

NAATBATT 2025

EXTENDING RANGE

LEADING IN
PRODUCTION
EFFICIENCY

The background of the slide is a photograph of industrial machinery, likely a battery manufacturing line. It features a large, white, rectangular component with a prominent yellow-orange frame and a dark, possibly black, top surface. The machinery is set against a bright, slightly blurred background, suggesting a factory environment.

Dürr Systems, Inc. NAATBatt 2025 Member Update

February 19, 2025
Orlando, Florida

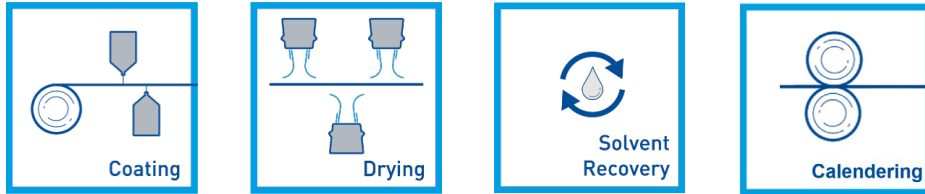
Nick Ortega, Key Account Manager, LiB

Strong partner for electrode manufacturing

Technology as key enabler for global e-mobility growth



Turnkey Electrode Manufacturing



2018
Strategic acquisition

Techno Smart

2020
Technology cooperation coating



2022
Unique European partnership



2023
Technology cooperation dry coating



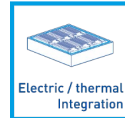
2023
Strategic acquisition

Market entry in li-ion manufacturing

Module Assembly



Battery Pack Assembly



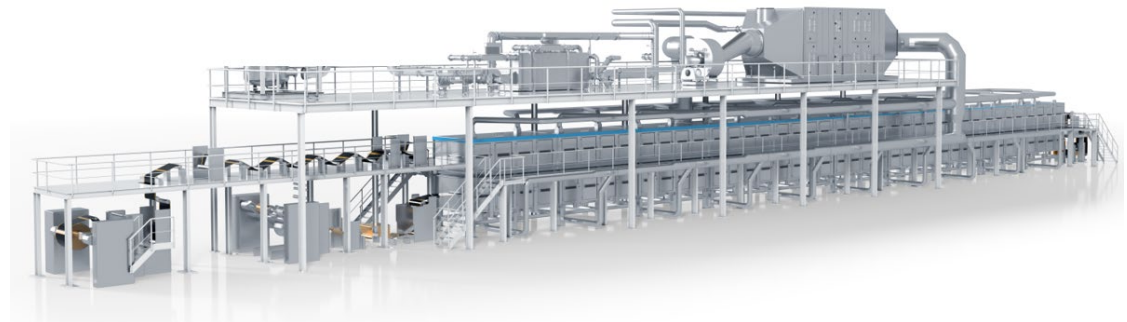
Battery Integration



Consulting



Strong partner along the entire value chain of battery production as well as paint technology for electric vehicles



Our contribution to sustainable production

Sustainable production of lithium-ion electrodes



Configured to meet strictest global and local emissions standards

Emissions < 1mg/m³

> 95 % reusable solvent

99.9 % recovered NMP

65 % heat recovery from condenser to dryer

Highest coating quality to reduce waste



Solvent Recovery & Refining

Combined with electrode coating and drying – turnkey solutions by Dürr

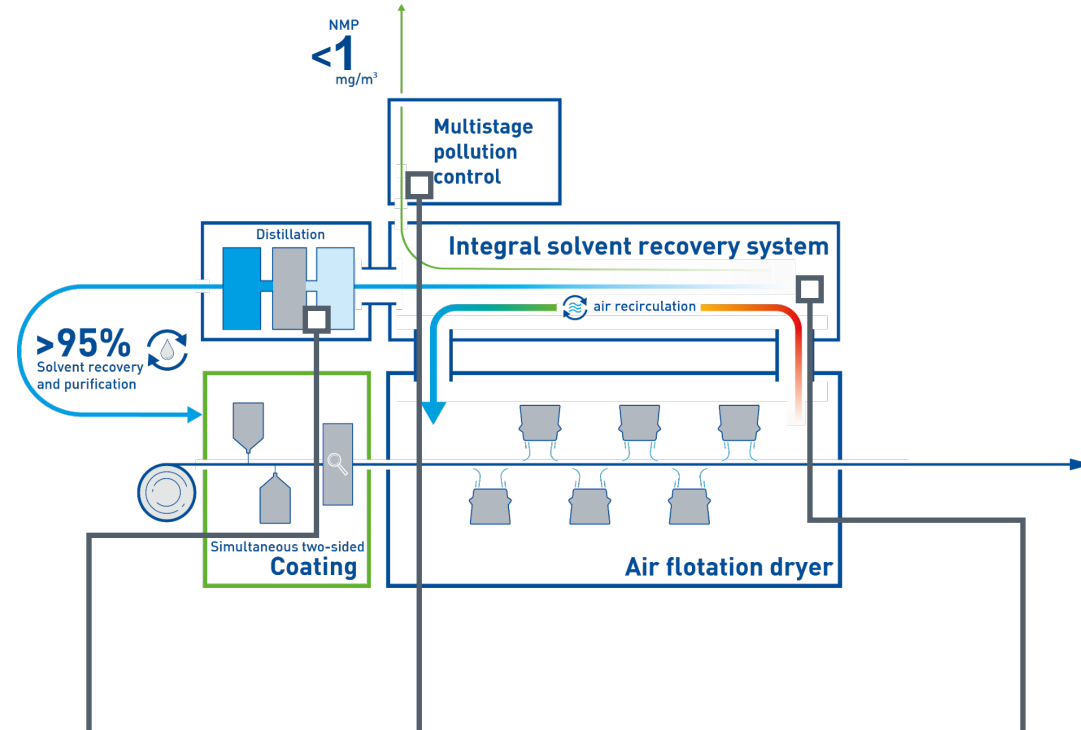


Refining & Tank farm

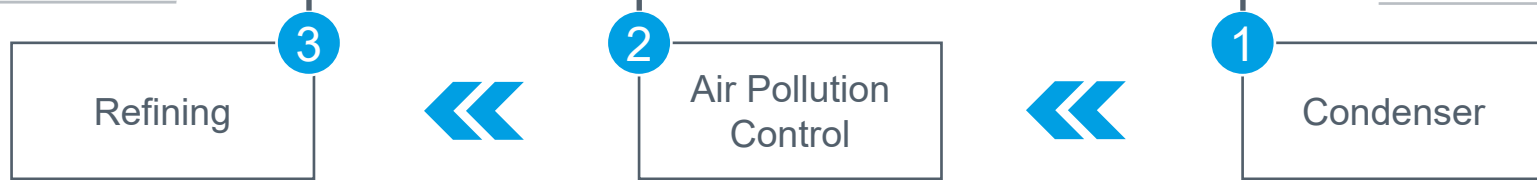


Condenser

Parameters refining	
Purity	> 99,85 % ("electronic grade")
Reuse of NMP	> 95 % in process
Payback	typically < 1 year



Parameters recovery	
High NMP recovery:	99,9 %
<260ppm back to the dryer and <1 mg/Nm ³ by air pollution control to atmosphere	
High internal heat recovery	

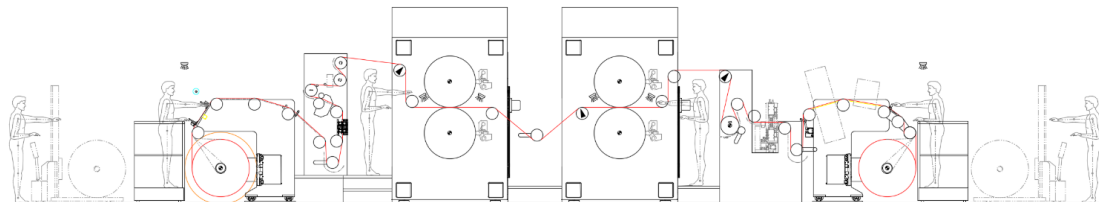
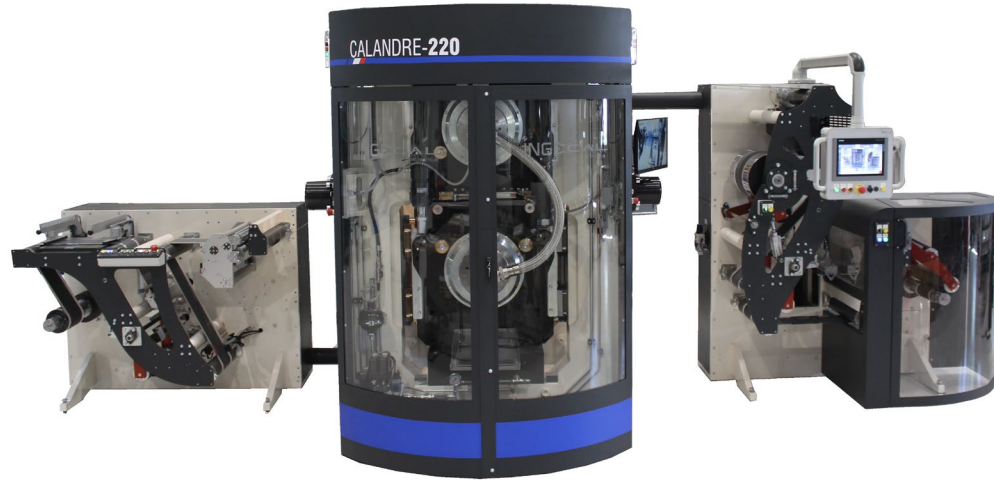


Exhaust air cleaning by double concentrators for lowest emission to meet strictest regulations

recover most of the solvent by condensation

Calendering

Turnkey coating lines



Technology

- 1 High precision with Dynamic Gap control : $\pm 0,5 \mu\text{m}$.
- 2 Lowest footprint due to compact design and dynamic gap control method.
- 3 No gap variation during transition phases and Start/Stop resulting in reduced scrap.

Benefits

- ★ Lowest scrap rates
 - ★ Easy to operate
 - ★ Scalable from 80 to 400 tons
- ➔ **Best in class calendering technology**

Strong partner along the value chain of battery production

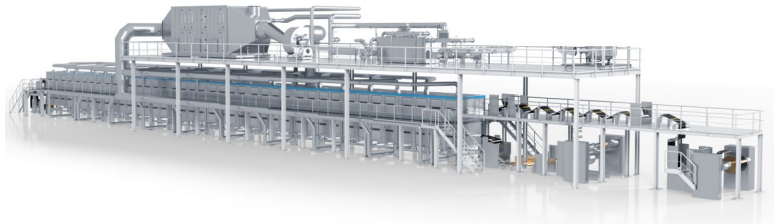


Battery manufacturing technology as key enabler for global e-mobility growth



Electrode Manufacturing

- Mixing
- **Coating & Drying**
- **Solvent Recovery**
- **Calendering**
- Slitting
- Secondary Drying



Cell Assembly

Cell Finishing /
Formation

Battery Assembly

- Notching
- Stacking or Winding
- Packing
- Electrolyte filling

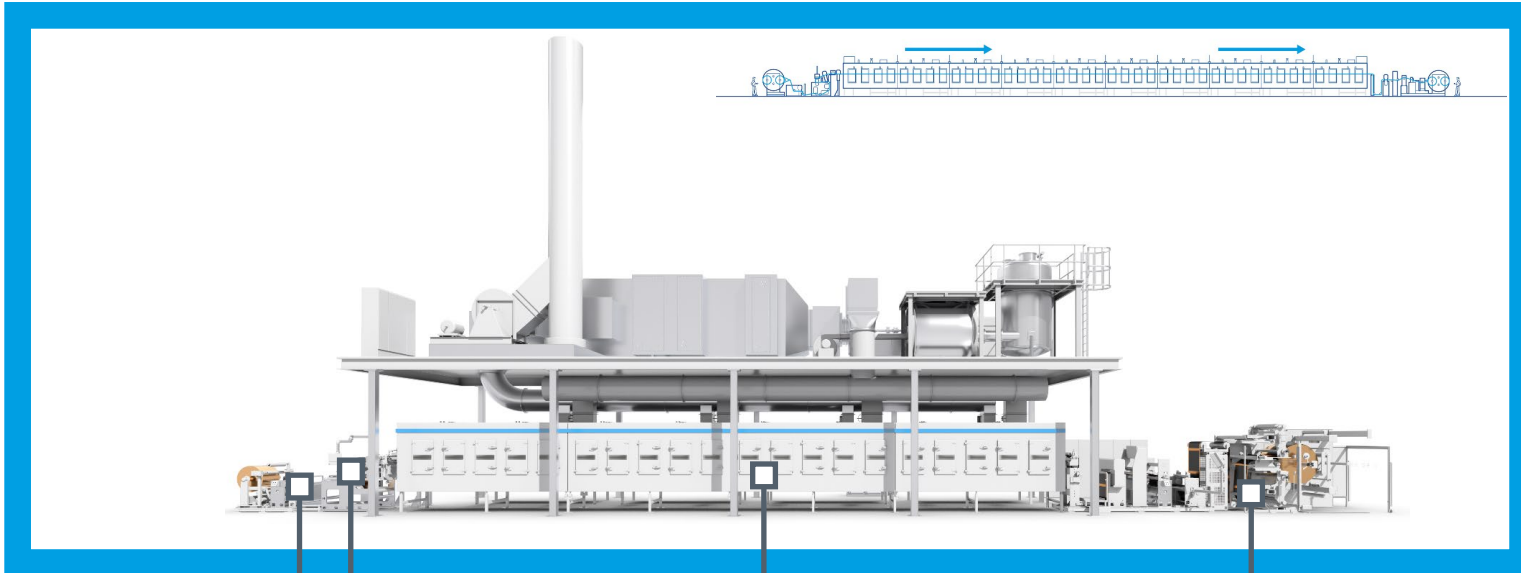
- Formation – first loading of cell
- Automation

- Put cells together in one battery box
- Automation



ProCoater™ & GigaCoater™

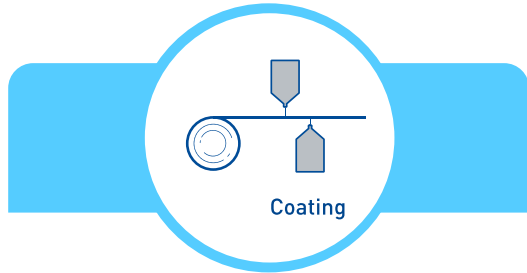
Simultaneous coating of both sides in one pass



Machine parameters	
Speed	20 – 80 m/min
Foil width	700 mm / 1400 mm
Capacity	0.5 – 1 GWh/a / 2 – 3 GWh/a
Dryer	15 – 50 m (flotation)
Coat weight	70 – 300 g/m ² dry
Coat precision	< +/- 1%
Sharp edges	< 3 mm
Dimensions & register	+/- 0,5 mm

Electrode manufacturing

Turnkey coating lines

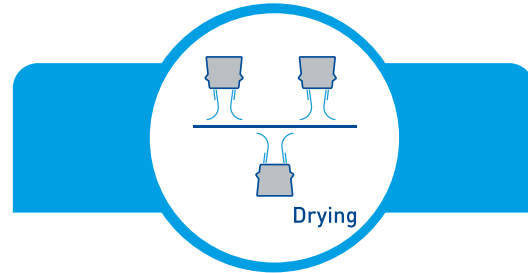


Coating

- 1 Tandem coating for series and large-scale production
- 2 Dual side coating for lab- and pilot lines to coat both sides in one process step

☆ Inline quality measurements
Closed-loop control
Unique automated thickness control
Automation and valve design

→ Higher yield and less scrap

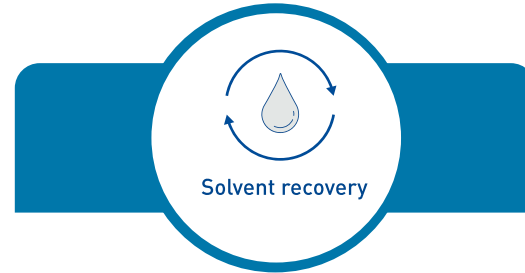


Drying

- 1 Flotation and roll supported dryer with more than 100 patents
- 2 Flexible heat sources
- 3 Air recirculation control and heat recovery technology

☆ No surface damages
Highest energy efficiency
No edge curling
Different temperature zones

→ Evenly dried electrodes with the lowest residual moisture

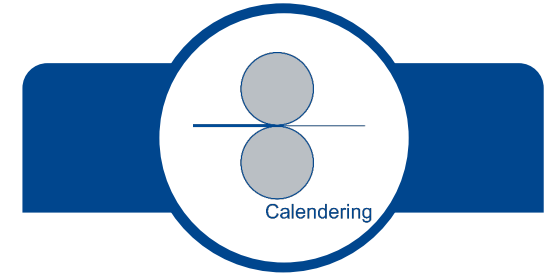


Solvent recovery

- 1 Most of the solvent recovered by condenser; < 260 ppm
- 2 Exhaust air cleaning by double concentrators; < 1 mg/Nm³
- 3 Electronic grade purity with > 95 % reuse of solvent in process

☆ Lowest emissions to meet strictest regulations

→ Typical payback with refining less than 1 year



Calendering

- 1 High precision with Dynamic Gap control : ± 0,5 µm.
- 2 Lowest footprint due to compact design and dynamic gap control method.
- 3 No gap variation during transition phases and Start/Stop resulting in reduced scrap.

☆ Lowest scrap rates
Easy to operate
Scalable from 80 to 400 tons

→ Best in class calendering technology

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www.durr.com

Dürr Systems, Inc.

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Lithium-Ion Battery Electrode Manufacturing

“Subject to change. The information in this presentation contains only general descriptions or performance characteristics, which may vary in different cases. The requested performance characteristics are only binding if they are expressly agreed in the contract.”

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