

# Lithium-ion: fact check.

The Jungheinrich decision-making aid.



**JUNGHEINRICH**

# The future is taking off.

You can wait for change to happen, or you can just seize the day. That's why we've been driving forward the development of lithium-ion batteries for use in intralogistics for over 10 years. As well as implementing our own, innovative solutions. It is our aim to pave the way and try new things. We are so convinced of the many advantages that Li-ion offers. So, in order to convince you too, we have put together useful facts and information that will provide a solid foundation for your decision.



# – 17 %

**of CO<sub>2</sub> emissions are saved over a truck cycle by using lithium-ion batteries compared to lead-acid batteries.**

Many sceptics complain about the large amount of energy expended in manufacturing lithium. Yet manufacture is just one of four steps within the life cycle of a battery. After this comes transportation, use and refurbishment. In conclusion, over the entire life cycle lithium-ion batteries prove to be superior to and conserve more CO<sub>2</sub> than lead-acid batteries. The EFG BB 216k electric forklift truck with a lithium-ion battery produces 17 % less CO<sub>2</sub> compared to the version with a lead-acid battery.

# 3 x

**The number of times lithium-ion batteries are given a new lease of life at Jungheinrich.**

In order to use lithium-ion batteries as sustainably as possible, we have developed a long-term cyclical concept. The batteries spend the first stage of their life cycle in new trucks. After professional refurbishment, they spend the second stage in used trucks. After that, the batteries still have sufficient capacity to be used as stationary energy storage systems in the third stage of the cycle. When batteries reach the end of their life for the third time, they are recycled and form raw materials for the production of new batteries.

# A guarantee of up to 8 years

**for calculable investment and planning security.**

You benefit from an eight-year guarantee on the lithium-ion batteries we produce. You also have the option of opting for our satisfaction guarantee: If you want to switch back to lead-acid batteries within six months, we can make that happen.

# > 170,000

installed lithium-ion batteries have already delivered impressive results in daily use.

With over 10 years of experience in the development, research and production of its own lithium-ion batteries, Jungheinrich plays a pioneering role in the intralogistics market. Since then, we have consistently developed battery systems and process parameters. This expertise offers our customers additional investment security.



**When deciding whether to switch to lithium-ion batteries, there are many good reasons and convincing facts. We have listed a number of benefits to give you an informed basis for your investment decision.**

# 95 %

of a lithium-ion battery is what we aim to recycle at Jungheinrich.

It is our goal and objective to reuse up to 95 % of valuable cell materials such as lithium, copper and aluminium and return them to the recycling cycle.



# Less cost

compared to lead acid technology: Lithium-ion batteries impress with their lower overall costs.

It's true that lithium-ion batteries are more expensive to purchase than conventional lead-acid batteries. However, these maintenance-free batteries that last up to three times longer do not incur maintenance and replacement costs, which has a positive effect on the overall costs of the system in the medium term.

# Maximum efficiency

Lithium-ion batteries are a real efficiency booster because they are particularly effective compared to other technologies. With Li-ion technology, the (renewable) energy used is passed on from storage and transport to vehicle propulsion with significantly less loss than with lead-acid batteries or green hydrogen. This results in an efficiency gain of around 30 % compared to the lead-acid alternative. If you focus on energy efficiency, lithium-ion technology is the obvious choice. It is good for your business and good for the environment.

# Fourfold safety

Our safety concept covers all aspects from employee safety and product safety to process safety and environmental safety.

## Environmental safety

Cells based on lithium iron phosphate offer the safest cell chemistry currently available on the market. Ecologically non-toxic and non-hazardous, they also present an extremely low fire hazard.

## Employee safety

Lithium-ion batteries are maintenance-free, do not emit gases and help to avoid injuries, particularly through simplified battery handling and uncomplicated charging processes.

## Product reliability

Our own battery management system protects against overcharging, overheating or a voltage imbalance. Battery strands can be switched off in isolation in the event of a fault so that the rest of the battery remains usable. The battery has a sturdy cover to protect it against external influences.

## Process reliability

Our energy experts will support you in switching to lithium-ion technology with a concept tailored to your needs and your company.

**ISO 9001** The German production facilities  
**ISO 14001** in Norderstedt, Moosburg  
and Landsberg are certified.

 Jungheinrich trucks  
conform to the European  
Safety Requirements.

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