



## **rail** | Product Overview

Batteries and system solutions for  
rail transport applications

## Power is our passion ...

You are looking at the results of 90 years' work. 90 years of passion for innovative solutions for mobile power supplies – 90 years of German engineering skill and the aim of never being satisfied with what we have already achieved.

This is only possible thanks to the employees, who continuously support us along this path. Together with our business partners, we have continued to push the limits forwards and ensure that the impossibilities of yesterday have now become a jointly achieved reality.

Only through our partnership with you, we are able to create the perfect symbiosis of economically optimised solutions and state-of-the-art technological products.

With our structure of nearly 2000 employees at more than 20 locations around the world, we are always close to you and keep our finger on the pulse of pioneering innovations.

Flexibility in the design of your projects and extremely reliable products are our every day aims. With highly available local service we have ensured a thorough understanding of your special challenges for decades.

**If you expect more than just a product but a competent partner who is always at your side, HOPPECKE is the right choice for you.**



## Your strategic partner for rail applications

Making reliable and sustainable energy solutions in the railway industry available to urban and rural areas at all times is one of the major challenges of our time.

HOPPECKE can count on a wide range of practical know-how to develop state-of-the-art high-tech batteries and system solutions in all common technologies. With our rail application range, we are offering you product and service innovations that set new standards in the mobile energy supply.

Together with our customers, we develop individual energy concepts that are convincing through flexibility and reliability even at peak loads – taking into account all international standards with regard to quality, safety and environment.

Whether heat, cold or vibration: Our custom-made special systems are used worldwide for the most extreme requirements. From the Sahara to Siberia, our traction batteries make a difference with their technological and innovative developments. Our railway battery systems meet the requirements of all applications in the complex and modern railway landscape. Our reliable battery systems are rounded off by a worldwide service that is also part of our philosophy.

We look forward to accepting your challenge!

### CERTIFICATIONS

#### Quality, safety and the environment

HOPPECKE is certified and tested according to international standards and guidelines.

#### Quality / Safety:

- ▶ ISO 9001
- ▶ IRIS ISO / TS22163
- ▶ OHSAS 18001
- ▶ EN 15 085

#### Environment:

- ▶ ISO 14001
- ▶ ISO 50001



# Technologies

Our diversity makes the decisive difference

## Nickel-Cadmium Products

### rail | power FNC

Fibre structure technology

Proven for millions of times, unique worldwide: Since 1983, our fibre-nickel-cadmium (FNC) technology has been convincing with high reliability and extreme cycle stability of over 3000 cycles (IEC60623). With its wide range of capacities and performance classes, it can be used flexibly and can be optimally adapted to your needs. Even at extreme temperatures, it ensures the safety of your railway application.



#### Your benefits rail | power FNC

- ▶ Very high reliability
- ▶ Very long cycle life
- ▶ Flexible in use

### rail | power HNCS

Sinter/PBE technology

High energy density and superior performance: The combination of these two properties makes this technology suitable for all applications which require high energy to be provided in a short time while also meeting demanding installation space and weight requirements. This opens up new areas of applications, including the supply of traction energy for depot or emergency operation.



#### Your benefits rail | power HNCS

- ▶ High energy density
- ▶ Outstanding performance
- ▶ More payload due to lower own weight

## Lead-Acid Products

### rail | power PzS

vented

The vented lead-acid battery, available as a 2V single cell, represents a long proven technology based on tubular and grid plate electrodes as well as liquid electrolyte. The electrodes are based on lead-antimony technology. They can be used reliably in all railway vehicles – even where space is limited.



#### Your benefits rail | power PzS

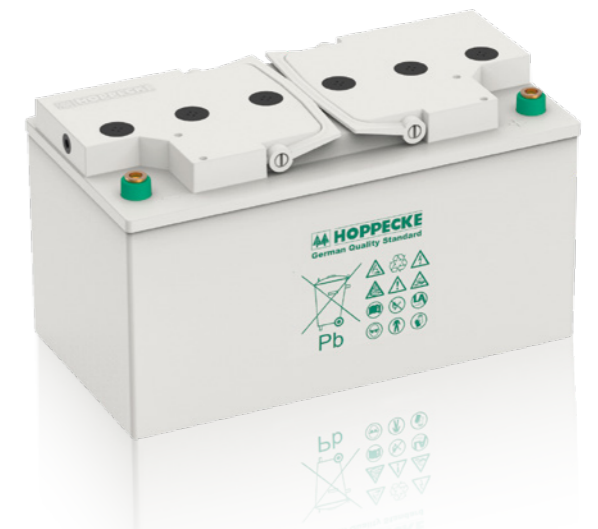
- ▶ Protective Shell Separator effectively prevents short-circuits due to mossing
- ▶ High cycle stability
- ▶ Long service life

### rail | power AGM

valve regulated

The valve-regulated lead acid batteries from HOPPECKE, available as 2V single cell as well as 6V and 12V block batteries, are characterised by the innovative and patented AGM-ESS technology. The addition of gel to the electrolyte combines the advantages of the AGM battery with those of the GEL battery.

This technology eliminates the need for regular topping up with water and avoids contamination by electrolyte aerosols, so minimising the required maintenance effort – and hence cost.



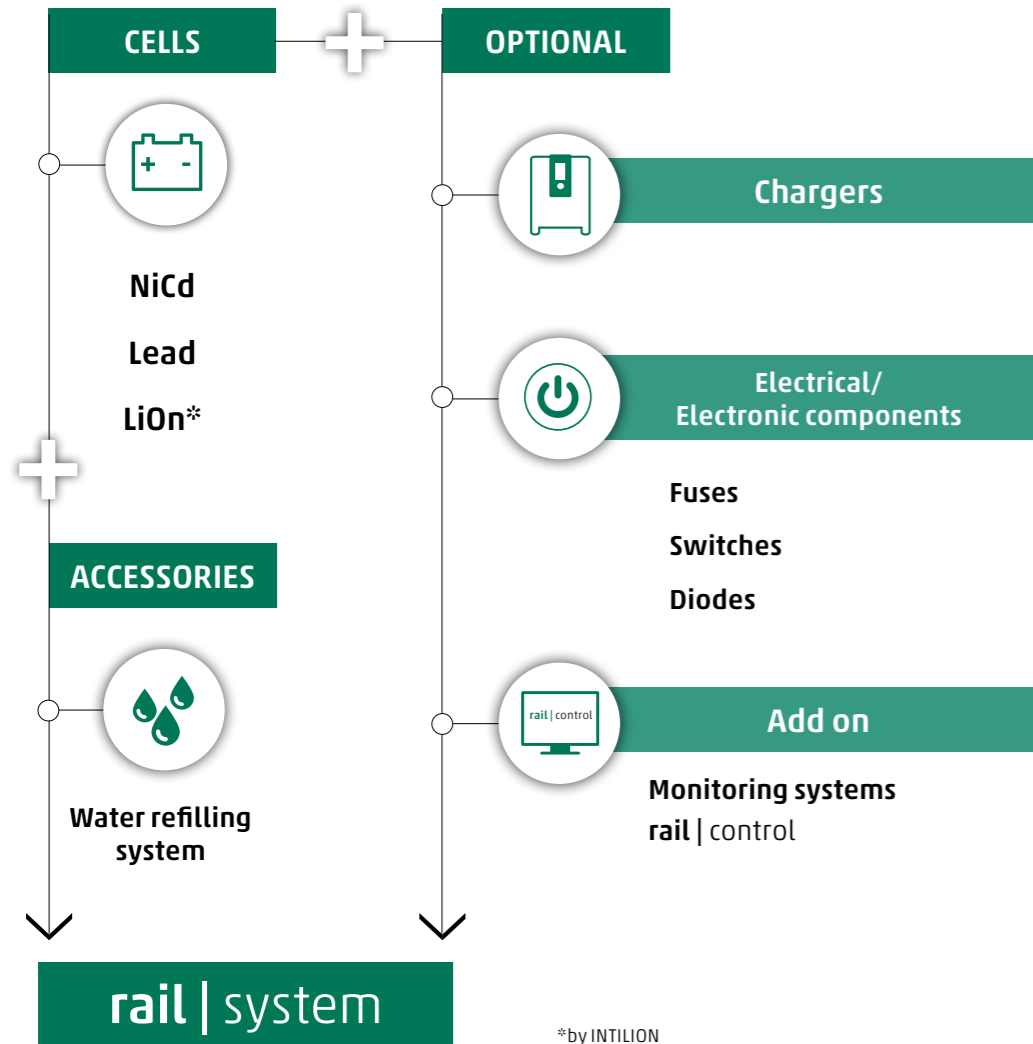
#### Your benefits rail | power AGM

- ▶ No need to top up with water
- ▶ Leakproof
- ▶ Compact design saves space



# HOPPECKE System Solutions

Our innovations for your success



## Our solution for your requirements

Together with you we develop tailored solutions for rail battery systems. We will focus on your successful project and support you from start to finish. We will be at your side – from initial project analysis through planning and implementation right down to the installation and certification of your power solutions. We will provide you with 3D models and drawings in current interchange formats at a very early phase of the project. For design validation, we will use the very latest methods.

## Your benefits rail | system

- ▶ Safety through reliable power supplies
- ▶ Long service intervals that minimise follow-up costs
- ▶ Custom design, advice and project support
- ▶ Long-established know-how of a market innovator
- ▶ Reliable energy supply

# Accessories

## Overview

### rail | control

Monitoring systems for condition monitoring

The HOPPECKE rail | control Monitoring System was developed based on a PLC system certified for rail use. It offers high flexibility regarding the mounting in the battery system, and can be freely configured to suit the requirements of customers and systems. Different input variables (analog and digital) can be collected, processed and provided via different interfaces.

#### The benefits:

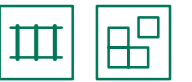
- ▶ Longer service intervals
- ▶ Shorter maintenance times
- ▶ Potential reduction in servicing costs

### rail | aquafill

Water refilling system

This central water refilling system enables to refill water quickly and reliably to an optimal filling level. rail | aquafill is simple to use and saves both: time and money. The floater-free design which eliminates mechanically moving parts ensures reliable operation over the entire service life of the system.





## The right system for your needs

There is a choice of installation variants – whether mounted on the roof, under the floor or fitted inside the vehicle, we will design and manufacture your custom power system.



**HOPPECKE meets all  
fire safety standards**



### Roof mounted

- ▶ Container for mounting on the vehicle roof
- ▶ No waste of passenger space

**Typical applications:**  
In trams and low-floor regional trainsets



### Mounted inside the vehicle

- ▶ Crates and trays for integrated installation in the car body
- ▶ Including removal mechanism on request

**Typical applications:**  
In the engine compartments of locomotives or propulsion modules



### Underfloor mounting

- ▶ Containers and trays for mounting under the vehicle
- ▶ Easy access

**Typical applications:**  
In high-speed trains and passenger coaches





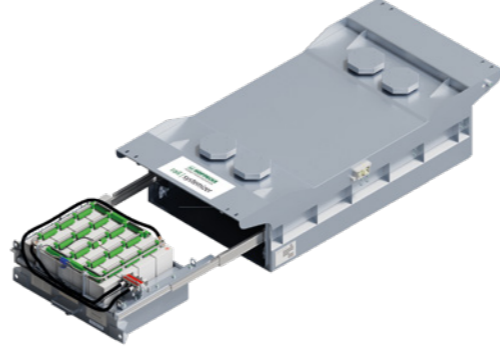



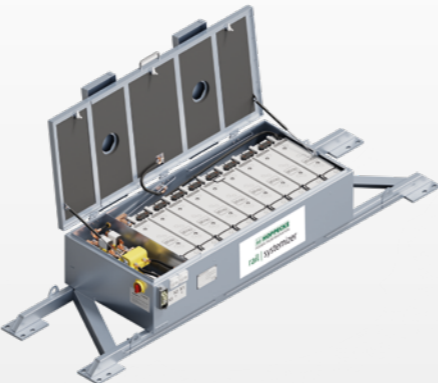





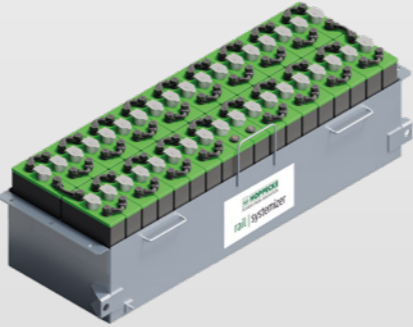





# Power Systems Rolling Stock

Perfection in performance and safety

HOPPECKE is a partner of leading vehicle manufacturers and railway operators. We offer a wide choice of cells, batteries and complete solutions for use in both national and international rail services. The battery systems are used in many different projects such as metros, commuter trains, trams, electric and diesel locomotives and high-speed trains.

We are happy to put our skills and experience at your service, whether your project requires roof or underfloor mounting or installation inside the train. Both in the design and validation of the product and with its worldwide delivery, commissioning and servicing. You will optimise your product availability and safety while keeping life-cycle costs low. All of which makes us one of the world's leading partners for the integration of complex rail battery systems.



	Lead-Acid	Nickel-Cadmium	Lithium-Ion
Underfloor mounting	 <p> <b>Regional trainset</b> England</p>	 <p> <b>Underground</b> Scotland</p>	 <p> <b>Passenger carriage</b> Paris-Turkey</p>
Roof mounted	 <p> <b>Regional trainset</b> Germany</p>	 <p> <b>Double-decker regional trainset</b> Scandinavia</p>	 <p> <b>Regional trainset</b> Research project Germany</p>
Mounted inside the vehicle	 <p> <b>Locomotive</b> Morocco</p>	 <p> <b>Maintenance train</b> Germany</p>	 <p> <b>Locomotive</b> Germany</p>

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Go here to see  
an overview  
of our rail products.

[www.hoppecke.com](http://www.hoppecke.com)