

Doctor Blade Continuous Coating Machine For Battery Electrode Sheets

Item Number: TB22



Introduction

Doctor blade continuous coating machine delivers precision electrode films with stable web tension, dual-sided hot-air drying, PLC operation, and accurate alignment for lithium-ion batteries, supercapacitors, nickel batteries, pilot-scale development, and advanced materials research.

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Application	Description	Key Benefit
Lithium-ion battery cathode development	Applies slurries based on ternary materials, lithium iron phosphate, lithium cobalt oxide, or lithium manganate to aluminum foil.	Produces controlled electrode films for formulation screening, process development, and pilot evaluation.
Lithium-ion battery anode development	Coats graphite, silicon-carbon, and other negative-electrode slurry systems onto copper foil.	Supports accurate control of dry thickness and coating dimensions for anode optimization.
Supercapacitor electrode fabrication	Creates continuous coated electrode sheets for supercapacitor research and small-batch process trials.	Combines stable web transport with dual-sided hot-air drying for consistent sheet preparation.
Nickel battery electrode research	Supports surface-coating processes for nickel battery electrode materials and related secondary battery structures.	Provides a compact, controllable platform for repeatable laboratory and pilot work.
Battery pilot-line process transfer	Establishes coating, drying, tension, and alignment conditions before scaling to larger production equipment.	Offers production-oriented control points that help research teams build process knowledge.
Advanced materials film processing	Applies functional slurry coatings to compatible aluminum or copper foil substrates for materials science projects.	Enables controlled metering, web handling, and drying within a single integrated system.
Solvent-based electrode coating	Processes oil-based NMP slurry systems where controlled drying and optional recovery capability are required.	Supports configured solvent management while maintaining a defined thermal process.
Water-based electrode coating	Processes water-based H ₂ O/NMP slurry systems within the stated viscosity and solids-content range.	Gives teams a practical platform for comparing water-based formulations and drying conditions.

Parameter	Specification	Notes
Site-facing identifier	TB22	Doctor blade continuous coating equipment
Suitable material systems	Ternary, lithium iron phosphate, lithium cobalt oxide, lithium manganate, graphite, silicon-carbon, and other battery positive- and negative-electrode sheet coating processes	
Coating method	Doctor blade continuous coating	
Coating speed	0~0.5 m/min	Depends on drying conditions
Running substrate thickness	Aluminum foil (Al): 8~30um; Copper foil (Cu): 6~30um	
Designed roller-face width	230 mm	
Guaranteed coating width	Within 200mm	
Doctor roller	Φ100mm	
Coating accuracy	±3um	

Parameter	Specification	Notes
Suitable slurry viscosity	2000~12000 (mPas)	
Single-sided dry coating thickness range	20-200μm	
Oil-based solvent	NMP (s.g=1.033, b.p=204°C)	
Water-based solvent	H2O/NMP (s.g=1.000, b.p=100°C)	
Suitable solids-content range	20~85%	
Coating dimensional accuracy	$L \leq \pm 1$, $W \leq \pm 0.5$ mm	L: length direction; W: width direction
Front-to-back alignment accuracy	$L \leq \pm 1$, $W \leq \pm 0.5$ mm	
Idler-roller mounting structure	Rigid steel-frame installation	Unwinding/head mechanism
Idler-roller surface treatment	Metal aluminum roller surface oxidation	
Tension-control system	Automatic constant-tension control	
Feed-roll loading method	3-inch pneumatic expanding shaft fixation	Single unwinding pneumatic expanding shaft
Maximum unwinding roll diameter	Φ250mm	
Pneumatic expanding shaft maximum load capacity	50Kg	
Number of unwinding pneumatic expanding shafts	1	
Doctor blade structure	Double-sided comma blade	
Coating roller	Steel roller with hard-chrome-plated surface	
Intermittent doctor-blade height adjustment	Precision lead-screw adjustment	
Single-head position	Installed and operated before the drying tunnel	
Oven structure	Double-layer independent heating, upper and lower arrangement	
Oven-section length	1 meter/section	
Oven material	SUS304 stainless steel	
Temperature-control protection	Normal operating temperature control; over-temperature monitoring and alarm protection; heating main power is cut off	Every section independently controlled
Heating method	Analog-signal power heating control; hot-air circulation structure	Accuracy $\pm 0.5^{\circ}\text{C}$
Heating power per oven section	3KW	
Oven temperature	Design Max150°C; temperature difference within one oven section $\leq \pm 2.5^{\circ}\text{C}$	
Airflow method	Upper and lower blowing	Upper and lower air chambers share a heating body
Air-nozzle structure	Nozzle slots opened using a dedicated mold	
Fan control	Contact control	
Heating control hardware	Analog-signal power-control solid-state relay	
Fan material	SUS304 stainless steel	
Solvent recovery system	Optional	
Automatic web guiding	Installed at the drying-tunnel outlet	Rewinding mechanism
Rewinding tension	Automatic constant-tension control	
Rewinding mounting structure	Rigid steel-frame installation	
Number of rewinding pneumatic expanding shafts	1	Single-arm rewinding
Overall dimensions	L1700W900H1100mm	Fitted with casters and leveling feet
Net weight	570KG	

Parameter	Specification	Notes
Gross weight	700KG	
Doctor blade circular runout	$\leq \pm 1.5\mu\text{m}$	
Doctor blade surface roughness	Ra0.4	
Doctor blade straightness	$\leq \pm 1.5\mu\text{m}$	
Coating roller circular runout	$\leq \pm 1.5\mu\text{m}$	
Coating roller surface roughness	Ra0.4	
Coating roller straightness	$\leq \pm 1.5\mu\text{m}$	
Head operating ambient temperature	25~30°C	
Other operating ambient temperature	10~40°C	
Head relative humidity for positive electrode	RH $\leq$ 35%	
Head relative humidity for negative electrode	RH $\leq$ 98%	
Other relative humidity	$\leq$ 98%	
Power supply	3PH 380V, 50HZ	Voltage fluctuation range: +8% -8%
Total power at startup	6KW	
Compressed-air requirement	Dried, filtered, and pressure-stabilized air	Outlet pressure greater than 5.0kg/cm ²