

Battery Stacking Machines 2026

The Winding-to-Stack Shift and the Buyer's RFQ Guide — NEGUP MACHINE

Why stacking decides the large-format cell

How a lithium-ion cell's electrodes are brought together — wound into a jelly roll or stacked sheet by sheet — sets its internal resistance, energy density, thermal behaviour and cycle life, and at volume it sets the scrap rate. As cells grow into large-format prismatic and pouch formats, the wound core wastes corner space, concentrates current at the tab ends and stresses the electrode at the core radius. Stacked prismatic and pouch cells hold 5–10% more active material in the same volume, run cooler under load and typically last 10–20% longer in cycle life. That is why the stacking machine has moved from a niche pouch-line tool to a mainstream item of cell-assembly capex in 2026.

Table 1 — The 2026 stacking machine market in numbers

Lithium battery stacking machine market, 2025	USD 2.85 billion	PMarketResearch, 2026
Lithium battery stacking machine market, 2032F	USD 8.07 billion (16.03% CAGR); USD 3.26B in 2026, USD 6.70B by 2031	PMarketResearch, 2026
Z-fold type share / EV application share, 2025	48.2% of market value / 77.8% of application demand	PMarketResearch, 2026
Regional split 2025: APAC / Europe / North America / RoW	USD 1.94B / 532.9M / 320.2M / 56.9M	PMarketResearch, 2026
Lamination stacking machines, 2025 → 2032F	USD 545.2M → 612.7M (2026) → 1,250.5M, 12.59% CAGR	360iResearch, Mar 2026
Li-ion cell stacking machine market, 2026 → 2033F	USD 6.1B → 13.8B, 12.40% CAGR; APAC largest, North America fastest-growing	HTF Market Intelligence, 2026
Battery stacking machine (broad definition), 2026 → 2032F	USD 706M → 1,072M, 7.2% CAGR	QYResearch, 2026
Global shipments and average price, 2025	About 3,179 units at about USD 205k per unit; capacity about 3,500 units	QYResearch, 2026

The spread between the USD 545M and USD 6.1B figures for 2026 is definitional: the narrow figure covers lamination stackers alone, the widest covers complete stacking lines. Asia-Pacific is the largest and most automated market in every estimate.

Table 2 — Winding vs stacking: the engineering tradeoff

Best-suited formats	Cylindrical (Tesla 4680); some prismatic	Large prismatic (EVE LF314 314 Ah); pouch (50 Ah NCM power pouch)
Speed	Web speeds to 3,000 mm/s; 200–300 ppm cylindrical lines	0.2–0.5 s per sheet; 0.2–0.4 s/SPL dual-station
Layer alignment	±0.2 mm typical	±0.1–0.2 mm standard; ±0.05 mm precision class
Space utilisation	Baseline	+5–10% active material in the same volume
Internal resistance and heat	Current concentrated at tab ends; stress at core radius	Uniform current distribution; even heat spread
Cycle life	Baseline	+10–20% vs wound equivalent
Solid-state readiness	Not applicable	The only viable route — every solid-state cell is stacked

Tesla's tabless 4680 cuts current-path resistance five- to six-fold inside a wound structure; BYD's Blade uses roughly 0.96 m stacked electrodes that winding cannot produce. Flat, large formats reward flat assemblies.

Table 3 — Stacking-line acceptance criteria for the RFQ

Layer alignment (X/Y/theta)	±0.1–0.2 mm standard class; ±0.05 mm for high-voltage or high-power cells	Vision-guided, every layer
Misalignment limit	Beyond about 0.3 mm deviation: risk of lithium plating, hot spots and accelerated capacity fade	Design limit, not a target
Stacking speed	0.5–1.0 s/SPL single-station; 0.2–0.4 s/SPL dual-station or multi-arm	Per machine, at production layer count
Separator tension	Closed-loop servo control, 2–10 N; no wrinkles or pinholes at fold corners	Continuous
Inline inspection	AI vision for electrode-edge defects, wrinkles, foreign particles, tab position; at least 99% recognition	Every layer
Annual capacity	About 1 GWh per standard machine; 3–5 GWh for high-speed multi-station lines	Per line
Layer count capability	10–20 (consumer), 30–60 (EV pouch), 80+ (large-format ESS)	Format-dependent
Environment	Dry-room compatible; documented dew point and particle class	Line-level

Six questions for your stacking-line RFQ

Which stacking route, and why? Z-fold, cut-and-stack integration and hot lamination trade speed, precision and cost differently — make the supplier justify the choice for your format.

What alignment accuracy is committed at production speed? Demo-speed numbers flatter every machine.

What is the seconds-per-layer figure at your layer count, and the annual GWh per machine that follows from it?

How is separator tension controlled, and what wrinkle and pinhole detection runs inline?

Which MES interfaces and per-layer traceability are native? Genealogy should be configuration, not a development project.

What does acceptance include? Trials on your own electrodes and coated foils, with documented yield and process capability.

NEGUP MACHINE supplies the equipment chain around the stacking decision: the **NG-002 prismatic assembly line** and **NG-003 assembly line** for stacked-cell handling, polarity check and busbar laser welding, the **NG-007 EOL test system** and **NG-008 comprehensive tester** for the electrical gates, and the **NG-013 cell grading machine** and **NG-014 pack aging machine** that screen and activate what the stacking line produces. Tell us your cell format, layer count and target takt, and we will size the line to the process rather than to a datasheet.

WhatsApp +86 153 0769 0902 | rain@negupgroup.com | www.negupmachine.com