

AGV Battery Systems



Motive Power Systems



Telecom/IT Battery Systems



Railway Battery Systems



Power Supply



Standby



# FNC<sup>®</sup>

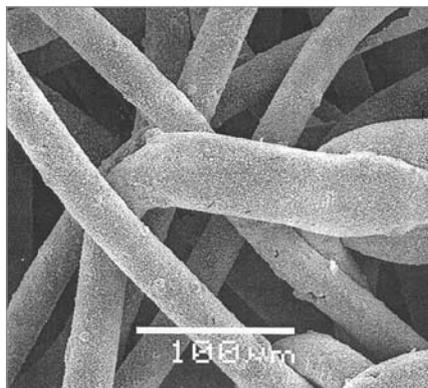
## Vented fibre structure Nickel Cadmium Battery Systems



## FNC® technology: unique in the world for over 20 years

In 1983 HOPPECKE first presented a nickel-cadmium battery which is still unique today. It is based on fibre-structured technology, or FNC® for short.

The special feature of FNC® technology is that, in contrast to pocket plates and sinter electrodes, the support for the active material is not a stiff and heavy metal, but a very light and flexible plastic fibre. This metallised polypropylene fibre-structured electrode was originally developed for such demanding applications as aerospace, also electric and hybrid vehicles.



The fibre structure: lightweight, flexible and able to be filled with up to 90% active material

The dense three-dimensional fibre structure is extremely porous. As a result, 90% of the volume of the fibre electrodes can be filled with active material. The decisive benefits as compared with other systems are:

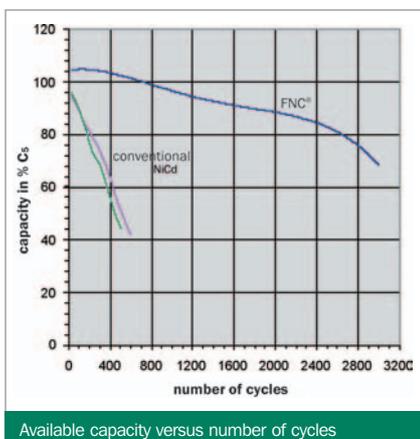
- High or very high currents are possible during discharge and when charging
- High currents require only a low rated capacity
- Considerable savings in weight and volume

### Electrodes which do not age No need for electrolyte exchange

The FNC® fibre-structured electrodes have a conductive nickel matrix which is filled with the active material by a specially developed process. At the same time, no additives such as graphite or iron are used.

Consequently, throughout the useful life of the battery, there is no oxidation of graphite or formation of carbonate in the electrolyte (KOH with a density of 1.19 kg/l). The result: the electrodes do not age. In contrast to conventional NiCd batteries, no change of electrolyte is necessary during the entire life of the battery.

And yet another notable feature in the success of FNC® technology: as with every other system, the volume of the active material changes with every charge and discharge cycle. The carrier material of other technologies is unable to absorb these changes. The FNC® fibre-structured electrodes on the other hand are able to adjust to the change in volume throughout the full life of the battery, so maintaining continuous contact between the active material and the electrode.

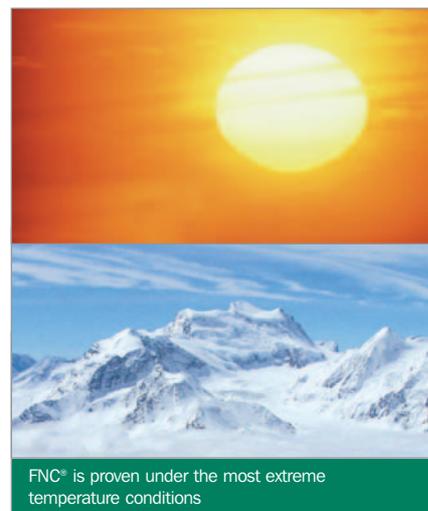


Available capacity versus number of cycles

### As a summary: The benefits of FNC® for you

- Very low internal resistance
- High energy density
- Extremely good resistance to cycling
- Minimal susceptibility to vibration and shock
- Distinctly greater long-term stability
- Considerably longer life expectancy

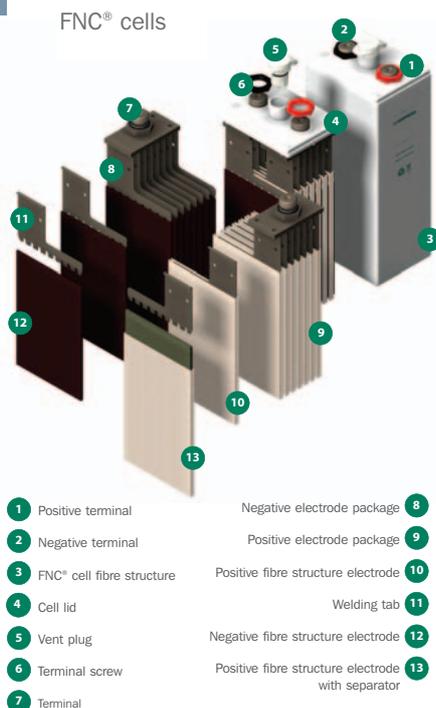
The rated voltage of an FNC® cell is typically 1.2 V. It may be operated reliably in a temperature range of -20 to +50°C. With special electrolyte, even temperatures of -50 to +60°C are possible.



FNC® is proven under the most extreme temperature conditions

# Proven and successful

## HOPPECKE FNC® cells



### Proven over 4.000.000 times: HOPPECKE FNC® cells

We have already supplied over 4.000.000 FNC® cells throughout the world. Applications include automated guided vehicle systems – a field in which HOPPECKE is the world leader. This success is based on the incomparable advantages offered by FNC® technology. These benefits are especially advantageous for long-life applications:

- No sudden failure because there is no internal corrosion
- 'Up to 25 years' life expectancy
- More than 3000 charge/discharge cycles
- No total failure of the battery in the event of deep discharge
- More than 85% of rated capacity available at -20°C
- Rapid charging facility at currents of up to 7xC<sub>5</sub>
- No corrosive gases under float charging operation

We manufacture FNC® cells exclusively at our Brilon site in Germany, which is certified

to ISO 9001, ISO 14001 and DIN 6700 C5 standards.

### All-round reliability: Our complete solutions

FNC® battery systems from HOPPECKE are used in:

- Train and metro systems incl. the associated infrastructure
- Fork lifts and automated guided vehicle systems
- Electric busses
- Stationary industrial applications

Our long years of experience also include the production and distribution of a variety of complete power supply systems covering:

- FNC® cells
- Racks, cabinets, crates or trays and boxes
- Battery chargers

Electrical components such as fuses, switches and diodes are also supplied by HOPPECKE.

### Do you need a special solution? Talk to us!

We design, manufacture and supply customised "turnkey" power supply systems. With battery racks and battery cabinets matching the design of the UPS equipment; with battery fuses and protective devices, container racks, monitoring systems and other components. All modules are matched to exactly one another and interconnected to provide a complete system.

Right at the start of the project, our customers are provided with 2D and 3D drawings in different file formats. On request we will also carry out thermal analyses and finite element analyses to verify mechanical stability.

In this way, through close cooperation with our customers, customised special solutions with compact dimensions and high energy density are devised and brought into being.

For example for installation in industrial trucks, automated guided vehicle systems, railways and stationary applications.

### HOPPECKE standard cells: Variety which speaks for itself

Besides polypropylene cells, we also offer standard cells made from four other materials: stainless steel, polyether sulfone VO (PES), polypropylene VO und polyamide VO (Grilon).

All plastic cells with the suffix VO comply with enhanced international fire resistance standards. The translucent polypropylene cells and the transparent PES cells make possible a visual check of the electrolyte level. With polypropylene VO and Grilon VO cells, on the other hand, manual checking is required: either with a glass tube or by using electrolyte level indicators mounted in the cell lids.



### Protecting the environment is not just a matter of words. But of deeds.

We guarantee to all our customers that we will take back their used nickel-cadmium batteries - irrespective of the technology, the manufacturer or the age of the batteries. To achieve this, we have developed and implemented our own recycling scheme. So, in accordance with EU regulations, HOPPECKE is contributing to the responsible handling of industrial batteries.

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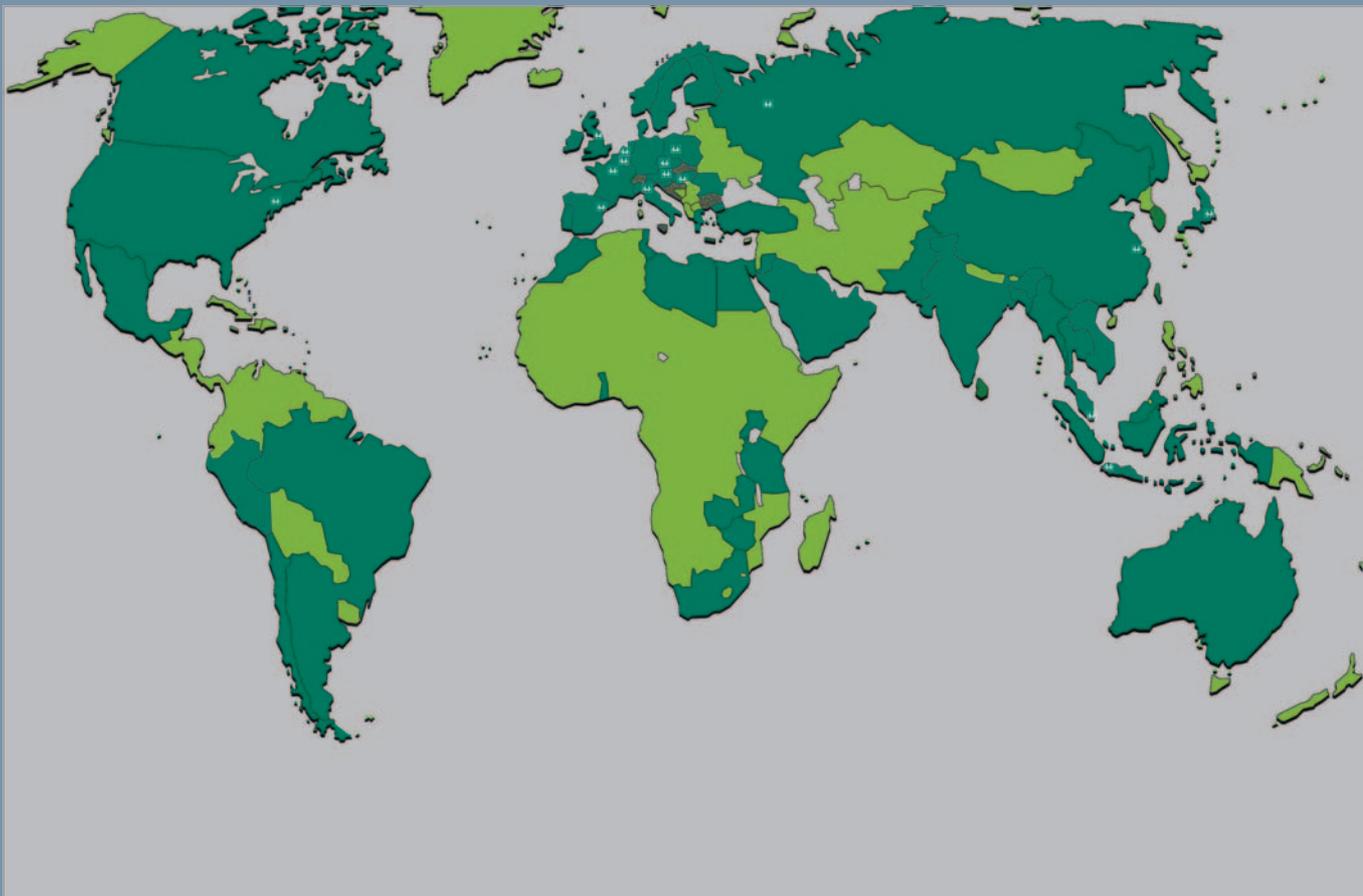
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HOPPECKE Batterie Systeme - worldwide

## Products and services - the complete solution...

- Low-maintenance and no-maintenance batteries
- Innovative battery chargers based on the latest technology
- Battery accessoires • Battery management systems and software
- Battery changeover systems • Battery/charger servicing
- Battery recycling • Applications engineering and technology
- Battery room design • Technical training and seminars
- Leasing • Power by the hour

Your local Partner:

...one name says it all!



For further details: [www.HOPPECKE.com](http://www.HOPPECKE.com)

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