response solenoid valve drive
- Transfer tank: Volume 5 liters, constant temperature control, liquid level control, pressure control, slow stirring.
- Material reflux coating controller: Material reflux coating controller
- Filter: 150 mesh filter.
- Pressure balance buffer: Ensure pipeline pressure balance.
- Pipelines and accessories: Stainless steel quick couplings and stainless-steel fittings
- Pressure monitoring system: Pressure monitoring system for each pipeline section.

Oven

- Type: Passive roller; 2 m/section, a total of 3 sections
- Heating Method: Electric Heating
- Heating power: 15 kW/section
- Heating temperature: Ambient temperature - 150°C
- Temperature control method: Separate PID control for each zone

• Temperature control accuracy:

1. Temperature setting value: $\pm 1^\circ\text{C}$
2. Temperature inside the box: $\leq \pm 3^\circ\text{C}$
3. Box surface temperature: $\leq$ Ambient temperature $+25^\circ\text{C}$ (working temperature below 130°C)
4. Air volume regulating damper: With scale markings

• Composition and Materials of Oven

1. Areas in direct contact with air: SUS304
2. Outer sealing plate of the box: SUS201
3. Outer layer of double-layer insulated pipeline: SUS201
4. Other structures: 45# steel

- Insulation layer: Rock wool/aluminum silicate

1. Oven body: 50mm thick insulation cotton
2. Insulated pipeline: 25mm thick insulation cotton
3. Filter: Primary filter
4. Sealing element: Foam silicone strip

• Operation door: 1pcs/section

- Location: located on the operating side
- Explosion proof port: located at the top of the box
- Centrifugal fan: Stainless steel fan, frequency converter controlled three-phase asynchronous motor.
- Duct: Stainless steel double-layer insulated duct.
- Safety interlock device: protection control for normal working temperature control, over temperature monitoring alarm, and automatic cut-off of heating main power supply (normal operation of exhaust system).

• Drive motor

1. Circulating fan: 2 x asynchronous motor.
2. Exhaust fan: 1 x asynchronous motor.

Rewinding unit

- Rewinding direction: Upward and downward
- Rewinding diameter: 300mm/roll
- Winding weight: 80 kg/roll (Approx.)
- Inner diameter of drum: 76.2-80mm,
- Fixing method: 3 "inflatable shaft,

- **Winding tension control**

1. Range: 10-50N/entire width
2. Type: Floating roller
3. Control: Cylinder + Precision Pressure Regulating valve
4. Drive mode: Stepper motor

- **Correction device**

1. Type: Motor correction driver push
2. Edge Sensor: Ultrasonic
3. Accuracy: $\pm 0.5\text{mm}$
4. Correction stroke: $\pm 50\text{mm}$
5. Guide roller: $\pm 80\text{ mm alloy tube}$

Edge gluing mechanism

- Turnover barrels: Single layer turnover bucket, 5L, electric mixing, equipped with observation lights in the visual window.
- Feeding pump: Removable high-precision metering feed pump
- Drive mode of feeding pump: Servo motor+ precision reducer
- Liquid level monitoring: Ultrasonic liquid level sensor.
- Pressure monitoring unit: Pump outlet slurry pressure (pressure difference) monitoring.
- Slurry filtration for iron removal equipped with metal mesh filter.
- Feeding pipe: Using PTFE hoses or stainless-steel hard pipes, resistant to acid, alkali, and organic solvent corrosion.
- Glue application method: Use screw pump + cross slide table + dedicated glue valve + glue head.

Electrical control cabinet

- Type: Main power control + Head control + Tail control
- Specification: Fully integrated under the oven, with intact sealing.
- Quantity: 1 set/unit
- Control Function: Main Power Switch + Air Switch Partition Control
- Monitoring Function: HMI Display

Power supply: Three-phase four wire AC400V $\pm 10\%$, 50Hz

Compressed air: 0.6 MPa

Power: 50kW

Installation space: L 10 m x W 2 m x H 2.2m (Approx.)

Warranty: 2-year warranty will be provided.

The quote for the below Spare Parts will be given separately.

1. Coating gasket: 2 Nos.
2. Heating Tube: 1 No.
3. Adhesive pressure roller: 1 No.
4. Temperature sensing probe: 1 No.
5. Slurry pipe: 1 No.
6. Air expansion shaft: 1 No.
7. Coating valve – solenoid valve: 1 No.
8. Pressure Sensor: 1 No.
9. Screw Pump: 1 No.
10. Oven bearing: 1 No.
11. Oven Synchronous Belt: 1 No.
12. Air filter cartridge: 2 Nos.
13. Foam silicone strip: 2 Nos.

NOTE: This Machine design is only for presentation, it can be changed as per specification