

Your specialist for extreme challenges



**SPECIAL POWER SYSTEMS**



**Sustainable Energy Solutions for**

- Railway and underground systems
- Electric buses
- Automatic guided vehicles

## YOUR PARTNER FOR SUSTAINABLE ENERGY SOLUTIONS

Innovation has been driving us forward since 1927. This is the reason why HOPPECKE's Special Power business unit has been at the forefront of battery technology from the start.

Together with our customers we are developing the sustainable energy solutions of the future all of which feature high levels of operational flexibility and fail-safety, even under conditions of peak demand. We are setting new and higher standards for the energy supply systems of tomorrow and are already world leaders in the integration of battery systems for rail vehicles. Our commitment and cooperation in your development process are something you can take for granted – both today and into the future.

Product performance and reliability combined with skilled attention to customer service lie at the heart of our worldwide operations. Why not try it for yourself? Challenge us and find out just what support we can offer in your quest for faster access to and greater success in, your markets.

### UNIQUE ELECTRICAL DESIGN

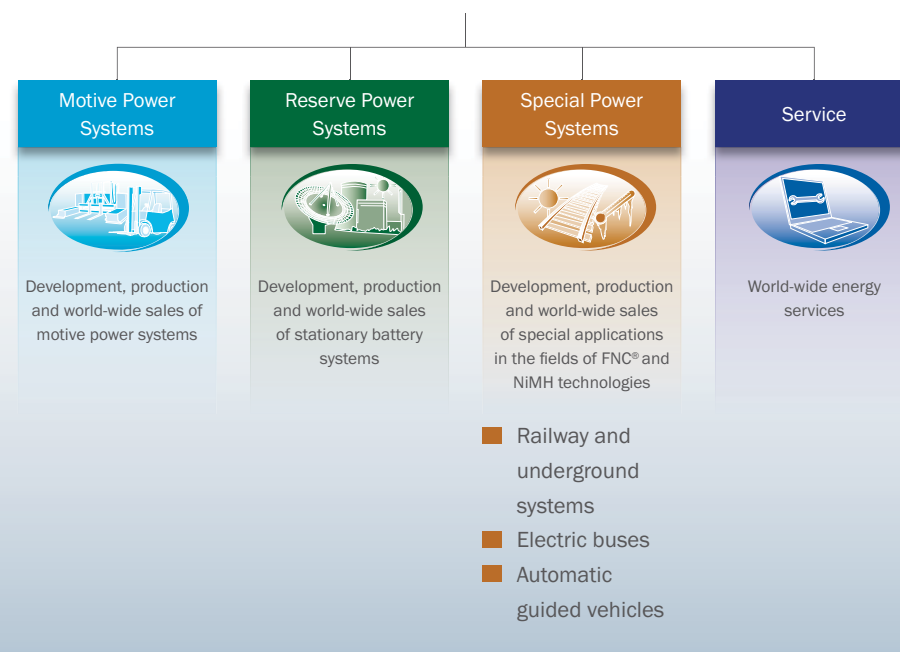
Define your requirements – We create your battery!

### UNIQUE MECHANICAL DESIGN

Designed for maintenance – Designed to cost!

### ONE SPECIALIST

Your partner for sustainable energy solutions!



## SPECIAL POWER SYSTEMS

### YOUR SPECIALIST FOR EXTREME CHALLENGES

Heat, cold and vibration: Our tailor-made specialist systems are used the world-over to cope with particularly extreme challenges.

With the aid of FNC® (fibre structure nickel), Metal-Hydrate and Li-Ion technologies or high current lead components, we can meet any task, whilst our space saving designs guarantee optimal energy density.

We believe in consulting face-to-face and drawing on the latest battery technology to design effective, systems based solutions to any energy challenge which your requirements may demand – no matter how complex they may be.

Since 1983 HOPPECKE Batterie Systeme has shipped more than 1 million FNC® cells to railway clients around the world. This success is based on the many benefits of FNC® technology compared to energy storage systems.

FNC® batteries can be cycled more than 3000 times. This makes them more powerful than any other NiCd technology exceeding the UIC 854 R directive by a wide margin.



HOPPECKE FNC®-C cell

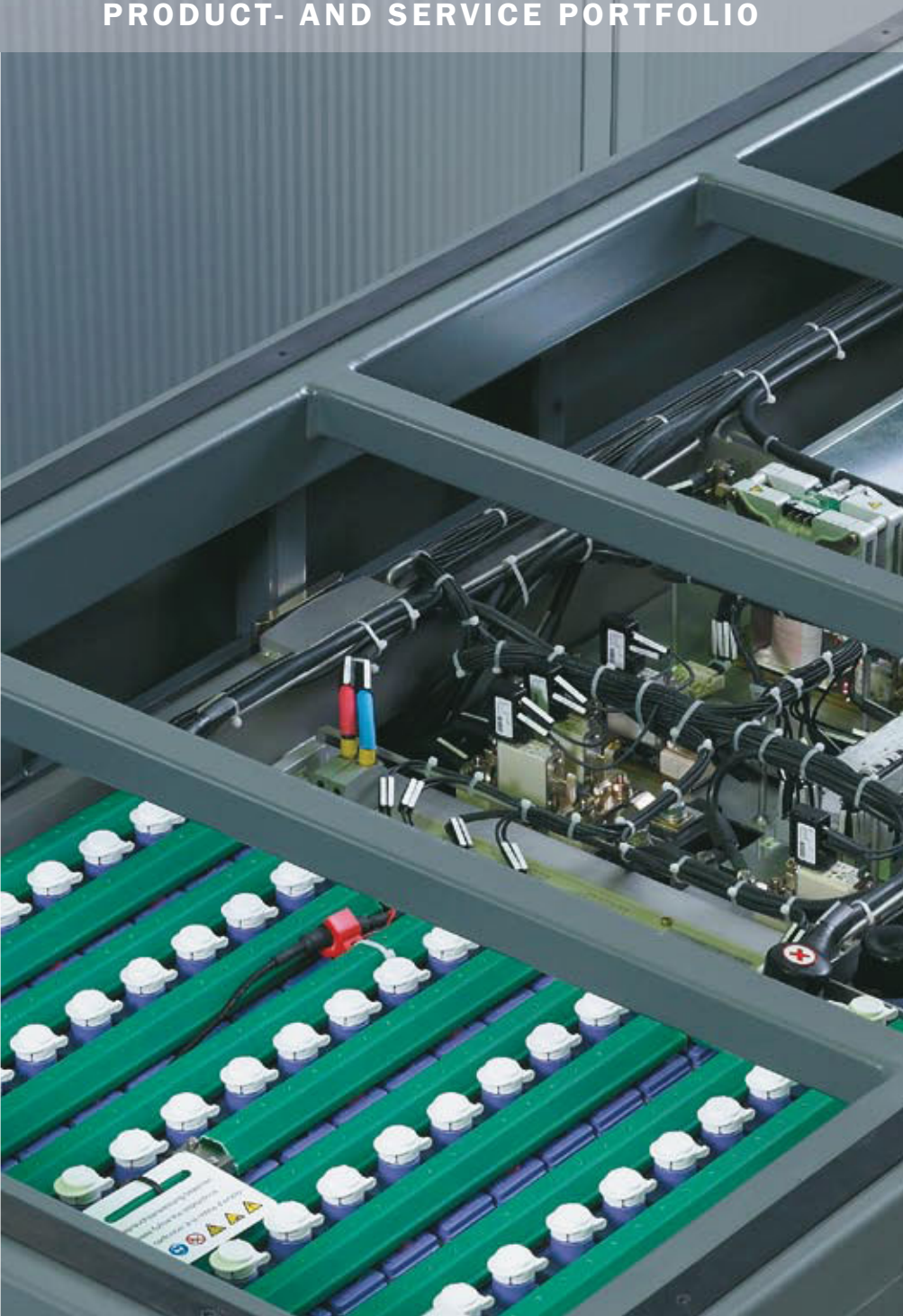


HOPPECKE FNC®-A cell



HOPPECKE FNC®-T cell

## PRODUCT- AND SERVICE PORTFOLIO



### UNPARALLELED WORLDWIDE – FNC® TECHNOLOGY

FNC® batteries can be cycled more than 3000 times. This makes them more powerful than any other NiCd product. Since FNC® electrodes can operate without a graphite additive there is no need to change the electrolyte - for the product's entire life! Special FNC® A cells recombine into water, a large part of the oxygen and hydrogen gasses which are generated during use. This also results in FNC® requiring less maintenance than NiCd cells, which recombine only a little, if at all.

#### Your benefits:

- Proven under the most extreme temperature conditions
- High cycle stability
- No electrolyte changes
- Low water consumption
- Reduced maintenance costs with longer service intervals

### ONE PARTNER FOR ALL TECHNOLOGIES

#### Lead-acid

- Cost efficient battery for standard rail auxiliary supply
- Advanced HOPPECKE Standard in quality and technology
- Complete systems with vented or sealed batteries

#### NiCd (FNC®)

- Technologically advanced battery for demanding requirements
- Longer life and higher cyclic endurance for railway applications even under conditions of extreme temperature
- Wide variety of energy-to-power ratios for optimum adaptation to customers' needs

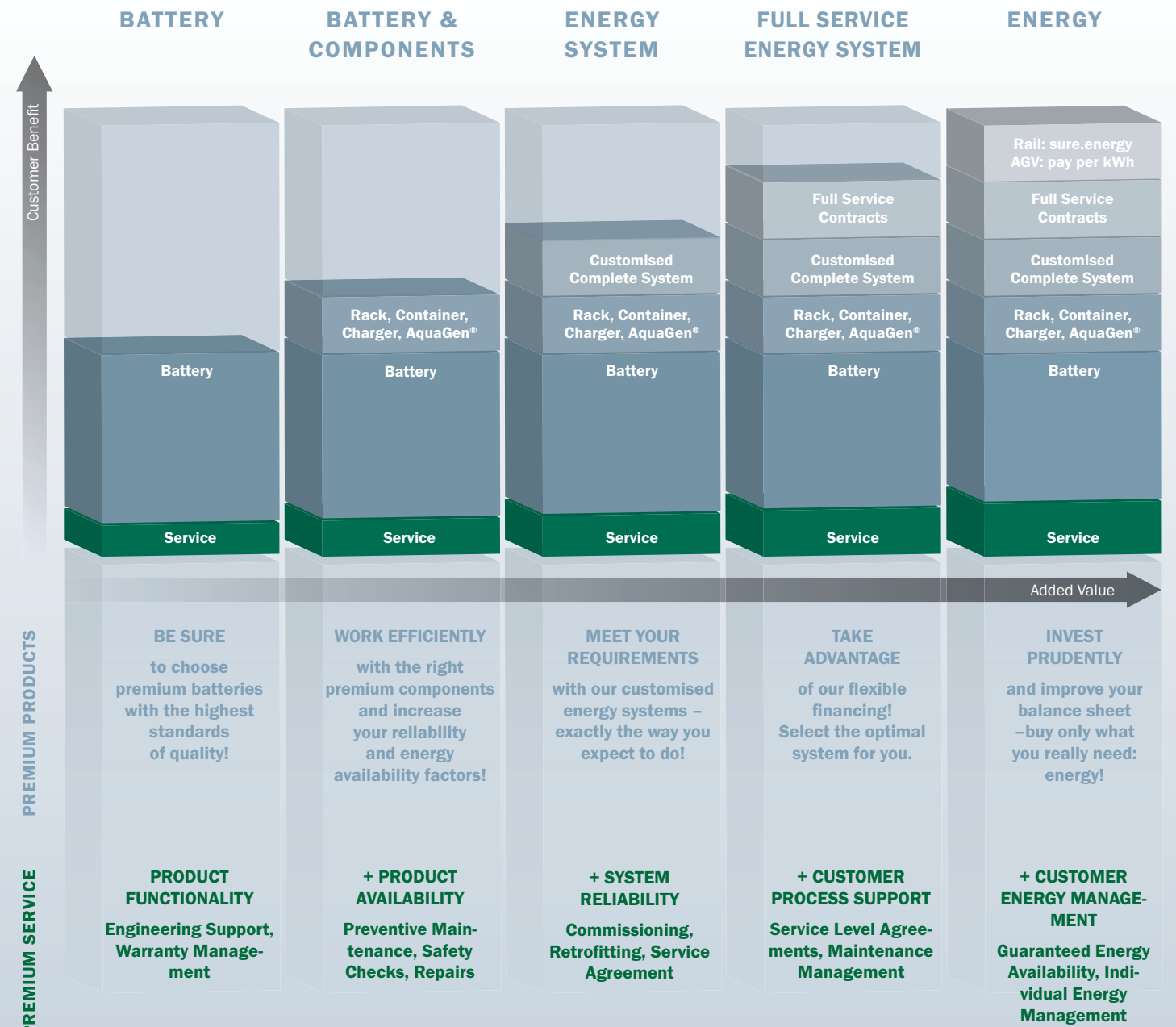
#### NiMH

- Most advanced alkaline cell technology for industrial applications
- Longest life and highest cyclic endurance for railway applications
- Meets highest demands concerning battery volume and weight

#### Li-Ion

- Highest energy and power density
- High cycle life for both full and partial cycles
- Extremely low self-discharge

## 5 ENERGY CONCEPTS FOR YOUR INDIVIDUAL REQUIREMENTS



### HOPPECKE PREMIUM PRODUCTS

### + HOPPECKE PREMIUM SERVICE

= SUSTAINABLE ENERGY SOLUTIONS  
DESIGNED AROUND YOUR NEEDS!



## APPLICATIONS



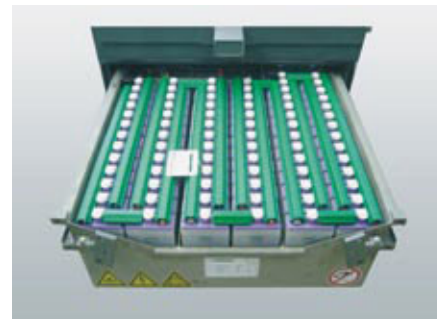
### RAILWAY AND UNDERGROUND SYSTEMS

HOPPECKE is your business partner for efficient railway battery systems ready to meet the demands of the future, today.

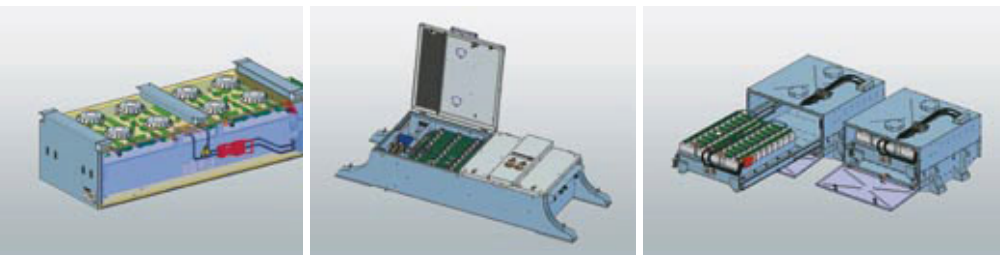
One partner for all technologies – offering the optimum solution for each application: high current lead components, FNC® (fibre structure nickel), NiMH and Li-Ion.

With HOPPECKE premium products plus HOPPECKE premium service we create sustainable energy solutions designed around your needs!

All electrodes used in HOPPECKE FNC® cells for rail applications are manufactured exclusively at the ISO 9001, ISO 14001, IRIS and EN 15085 certified location in Brilon, Germany.



### EXAMPLES OF INSTALLATION



### ELECTRIC BUSES

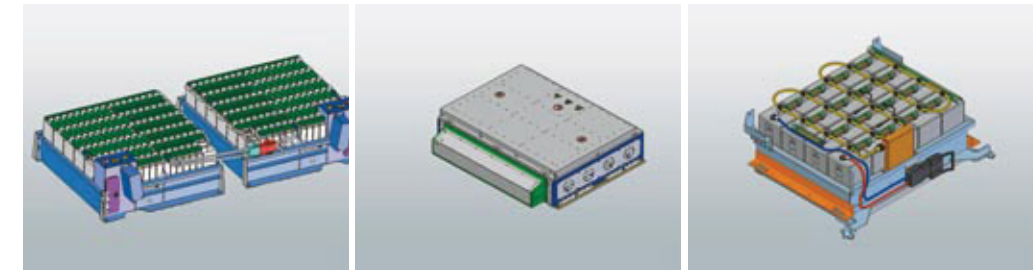
Next-generation energy systems from HOPPECKE are in use throughout the world in state-of-the-art battery-electric, hybrid and trolley buses.

We focus on reducing carbon footprints by using sustainable energy solutions and advancing technologies poised for future commercialisation.



Elektrobus battery system with HOPPECKE FNC®-A cells

### EXAMPLES OF INSTALLATION



### AUTOMATIC GUIDED VEHICLES

HOPPECKE is the world's leading supplier of alkaline batteries for automated guided vehicles. The HOPPECKE FNC®-T series has been specially engineered for operations incorporating intermediate charging.

Lower your operating costs by using efficient energy storage. Our systems offer 24-hour operation without battery changing, reduced charging times, minimum maintenance requirements and maximum operational flexibility.



Automatic guided vehicle battery system with HOPPECKE FNC®-T cells

### EXAMPLES OF INSTALLATION



**Special Power**

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