

Licensing Ecofriendly Recycling of Lithium-Ion Batteries

Duesenfeld GmbH



Corporate Presentation

Patents for licensing

- Patent Discharge
 - Licence description
 - Advantages
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- Patent Vacuum Drying
 - Licence description
 - Advantages
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- Patent Hydrometallurgy
 - Licence description
 - Advantages

Corporate Presentation

- Duesenfeld is a pioneer in the recycling of Lithium-Ion Batteries and has developed processes that do not require the initial melting or heating of the battery modules.
- Duesenfeld licenses the CO₂-neutral technology to car manufacturers, cell producers and recycling companies worldwide.
- Scaling through licensing, highest possible impact for CO₂ savings
- Plant engineering partners supply turnkey recycling plants to licensed customers
- R&D for best recycling technology > permanent updates for licence customers

Company Foundation: 2016

Location: Wendeburg / Germany.

Research close to industry : Production runs in 3-shift operation with a capacity level up to 3,000 tons / year.

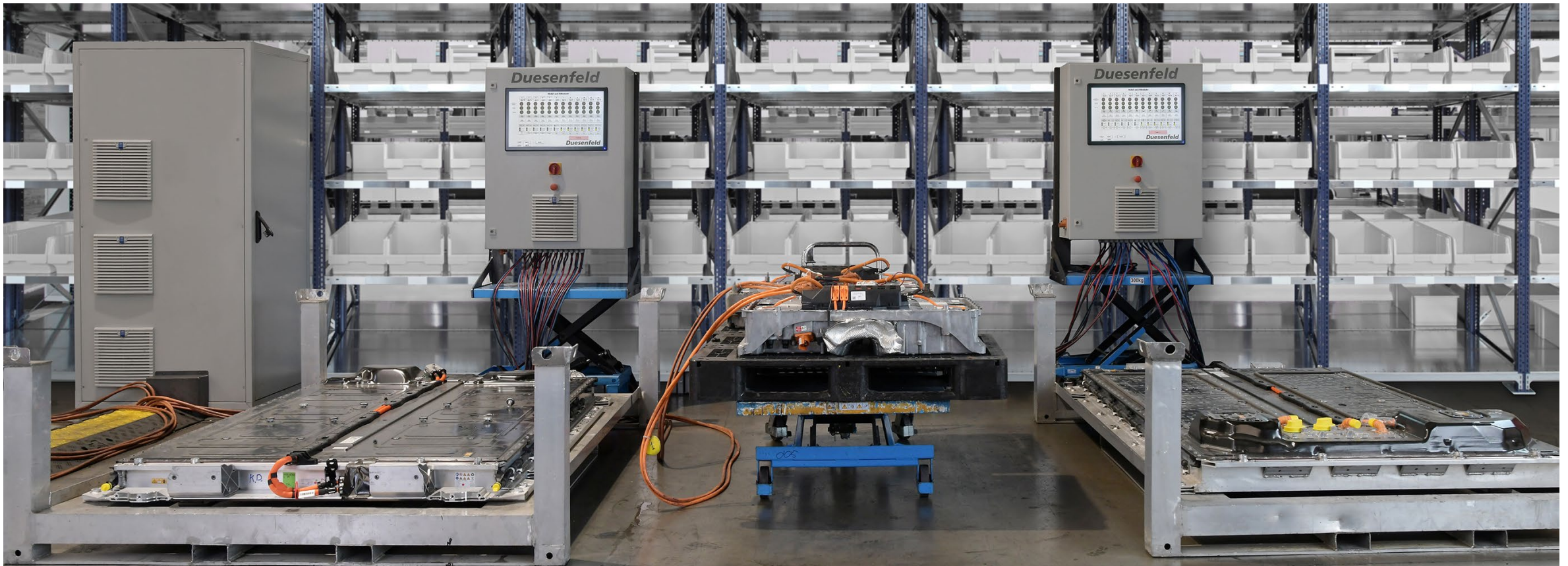
CO₂ neutral operation

Long-years experience in recycling technology and R&D (>10 years)



Patent Discharging

- Safe and efficient discharging Patented, automated discharge process with series connection.
- Controlled deep discharge followed by automatic short circuit. Recovery of stored electrical energy up to 50 % of total consumption.



Patent Vacuum drying

- Patented low-temperature process $<80^{\circ}\text{C}$ and $<300\text{ hPa}$ > no toxic gases
- Recovery Duesenfeld Black[®], high purity electrolyte
- No generation of hydrogen fluoride: no waste gas scrubbing, no contaminated waste and no corrosion of the plant; energy and cost savings.
- Conducting salt is not decomposed, 100% of the lithium remains in the black mass
- Duesenfeld Black[®] has product status at the production site in Wendeburg



Recovered reusable Electrolyte

Patent Hydrometallurgy

Description

- Patented Duesenfeld process
- Safe fluoride removal
- End products: NiSO_4 , CoSO_4 , MnSO_4 , Li_2CO_3 (battery grade) and graphite.



Duesenfeld

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Lithium-Ion Batteries

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