



grid | Xtreme VR

The next generation
pure lead batteries



The future begins now ...

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 21 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.



grid | Xtreme VR

The high-performance pure lead battery

The HOPPECKE grid | Xtreme VR is the next generation of pure lead AGM batteries. Consistent further development and improvement of all components has set new standards.

In order to meet customer demands for increased performance and durability, HOPPECKE has completely redeveloped the grid | Xtreme VR battery. We have taken a close look at all components and optimised or completely redesigned each part. This new product family from HOPPECKE is distinguished by its unique design and the innovative details.

The HOPPECKE grid | Xtreme VR with high-performance pure lead technology (HPPL) serves both current and future market trends, including the need for ever shorter bridging times with high-current discharges and use at high ambient temperatures.

During the development of the HOPPECKE grid | Xtreme VR, the focus was intentionally put on the optimisation of all components to fully exploit the performance gain offered by HPPL technology. This redefined the standard for maintenance-free, sealed (VRLA) batteries.

Optimised for your benefit – designed for optimum performance

The special design of the grid | Xtreme VR using thin plate technology ensures higher energy and power density. This results in a comparatively small space requirement, which also results in lower infrastructure costs.

The extended operating temperature range means that the battery can also be used under harsh environmental conditions and saves costs for battery room air conditioning. The grid | Xtreme VR is characterised by its excellent cycle capability and its long service life expectancy of up to 15 years (at 20 °C). It provides outstanding fast charging capability and enables operation in the Partial State of Charge (PSoC).

The reduced self-discharge enables longer storage times and reduced recharging intervals (up to 24 months at 20 °C). Corrosion on poles and connectors is prevented by retaining the well-established, fully insulated connector system.

Separate contact points on the battery surface allow impedance to be measured quickly and easily, even when installed.

The compact shape enables the battery to be installed in both a vertical and horizontal orientation. Combined with the integrated front terminals this means that the grid | Xtreme VR always offers the best possible maintenance access and the greatest possible flexibility, even in the case of plant conversions.





grid | Xtreme VR

HPPL technology – the best for two applications

The use of pure lead for the manufacture of the electrodes forms the basis of the new HPPL technology. Its superior corrosion properties compared to other lead alloys enable a significant reduction in electrode thickness while simultaneously increasing the service life. It also enabled the number of electrodes used has been maximized. The result is a larger electrochemical reaction surface, which is pioneering in terms of energy and power density for lead-acid storage technologies. HPPL technology also uses active masses with high-density, which were previously only used for deep cycle lead-acid batteries. As a result the innovative HOPPECKE grid | Xtreme VR combines in one product series properties previously only available in two different product series.

This exceptional HPPL technology required a complete revision of all of the important battery components. State-of-the-art simulation software was used to adapt the discharge cross-sections to the increased loads, restricting heat generation to a safe level under all operating conditions.

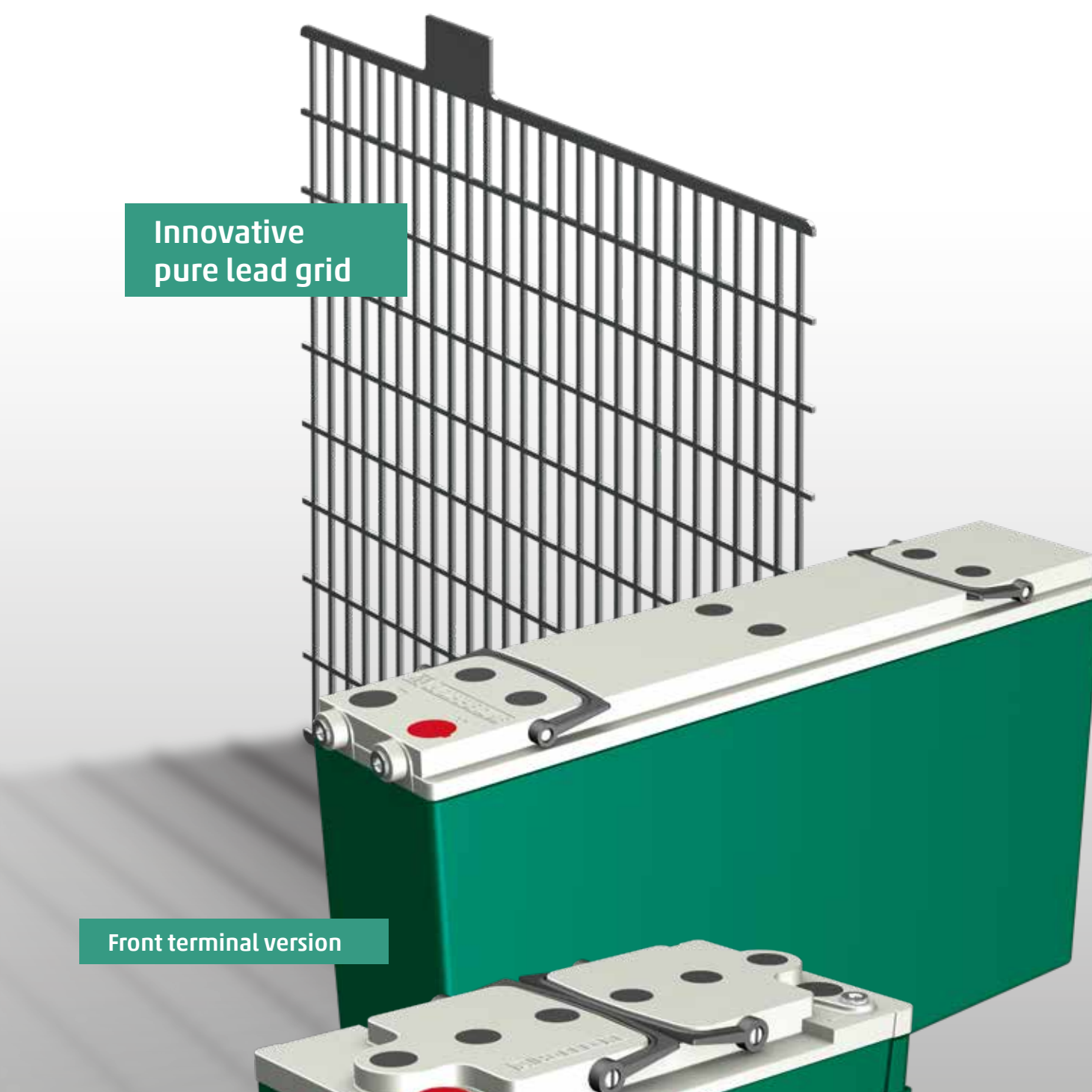
The upper limit of the permitted operating temperature range was increased from 45 °C up to 55 °C. Combined with the dimensionally stable battery case this makes the grid | Xtreme VR particularly suitable for use in harsh environmental conditions.

The increased demands on the grid | Xtreme VR led to the proven HOPPECKE pole system being redesigned. The indispensable COS production technology could not efficiently be combined with separate single poles. The new manufacturing process for the pole bushing now makes it possible to combine the proven sealing properties

of plastic encapsulation with a discharge component manufactured entirely using the COS process. Impedance measurement is also possible with the new pole design, making maintenance significantly easier.

For the function of AGM batteries it is essential that the plate sets are preloaded in the battery case. The compression applied to the plate set is necessary for the internal recombination of oxygen and hydrogen, as well as for the stabilisation of the installed active masses to increase the cycle capability.

The version with top-mounted terminals has optional patented safeguard-tec on the end walls that enable positive-locking installation with a high load capacity. This enables cost-effective standard installation in cabinets or on battery racks.



Innovative
pure lead grid



Front terminal version



Top terminal version

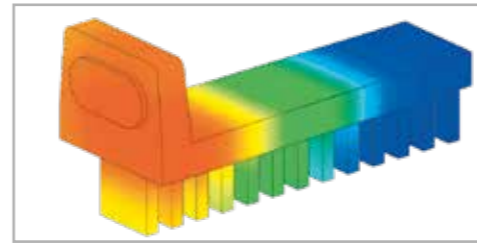
The advantages grid | Xtreme VR

- ▶ Long service life expectancy of up to 15 years
- ▶ Suitable for harsh environmental conditions and high operating temperatures
- ▶ High flexibility due to modular expandability
- ▶ Improved high current performance over service life
- ▶ Low space requirement
- ▶ High energy efficiency
- ▶ Fewer recharging intervals
- ▶ Easy maintenance thanks to optimised access points
- ▶ Use in PSoC mode
- ▶ Fast charging capability
- ▶ Minimised investment costs



grid | Xtreme VR

The components at a glance



Optimised discharge cross-sections

- ▶ Improved current conduction (top lead)
- ▶ Reduced voltage loss
- ▶ Reduced heat generation
- ▶ Avoidance of thermal overload of the electrical discharge components



Pole design

- ▶ The pole bridge and pole are cast in one production step (COS)
- ▶ Reliable inductive process pole welding
- ▶ Offset of pole welding and connector joint with access for measuring devices

Folding handles

- ▶ Compact design
- ▶ The volume saves is used to maximise the plate formats
- ▶ Easier handling with tray installation conditions

Each cell has its own valve plug

- ▶ No negative influence on the individual cells as happens with a central valve
- ▶ The specified opening pressure is ensured by 100 % inspection before installation

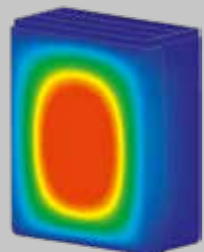


Innovative, patented safeguard-tec

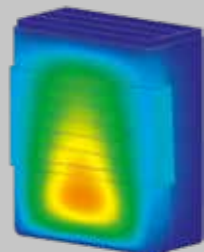
- ▶ Dimensional stability unaffected by time and temperature
- ▶ Optional use with the Top terminal version



Simulation of the battery case wall deformation taking into account the effects of temperature and time



WITHOUT safeguard-tec



WITH safeguard-tec



High-performance pure lead electrode

- ▶ Extremely low corrosion rates
- ▶ Minimised cost of specific materials
- ▶ Higher number of electrodes in the specified volume enables the use of greater active mass densities



The modular solution for data center

Highest power density for efficient use of space

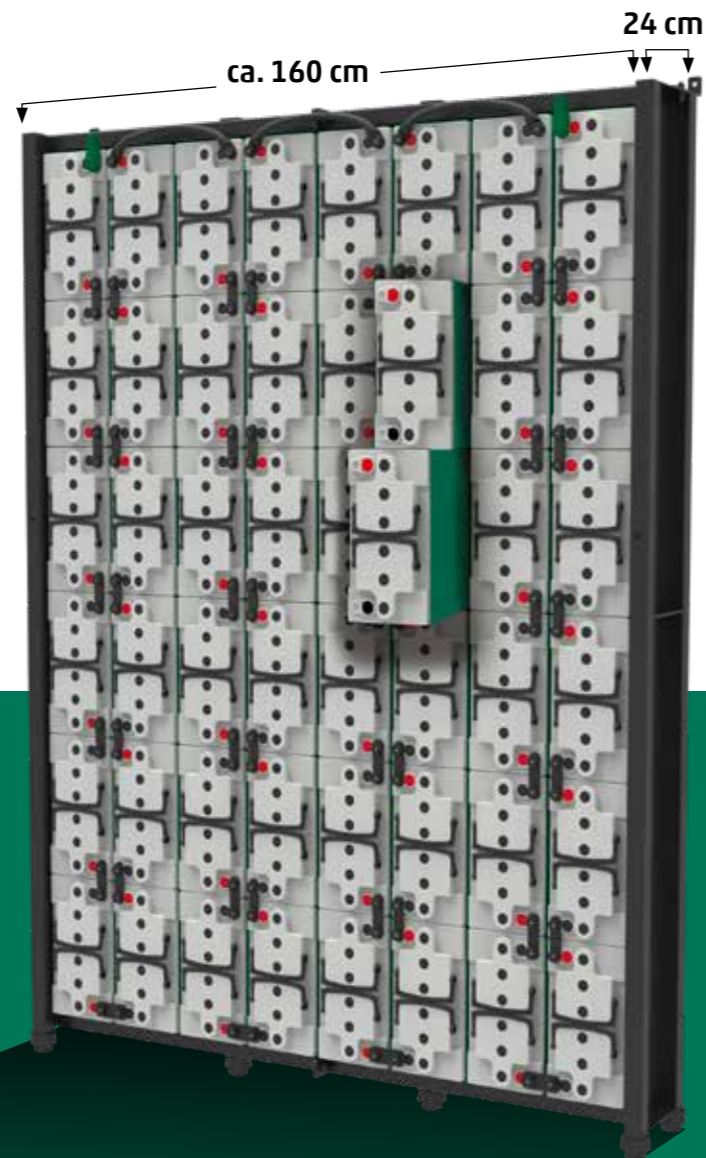
When it comes to power supply, reliability in data center is essential. An uninterruptible power supply (UPS) jumps in immediately in an emergency and keeps the operation running. It is often immediate voltage surges caused by lightning, fluctuations in the mains frequency or simply short circuits that lead to failure.

If the UPS registers a problem, it initiates a switchover of the power supply to the connected batteries within milliseconds. Depending on the type and dimensioning, the required discharge time can vary. The spectrum ranges from small systems for securing individual computers to large, centrally controlled systems with several hundred kVA.

The grid | XtremeStack is ideally suited for this application due to its high-performance pure lead technology. HOPPECKE has developed the grid | XtremeStack in order to use the batteries as efficiently as possible. The innovative stacking solution uses the existing space intelligently to integrate the maximum number of grid | Xtreme VR top terminal batteries to save space in a complete system.

The modular approach of grid | XtremeStack ensures optimal maintenance, scalability and flexibility. If for example the UPS performance requirements change, additional modules and batteries can easily be added or removed. The design of the system allows the existing floor space to be compacted over time without taking up additional square metres.

The modular design of grid | XtremeStack keeps the footprint small and makes installation and commissioning easy. Standardized modules lead to fewer spare parts to stock and simplified system upgrades. The scalability and exceptionally energyefficient design also contribute to a low total cost of ownership.



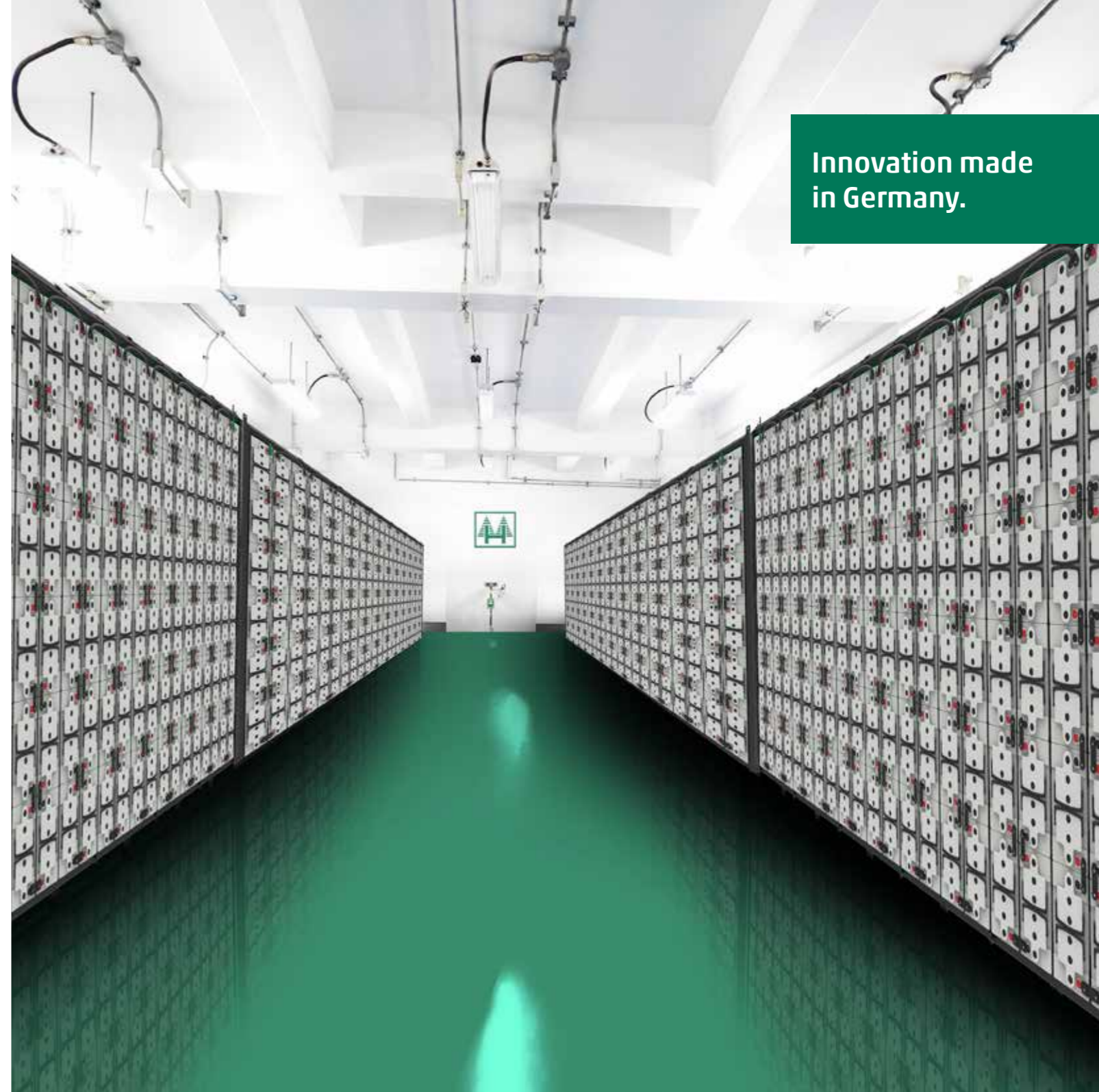
Optimal use of space with a minimal footprint.

grid | XtremeStack

The innovative stacking solution from HOPPECKE. Tailored for grid | Xtreme VR batteries in the top terminal variant.

grid | XtremeStack is both horizontally and vertically expandable and adapts flexibly to your needs.

Innovation made in Germany.



The advantages grid | XtremeStack

- ▶ **eXtremely scalable**
the system grows and shrinks with the requirements
- ▶ **eXtremely flexible**
modular design for easy expandability
- ▶ **eXtremely low maintenance costs**
easy access to batteries – saves time and money
- ▶ **eXtremely space saving**
20% more batteries in the same area for reduced footprint
- ▶ **eXtremely efficient use of space**
27% less space needed with 22% higher energy density
- ▶ **eXtremely durable**
low temperature development for extended battery life
- ▶ **eXtremely simple assembly**
low parts complexity for less assembly effort and costs



Less space for more performance

The new **grid | XtremeStack** in comparison

Compared to conventional battery racks, the batteries in the new **grid | XtremeStack** are stored upright and without gaps. This unique arrangement has several advantages: It supports the function and at the same time saves space and is easy to maintain. Maximizing dimensional stability through the innovative design and the heavy-duty plastic of the battery case allows the carrying of the multiple weight of each individual battery and the elimination of the safeguard-tec.

The heatflow (convection) between the battery stacks ensures an even temperature distribution and avoids hot spots for increased service lifetime. Eight highly stable elements made of steel with protective insulating polyethylene coating are sufficient to create the modular **grid | XtremeStack** system to achieve maximum efficient use of space and power density (kW/m^3) - with comparatively less installation effort and lower costs. From now on, an expansion of capacity is no longer inevitable to connected to additional square meters.



conventional battery rack



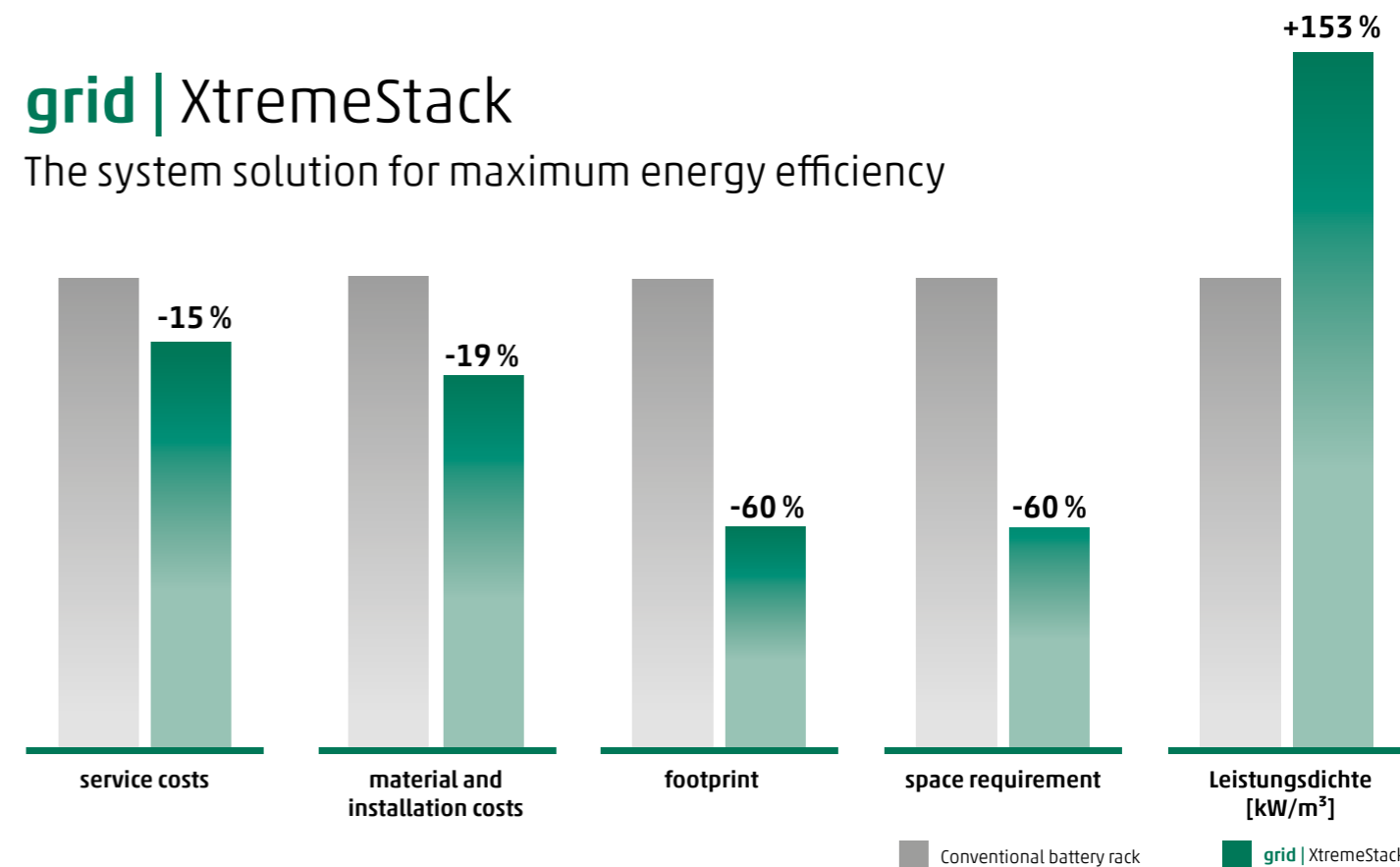
grid | XtremeStack

The technology:

- ▶ stable plug-in modules
- ▶ centering and convection support
- ▶ assembly and stacking aid including end stops
- ▶ scalable support levels
- ▶ tilt protection
- ▶ insulated PE coating
- ▶ suitable for **grid | Xtreme VR** top terminal

grid | XtremeStack

The system solution for maximum energy efficiency

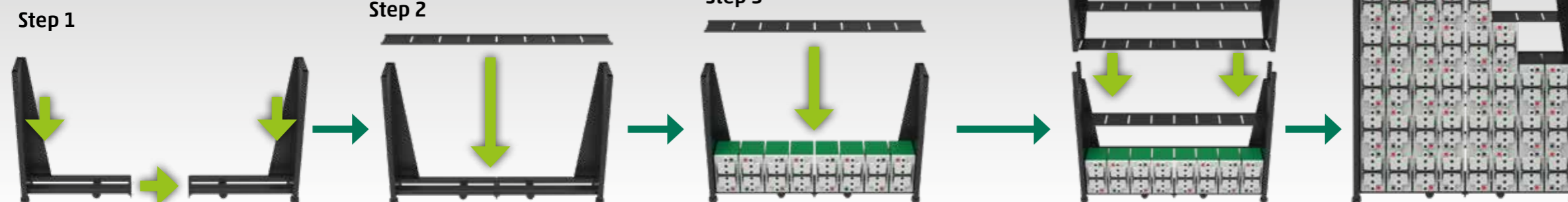


System solutions from HOPPECKE makes the different

You are the operator of a data center and would like to use the available space for your UPS with the help of **grid | XtremeStack** as efficiently as possible? Do you need a state-of-the-art stacking solution including the associated batteries? Contact us. We take over analysis and planning and would be happy to advise you. Of course, we also take care of the complete installation, maintenance and repairs.

HOPPECKE offers the perfect system solution for each application. From batteries to chargers and monitoring systems to our extensive services - everything is perfectly coordinated.

eXtremely easy fast installation in just 5 steps



44 m²
offer space for

grid | XtremeStack:
1632 batteries

Conventional battery rack:
1340 batteries



Our service makes the difference

Under the heading "Lifecycle Services" we offer you far more than just products. From the initial idea, to consultation, installation and ongoing service up to disassembly and recycling, you have HOPPECKE professionals at your side, who make processes simple and transparent and ensure the smooth operation of your company in every situation.



Hotline and technical support

Extensive European service network with more than 250 experts at 15 locations, who are always available - by telephone or on site. International Key Account Management for internationally operating partners.

Analysis and advice

Technological and application advice on site. Process, optimisation, safety and efficiency analyses by certified HOPPECKE professionals. Target group oriented instruction and training for every application.

Monitoring

By linking your systems to the HOPPECKE Remote Service Portal, you integrate our technicians directly into your system environment. In this way, your systems are optimally monitored; HOPPECKE professionals respond proactively to any abnormalities and remedy these immediately.

Installation and commissioning, disassembly and recycling

Our installation teams are professionals in their field and not only ensure simple installation and maintenance according to schedule, but also provide complete turnkey solutions. I. e. complete installation, acceptance and handover to you.

And of course, when the time comes, proper and legally compliant disassembly, including recycling and documentation (certified according to ISO 9001/2008, ISO 14001 and ISO 50001).

Testing, maintenance and repair

With regular servicing, you extend the service life, reduce down times and ensure permanent functional safety. This ensures smooth operation, compliance with all legal regulations and protects your investment.



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