

THERMAL PROCESS SOLUTIONS FOR THE LITHIUM ION BATTERY INDUSTRY



Expertise in battery kiln manufacturing

Thanks to our extensive expertise we offer a broad, customizable, high quality equipment/solutions range for Lithium-ion battery materials.

High manufacturing quality

- High level quality control management by Riedhammer / Sacmi
- Use of high grade materials and components / Reliable suppliers
- Quality and performance validation in our workshop (FAT)
- Continuous development / improvement of equipment
- Special / tailor-made solutions

High efficiency

- Reliable long lifetime equipment / High productivity
- Very low specific energy and media consumption
- Excellent temperature uniformity
- Strong, reliable sagger circulation and handling system

Excellent service

- High performance service
- Efficient operator training
- 24-hour response time for troubleshooting
- Remote control for fast technical support

Large number of completed projects worldwide

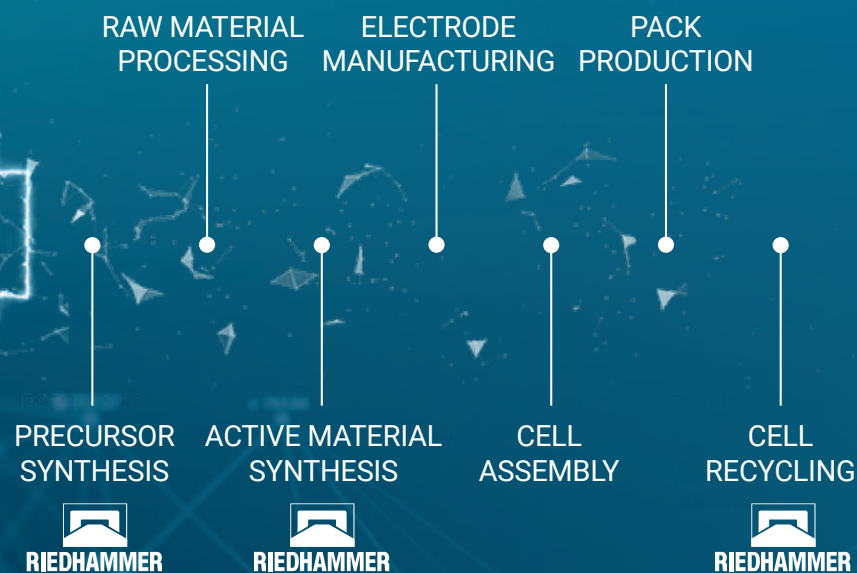
- ✓ More than 450 battery kilns successfully built and in operation
- ✓ > 170 kilns for high O₂ operation
- ✓ > 300 kilns in Asia
- ✓ Successful projects in China, South Korea, North America and Europe
- ✓ Supplying key players in the battery business



Process chain for the Lithium battery production



- Precursor synthesis
- Active material synthesis
- Cell Recycling

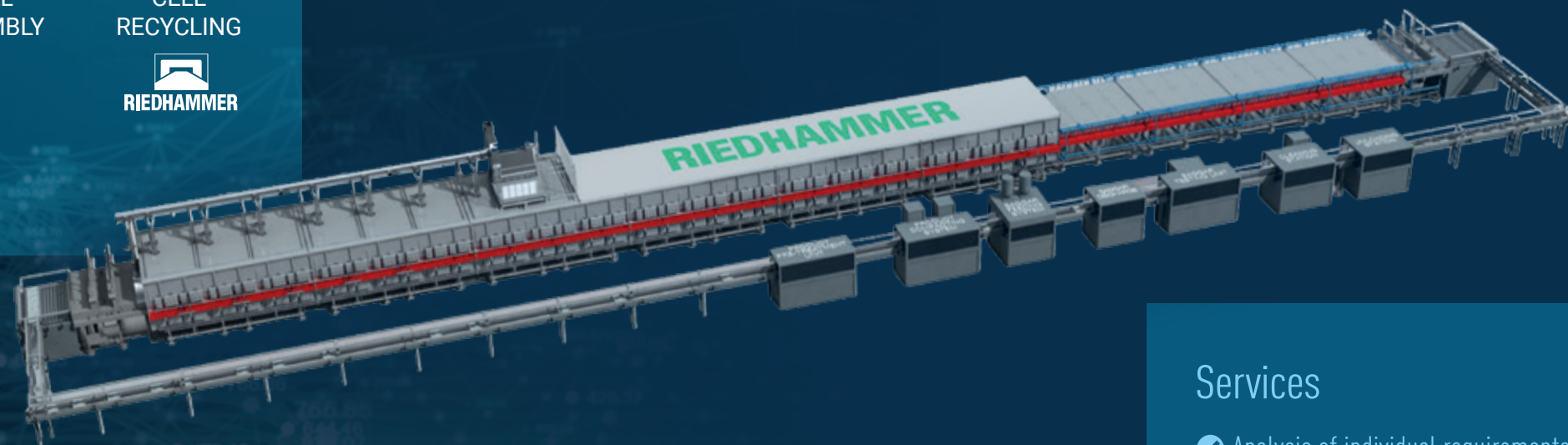


Roller hearth kilns

Sagger circulation line with automatic sagger handling and powder handling systems

- ▣ Tailor-made process requirements
- ▣ 4-tray, 6-tray width with multiple layer configuration
- ▣ High O₂ atmosphere > 99 %
- ▣ Inert gas atmosphere (N₂, Ar, CO₂ and others) < 30 ppm O₂
- ▣ Special atmosphere (H₂, CO, CH₄ and others)

- ▣ Optimal temperature distribution
- ▣ Length up to 150 m
- ▣ Gas-tight kiln casing
- ▣ Uniform product treatment



Rotary kilns

- ▣ No need for saggars or handling
- ▣ High output capacity due to excellent heat transfer and short cycle time
- ▣ Customized solution, tailored to your product
- ▣ Adjustable tilt and rotation speed
- ▣ Precise atmosphere adjustment inside rotary tube
- ▣ Gas-tight feed system
- ▣ Cooling tube



Wide range of powder calcination and sintering processes

- ▣ High O₂ atmosphere > 99 %
- ▣ Inert gas atmosphere (N₂, Ar, CO₂ and others) < 30 ppm O₂
- ▣ Special atmosphere (N₂, CO, CH₄ and others) < 30 ppm O₂ / Air atm.



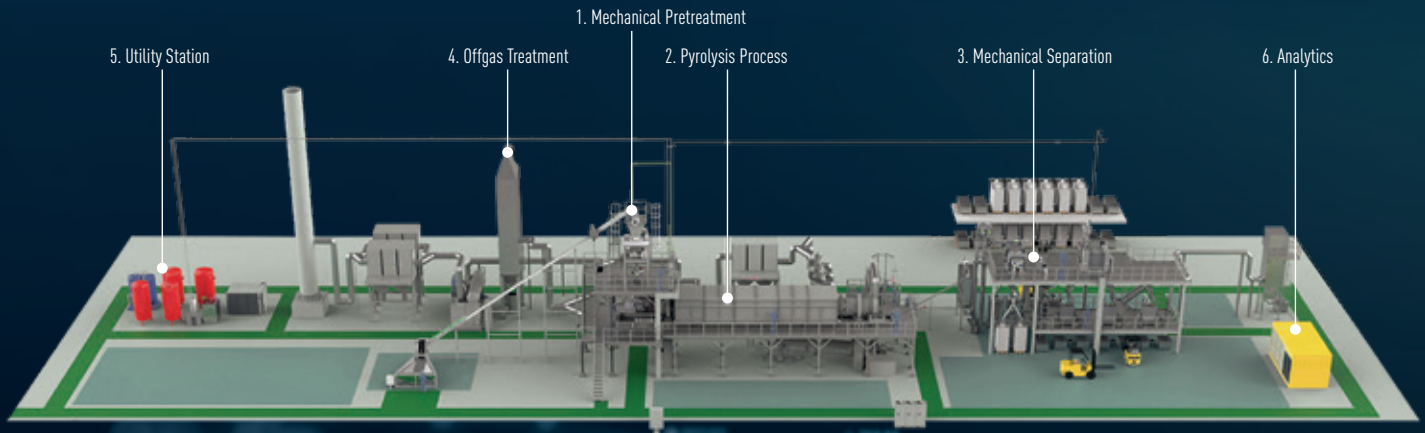
Services

- ✓ Analysis of individual requirements
- ✓ Customized kiln solutions
- ✓ Design concepts
- ✓ Detailed offers
- ✓ Process engineering
- ✓ Production and testing
- ✓ Shipping, assembly, commissioning on site
- ✓ Documentation
- ✓ Production support
- ✓ Process analysis
- ✓ Maintenance
- ✓ Plant revamping

Support for related processes and equipment via a broad network throughout the LIB industry

Combined Lithium cell recycling plant

All-in-one



Product Innovation

- Processing of different cell shapes and cell chemistries
- Continuous Recycling Operation
- Capacity of up to 48 tons/day

Innovative Technology

- Robust and efficient Pyrolysis Kiln – fully developed technology
- Efficient removal of binders, organics and fluorine sources
- Regeneration of commercially available recycled materials of highest quality



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