

Water Bath Extrusion Continuous Coating Machine

Item Number: TB29



Introduction

Water bath extrusion continuous coating machine delivers high precision electrode coating, dual liquid treatment, controlled drying, and stable web handling for battery materials research and pilot scale manufacturing.

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Application	Description	Key Benefit
Lithium-ion cathode electrode development	Applies cathode slurry onto aluminum foil before controlled drying and collection.	Supports precision coating studies on 8-30 um aluminum foil with controlled dry thickness.
Lithium-ion anode electrode development	Coats anode formulations onto copper foil for laboratory and pilot electrode trials.	Provides stable transport for 6-30 um copper foil and accommodates a wide slurry-viscosity range.
Battery slurry formulation validation	Compares formulations with solids content from 20-85% and viscosity from 2000-12000 mPas.	Helps technical teams evaluate coating response under repeatable web, bath, and drying conditions.
Water-based electrode processing	Processes systems using H ₂ O/NMP solvent with a stated specific gravity of 1.000 and boiling point of 100 C.	Provides a continuous route for coating and double-sided hot-air drying during water-based process work.
NMP-based electrode processing	Handles oil-based NMP solvent formulations with a stated specific gravity of 1.033 and boiling point of 204 C.	Supports controlled drying development for conventional oil-based slurry systems.
Surface treatment and liquid-bath process trials	Uses two independently usable liquid baths before the drying stage.	Allows two different liquids to be configured in one continuous line for process experimentation.
Advanced materials foil coating	Produces controlled films on thin conductive foil for materials science and functional-coating research.	Combines web alignment, extrusion deposition, thermal treatment, and rewinding in a compact workflow.
Pilot-scale roll-to-roll process optimization	Establishes operating windows for coating speed, tension, dimensional accuracy, and oven temperature.	Generates process-relevant data before larger-scale manufacturing transfer.

Parameter	TB29 Specification	Notes
Coating method	Extrusion coating	
Coating speed	0-5 m/min	Subject to drying conditions
Compatible aluminum foil thickness	8-30 um	Al
Compatible copper foil thickness	6-30 um	Cu
Roller face design width	200 mm	
Guaranteed coating width	Within 120 mm	
Coating accuracy	+/-3 um	
Double-sided coating weight accuracy	Coating center value +/-1.5%	mg/cm ²
Suitable slurry viscosity	2000-12000 mPas	
Single-side coated dry-thickness range	20-200 um	

Parameter	TB29 Specification	Notes
Suitable solids-content range	20-85%	
Coating dimensional accuracy	L <= +/-1 mm; W <= +/-0.5 mm	L: length direction; W: width direction
Feed system	Syringe pump	
Oil-based solvent characteristic	NMP, s.g=1.033, b.p=204 C	
Water-based solvent characteristic	H2O/NMP, s.g=1.000, b.p=100 C	
Idler roller mounting structure	Rigid steel-frame installation	
Idler roller surface treatment	Oxidized metal aluminum roller surface	
Unwind tension control	Automatic constant-tension control	
Loading method	3-inch pneumatic expanding shaft fixation	Single pneumatic expanding shaft for unwinding
Maximum unwinding roll diameter	Φ250 mm	
Pneumatic expanding shaft maximum load	80 Kg	
Unwinding pneumatic expanding shafts	1	
Coating roller	Steel roller with hard-chrome-plated surface	
Doctor blade intermittent height adjustment	Precision micro-adjustment	
Single-head position	Installed and operated before the drying channel	
Liquid-bath quantity	2	Two different liquids can be configured
Liquid-bath material	SUS304 stainless steel	
Single liquid-bath length	1.5 m	
Liquid-bath drainage outlets	2 per bath	
Liquid-bath overflow outlets	1 per bath	
Liquid-bath temperature control	Uniformly arranged heating elements	Even heating
Liquid-bath heating method	Electric heating	Accuracy +/-1 C
Liquid-bath heating power	4 KW	
Oven structure	Double-layer independent heating, upper and lower arrangement	
Oven length	1.2 m/section	
Oven material	SUS304 stainless steel	
Oven temperature control	Normal operating-temperature control; over-temperature monitoring alarm and protection control	Each section independently controlled; main heating power is disconnected upon over-temperature protection
Oven heating method	Analog-signal controlled power heating with hot-air circulation	Accuracy +/-0.5 C
Heating power per oven section	9 KW	
Oven internal temperature	Design Max 150 C; temperature difference within a single oven section <= +/-2.5 C	
Airflow direction	Upper and lower blowing	Upper and lower air chambers share the heating body
Air-nozzle structure	Nozzle slots opened using a dedicated mold	
Fan control	Contact control	
Heating control hardware	Analog-signal controlled power solid-state relay	
Fan material	SUS304 stainless steel	
Rewind web guiding	Automatic correction installed at drying-channel outlet	
Rewind tension control	Automatic constant-tension control	
Rewind installation structure	Rigid steel-frame installation	

Parameter	TB29 Specification	Notes
Rewinding pneumatic expanding shafts	1	Single-arm rewinding
Slitting	Slitting mechanism included	
Main control system	Touchscreen and PLC	Dual touchscreens at head and tail
Fault alarm display	Touchscreen displays the corresponding corrective screen	
Extrusion head precision	Ra0.4; straightness $\leq \pm 1.5 \mu\text{m}$	
Coating roller precision	Radial runout $\leq \pm 1.5 \mu\text{m}$; Ra0.4; straightness $\leq \pm 1.5 \mu\text{m}$	Steel coating roller
Web-guiding deviation	$\pm 0.3 \text{ mm}$	
Overall dimensions	L7000W920H1900 mm	With installed casters and leveling feet
Weight	Approx. 1200 KG	
Head environment temperature	25-30 C	
Other environment 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	Three-phase five-wire, 380V, 50HZ	Voltage fluctuation range: +8% to -8%
Total power at startup	20 KW	
Compressed air requirement	Dried, filtered, and pressure-regulated air	Outlet pressure $> 5.0 \text{ kg/cm}^2$