

Battery production equipment and services

Electromobility & Battery

End-to-end solutions for efficient production processes



YOUR  IN BATTERY PRODUCTION

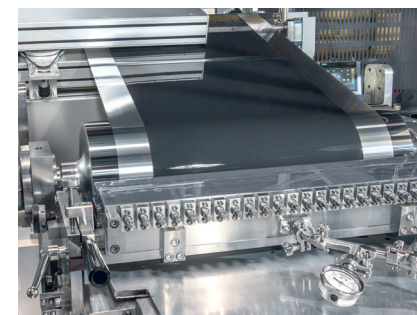
Electrifying solutions for future mobility

Full power for the future

Battery excellence for all manufacturing processes

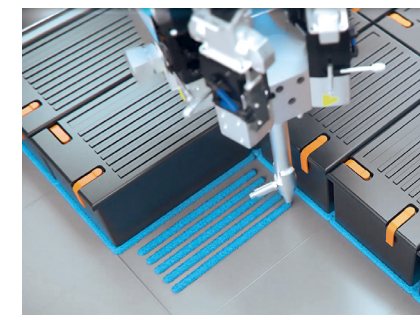
The increasing demand for clean energy is driving substantial growth in the battery industry. The advanced technology offered by Dürr in partnership with its specialist subsidiary teamtechnik enables you to stay ahead in battery production. As a worldwide company headquartered in Germany,

Dürr offers equipment for every stage of the value chain – not only paving the way for the production of efficient, high-quality batteries and electric vehicles, but also supporting future industry growth.



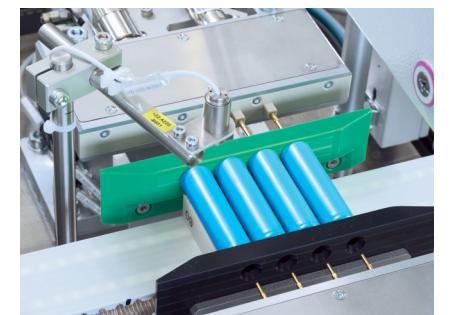
CELL MANUFACTURING

- Electrode coating
- Electrode drying
- Solvent recovery & refining



DISPENSING

- Gluing application
- Gap filling
- Cover sealing

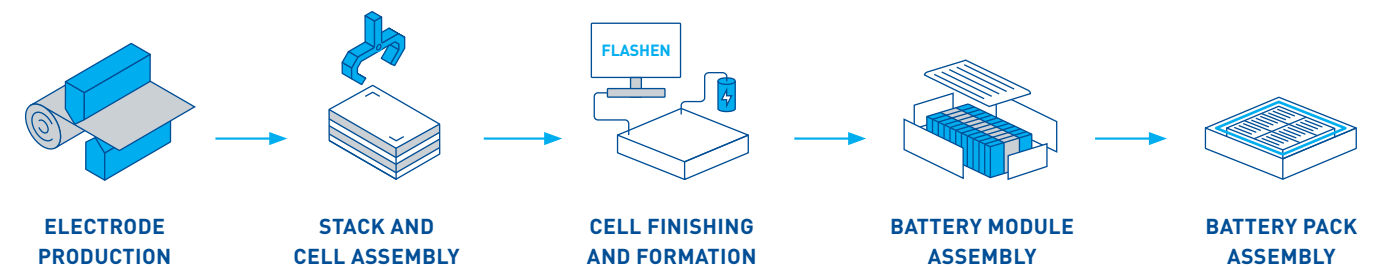


BATTERY ASSEMBLY AND TEST

- Cell end-of-line (EOL) testing and packaging
- Module assembly
- Battery pack EOL testing



UNIQUE EUROPEAN PARTNERSHIP IN THE FIELD OF PRODUCTION TECHNOLOGY FOR LITHIUM-ION BATTERIES

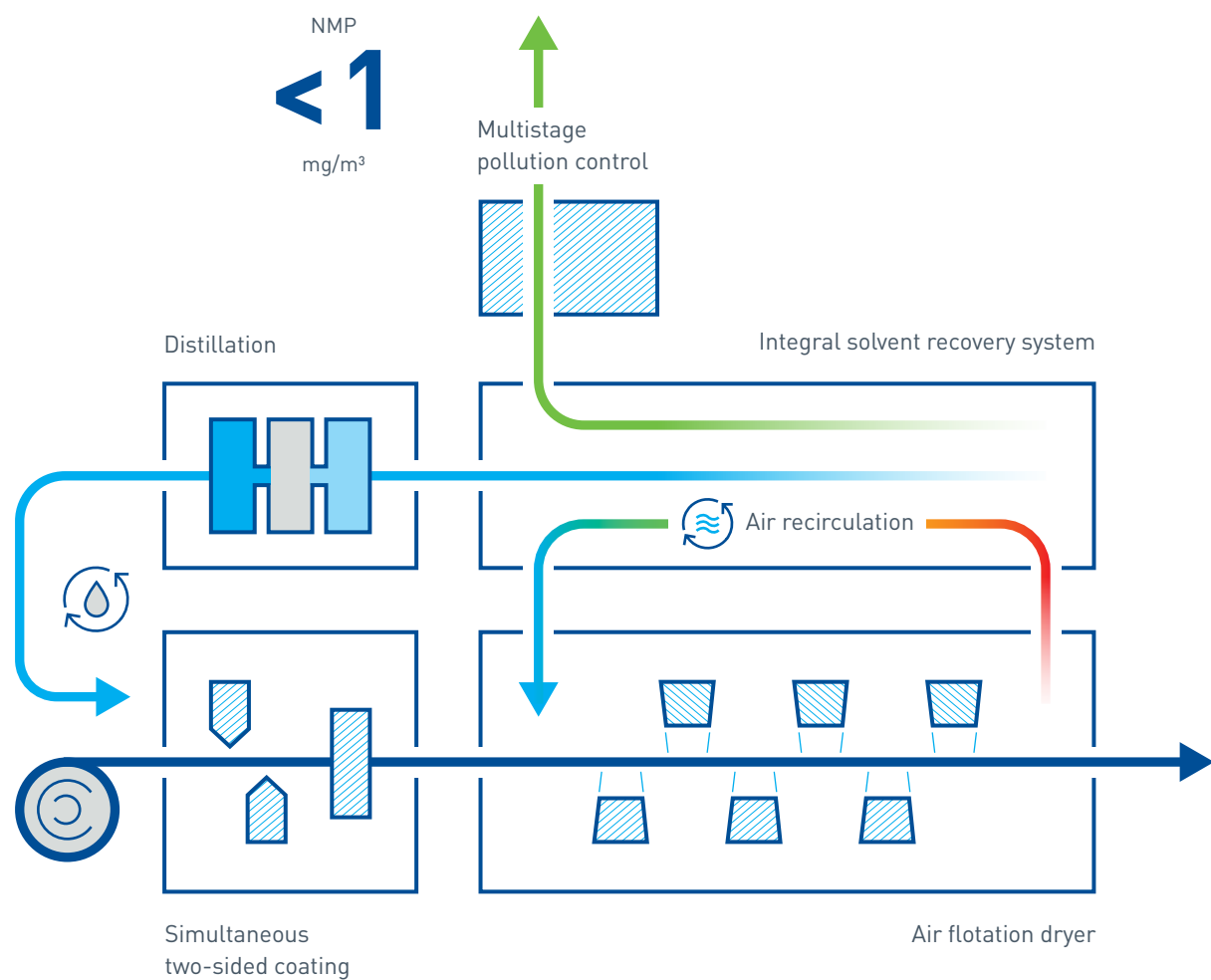


Manz, GROB, and Dürr have formed a strategic partnership in order to jointly acquire and deliver projects involving the equipping and fitting of entire battery factories. Our aim is to offer the manufacturers of lithium-ion batteries a single source of supply for fitting their facilities with production technology –

spanning every stage of the value chain. Working in unison, we offer turnkey solutions for use in entire digital factories, including consulting services, production equipment along the entire process chain, and smart approaches to connected manufacturing.

Lithium-ion electrode manufacturing

Highest quality from R&D to mass production



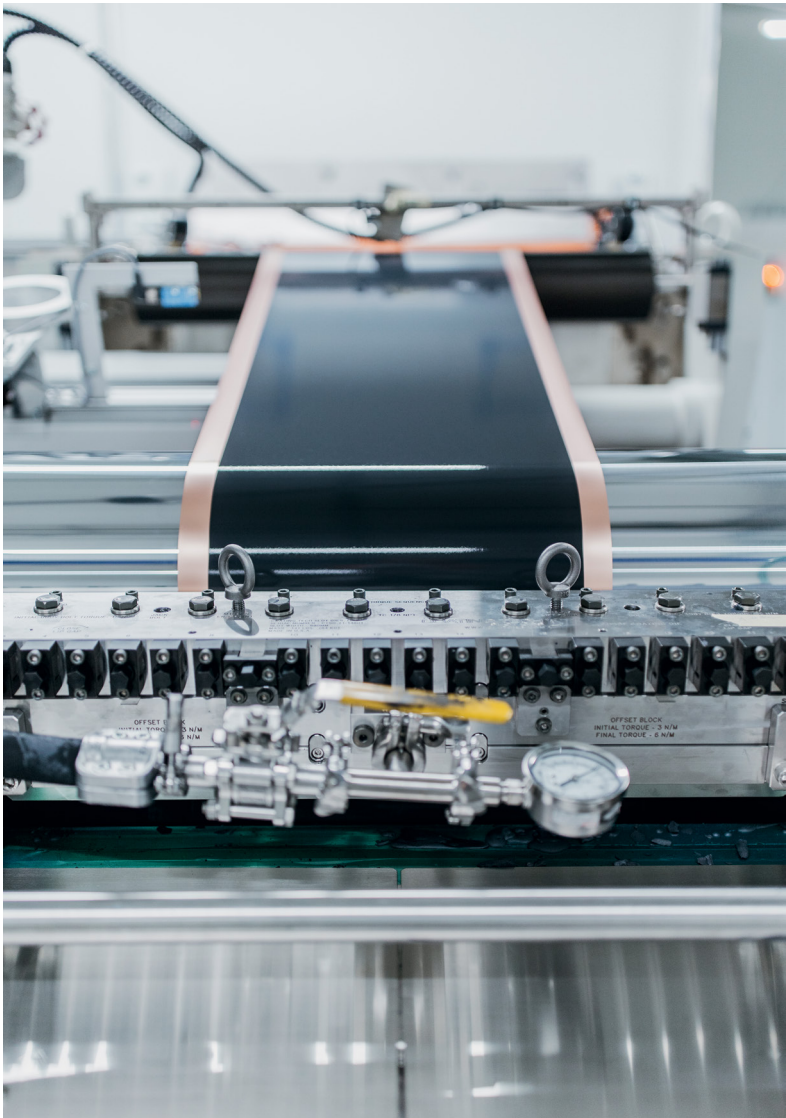
ELECTRODE COATING

To provide solutions that match production requirements, we offer innovative, simultaneous two-sided coating as well as conventional tandem coating equipment. Dürr has developed a web coating process based on two slot-dies mounted vertically and horizontally. These make it possible to coat both sides of electrode foils simultaneously. All this results in a smaller overall manufacturing footprint and zero edge curl after drying. Together with our Japanese partner TechnoSmart, we also offer a straightforward tandem coating process optimized for large foil widths.

DRYING AND CURING

Dürr provides end-to-end drying and curing solutions for the production of advanced web-based materials, such as cathode and anode electrodes for lithium-ion batteries. With more than 100 patents and thousands of dryer installations worldwide, we continue to pioneer the engineering and development of non-contact flotation dryers and ovens.

- Custom convection and hybrid dryer styles and designs
- Different types of heat sources, zone lengths, web widths, and nozzle configurations
- Superior drying, curing, and web handling



Coating quality enables the battery performance.



Solvent recovery: an integral part of sustainable production



> 99 %

recovered NMP

> 95 %

reusable solvent after distillation

SOLVENT RECOVERY AND REFINING

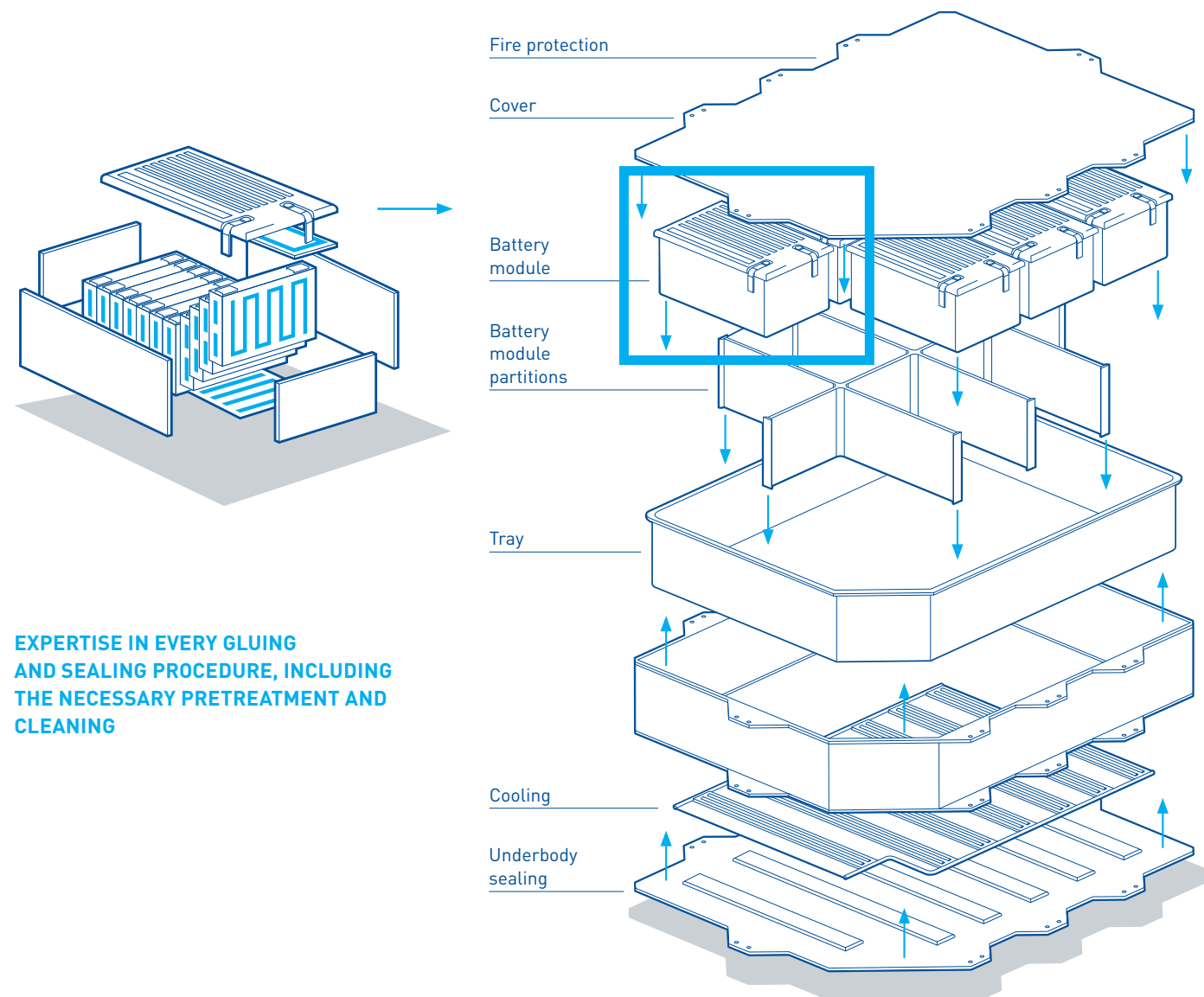
Dürr has developed proprietary systems that maximize the efficient removal, recovery, and purification of solvents, primarily for use with the kind of coating line exhaust air streams encountered in electrode manufacturing. These multistage systems offer the lowest CapEx and operating costs for gigafactories.

Gluing solutions

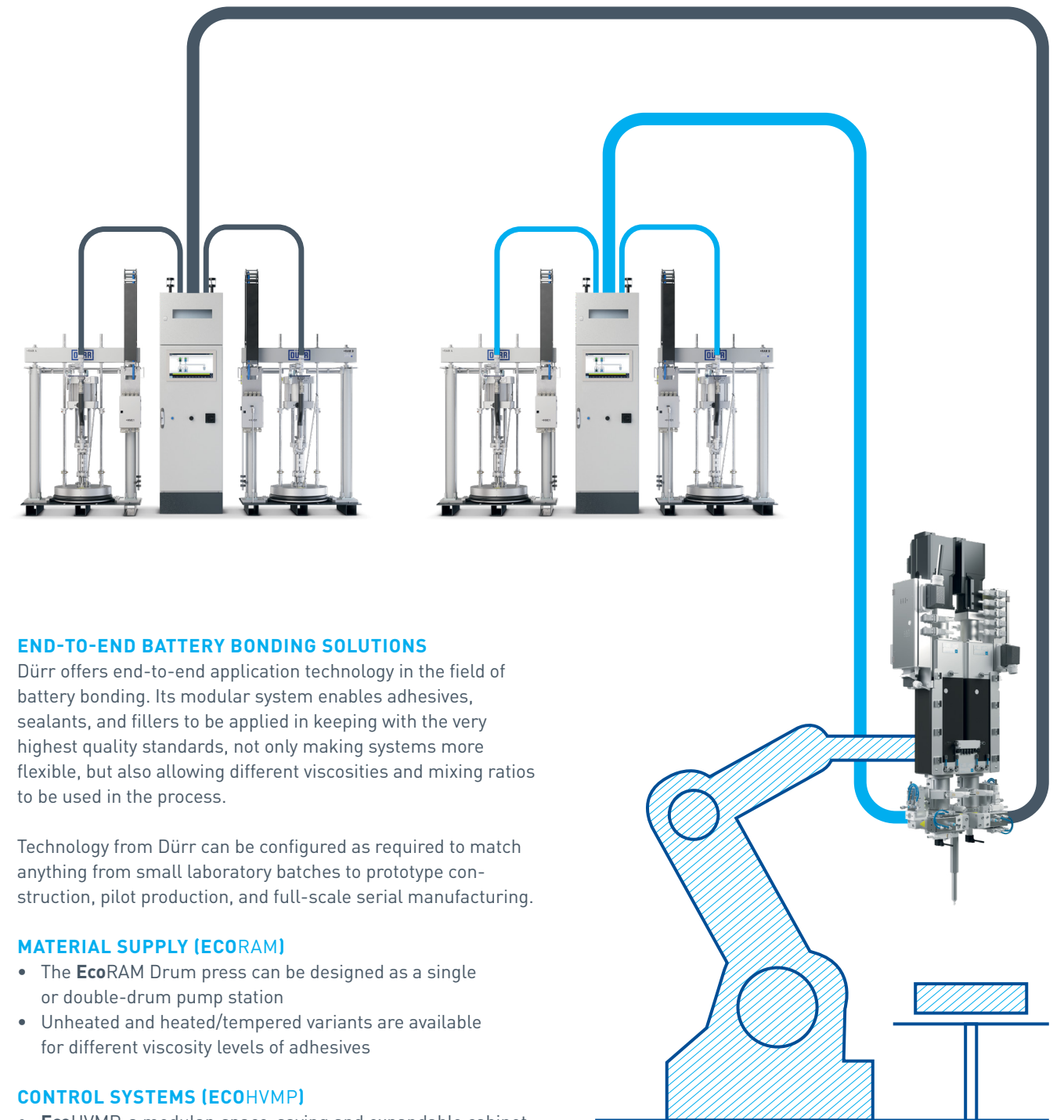
Precise application of sealants and fillers in battery production

The best way to shield sensitive battery cells from the negative impacts of collisions – and offer general protection from vibration – is to ensure adhesives and sealants are evenly distributed during assembly.

Dürr is also developing innovative processes for the application of thermally conductive materials in the field of thermal management. This finally makes it possible to completely seal in battery cells – without air pockets. Not only does this optimize thermal conduction, it also stops humidity entering and gases escaping.



EXPERTISE IN EVERY GLUING AND SEALING PROCEDURE, INCLUDING THE NECESSARY PRETREATMENT AND CLEANING



END-TO-END BATTERY BONDING SOLUTIONS

Dürr offers end-to-end application technology in the field of battery bonding. Its modular system enables adhesives, sealants, and fillers to be applied in keeping with the very highest quality standards, not only making systems more flexible, but also allowing different viscosities and mixing ratios to be used in the process.

Technology from Dürr can be configured as required to match anything from small laboratory batches to prototype construction, pilot production, and full-scale serial manufacturing.

MATERIAL SUPPLY (ECORAM)

- The **EcoRAM** Drum press can be designed as a single or double-drum pump station
- Unheated and heated/tempered variants are available for different viscosity levels of adhesives

CONTROL SYSTEMS (ECOHVMP)

- **EcoHVMP**, a modular, space-saving and expandable cabinet controls the pump and applicators
- The control cabinet (safety PLC) works without complex cable routing, and connectors provide for quick installation

DOSING SYSTEMS (ECOSHOT METER)

- Our electric piston dosing unit dispenses highly viscous materials independent of material supply factors
- Suitable for 1K or 2K applications requiring very high dynamics and accuracy in the process

APPLICATORS (ECOGUN)

- Come equipped with different nozzles to apply adhesives with different bead cross-sections and volume
- Deliver optimum quality at the start and end of the bead
- Can be used on gluing towers or controlled by robots

Turnkey testing and assembly systems

High-speed battery mass production

FROM CELLS TO ENTIRE MODULES AND PACKS

Drawing on many years of experience in advanced manufacturing, teamtechnik is now one of the leading providers of modular, flexible assembly and testing systems. Its strong track record now applies to the stringent demands of battery production:

- EOL testing and packaging of battery cells
- Battery module test and assembly
- EOL testing of battery packs

FROM START-UP SYSTEMS TO HIGH-SPEED PRODUCTION – TAILORED TO YOUR EXACT NEEDS

Teamtechnik offers standardized assembly and test systems for use in the optical and electrical EOL testing of all cylindrical cell formats. Its solutions can also be used with prismatic cells in all kinds of production processes after formation and aging.

The TEAMBATT platform allows a wide range of tests to be conducted in keeping with differing assembly requirements. Systems can be extended as required and matched to all kinds of production scenarios.

TEAMTECHNIK TECHNOLOGY OVERVIEW



➔ MECHANICAL APPLICATIONS



➔ OPTICAL TEST



➔ ELECTRICAL TEST

PROCESS TECHNOLOGIES		
Process steps	Optical inspections	Electrical testing
Cell feeding	Dimensional inspection	OCV (open circuit voltage)
Cell weight measurement	Testing for impurities	Internal resistance testing
Cell insulation and application of insulation material	Identification and tracking by barcode reading or DMC reading	ACIR, DCIR
Heat-shrink tunnel cleaning or plasma activation	Optical inspection of the insulation foil	Puls power
NOK handling	Top and bottom inspection	BMS flash
Pressing	Surface inspection	HV testing
Packaging		Leakage testing
Palletizing		

MODULE ASSEMBLY AND TESTING



CELLS

The EOL packaging lines of cell production involve an extensive variety of processes. In addition to important processes such as shrink tube application and cell labeling, the main focus of EOL packaging lies in optical and electrical testing. We provide turnkey solutions to match all key packaging and testing processes, from fitting insulation tubes to packing cells into boxes using different palletizing solutions.

MODULES

One of teamtechnik's core competencies is the design and construction of entire manufacturing lines for the production of battery modules made with cylindrical cells. Traditional production involves assembling and testing modules quickly and accurately based on individual round cell batteries. We provide turnkey solutions with footprints of only 12 × 6 meters, delivering outputs of 7,200 cells per hour and system autonomy of 60 minutes.

IN-DEPTH HANDLING KNOW-HOW

Depending on the specific requirements of customers, as well as individual cell designs, there are many ways to handle round and prismatic cells in production. The options range from bunker systems to rotary indexing tables, cell conveyor belts, robot handling, pick-and-place solutions, magnetic or vacuum grippers, and axial portals.



Cell feeding with bunker solution.

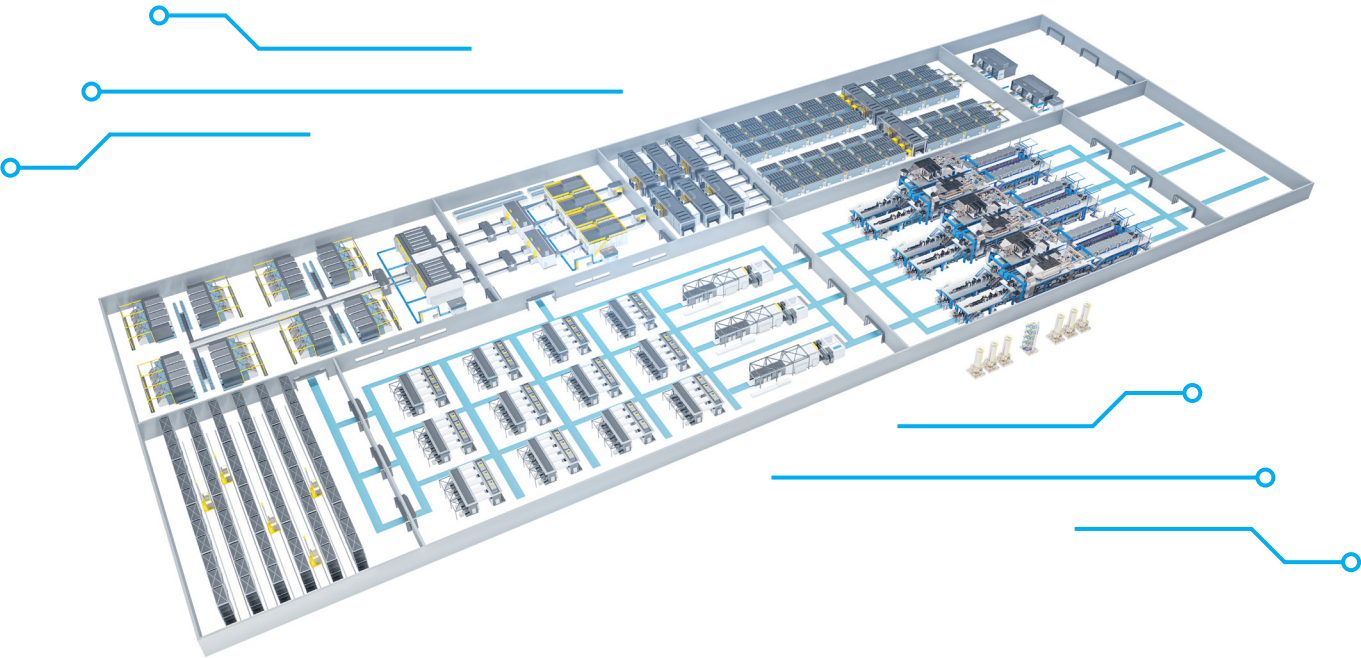
Digitalize and plan your battery facility

Optimize factory planning with Dürr

PLAN YOUR DIGITAL BATTERY FACILITY

iTAC Software, a subsidiary of Dürr, offers battery manufacturers an end-to-end solution for optimizing and controlling entire production processes – from electrode production to cell assembly and finishing. By combining business intelligence dashboards with predictive quality based on analytical tools,

its solutions make it possible to detect changes and anomalies early. As an all-in-one solution, it also increases productivity and safeguards quality, thus enabling manufacturers to produce zero-defect batteries at maximum capacity.



CONSULTING

Dürr Consulting has a world-class understanding of industry in combination with detailed digital expertise. This offers access to key know-how that will ensure production remains competitive over the long term by integrating different fields of technology, advanced innovation, digitalization, production system design, and process optimization.

In addition to enabling battery producers to meet the evolving needs of the battery market, this solution enables them to perform exceptionally well while maintaining competitive pricing. The integrated planning tools of our digital solutions also offer tangible customer benefits from initial ideas and concepts to standard operating procedures.

Your partner for successful production

Dürr offers customer support in all corners of the globe. Always on hand to help you reduce production costs, we also improve plant availability and guarantee rapid technical support. Whether you're dealing with an emergency in the here and now, or planning and implementing a relaunch – we're here to support you.

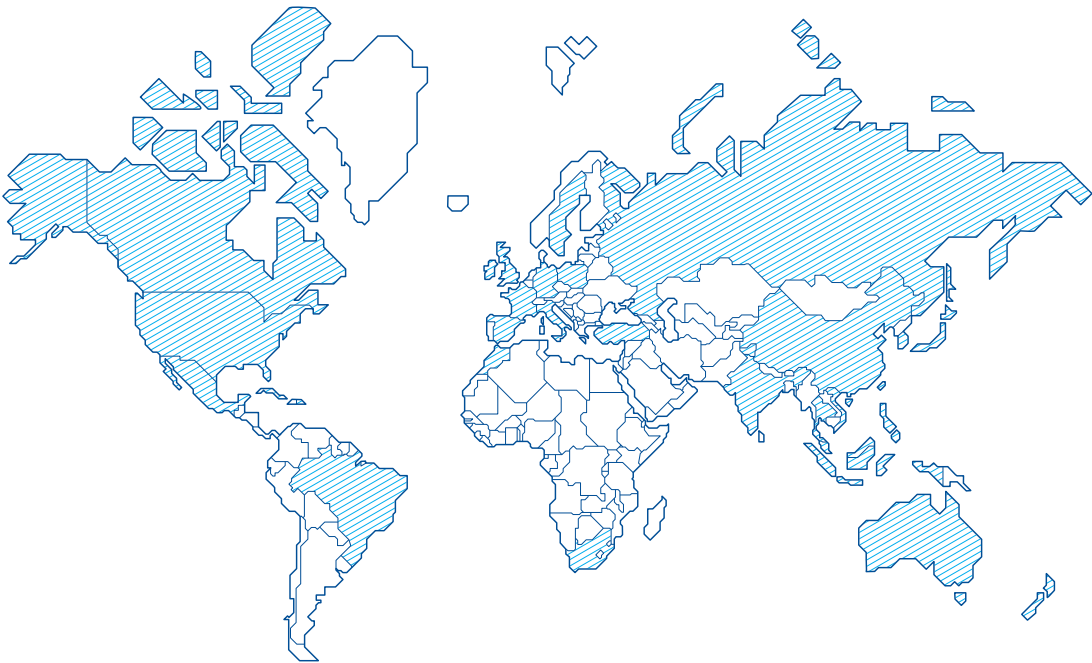


OUR SERVICE – READY ON DEMAND

- Ramp-up and launch management
- Modifications and upgrades
- Engineering with experience
- Spare parts service
- Inspection and maintenance
- Service locations all over the world

Anytime, anywhere

DÜRR SERVICES – ALWAYS CLOSE TO YOUR PLANT



CANADA	FRANCE	ITALY	MOROCCO	JAPAN	MALAYSIA
USA	SPAIN	POLAND	SOUTH AFRICA	SOUTH KOREA	INDONESIA
MEXICO	BELGIUM	RUSSIA	CHINA	VIETNAM	AUSTRALIA
BRAZIL	GERMANY	TURKEY	INDIA	THAILAND	NEW ZEALAND
UK	SWEDEN				

LEADING IN PRODUCTION EFFICIENCY



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