Our energy for your success

Accumulatorenwerke HOPPECKE
Carl Zoellner & Sohn GmbH
Bontkirchener Straße 1
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www.hoppecke.com
Founded 1927 by Carl Zoellner

Value-based, independent family enterprise
Willingness to perform and loyalty are the foundations of our success.

Putting people first
Employees are highly motivated and geared to performance.

Employee participation
Company asset accumulation, participation and profit-sharing

Training
Training in eight different vocational fields, in part cooperating with universities

Internal und external transfer of knowledge
Forms a dynamic basis for future-oriented energy services
## Group Structure

### Holding Accumulatorenerwerke HOPPECKE

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- **HOPPECKE Batterien**
  - R&D
  - Production
  - Sales
  - Recycling of lead-acid industrial battery systems

- **HOPPECKE Batterie Systeme**
  - Production
  - Sales

- **HOPPECKE Technologies**
  - R&D
  - Production
  - Sales
  - Recycling of alkaline industrial battery systems

- **HOPPECKE Service**
  - Service for batteries and chargers
  - Safety checks
  - System advices
  - On-site trainings

- **HOPPECKE Metallhütte (Smelter)**
  - Recycling of lead-acid batteries in our own smelter

- **HOPPECKE International Subsidiaries, worldwide**
  - Production
  - Sales
  - Service

*09.06.2011*
A Strong Brand

Quality is our Trademark

- **Innovation**
  Development of optimal solutions for energy supply in one of the largest R&D departments in this industry in Europe.

- **Quality**
  High quality right from the start of the development phase, high quality management in accordance with recognised test procedures.

  Quality pays its way through:
  - Longer product life
  - Improved usage of resources
  - The highest degree of energy safety
  - Maximum energy availability

- **Service**
  Europe-wide service network. Certified service staff. Consulting, service and training offers - for all technologies and applications of industrial batteries.
European Presence

Headquarter / Production
HOPPECKE Subsidiaries
HOPPECKE Representations

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Requirements of a solar battery type

- High charge / discharge efficiency
- Minimum self discharge
- Reasonable price
- Maintenance-free types

and

- Low maintenance types
- Resistance against deep discharge
- Reduced space in horizontal installation
  - Battery with fixed electrolyte
- High cycle life in partial state of charge (PSoC)
Designs of lead acid batteries

**Vented cells solar.power**

- Liquid electrolyte
- Open system
- Direct exchange to the atmosphere
- Low maintenance, cells need to be topped up with water from time to time

**Advantages:**

- High cycle lifetime
- Robust design

**Sealed cells solar.power**

- Fixed electrolyte in Gel or AGM
- Contact to the atmosphere by valve regulation
- In „maintenance-free“ cells; no water topping required (sealed system)

**Advantages:**

- Maintenance-free
- High energy density
- 1/4 of air ventilation compared to a vented type
- Recombination

__Water consumption influences lifetime__

09.06.2011
Invented in 1881 (Volkmars patent)

Optimum grid design for good cast ability and low resistance

Low antimony alloy for vented and lead calcium tin alloy for valve-regulated batteries

Applied for all lead acid battery types (negative plate always a grid plate)

Active mass gets pasted into the grid

Can be a negative as well as a positive plate
Tubular (Pz) plate

- Invented around 1910 with slitted hard rubber tube
- Electrode for cycle applications
- Always positive plate
- Gauntlets made from woven high-quality polyester (coating the active mass)
- Highest operational life
- Highest endurance of cycles
- Also known as Pz – plate (– plating of the active mass)
New Technologies

- Highest cycle stability during PSoC operation - due to tubular plate design and optional electrolyte recirculation for single cells
- Maximum compatibility - dimensions according to DIN 40736-1 / DIN 40737-3
- Higher short-circuit safety even during the installation - based on HOPPECKE system connectors
- Easy assembly and installation - battery lid with integral handle
- Extremely extended water refill intervals up to maintenance-free - optional use of AquaGen® recombination system minimizes emission of gas and aerosols
Secondary reaction inside vented lead acid batteries: Water decomposition of liquid electrolyte

During operation of the AquaGen® premium.top-recombination systems the developed oxygen and hydrogen gas moves into the AquaGen® system.

By the integrated catalyst these gases are recombined to water vapor.

The water vapor condenses inside the housing of the AquaGen® premium.top – system.

Water drops flow back into the battery cell.
Function of HOPPECKE AquaGen® premium.top

- Flash back protection
- Valve
- Opening permits escaping gas which can not be recombined.
- Ceramic protection for the catalyst material
- Dome for condensation of water vapor
Benefits of HOPPECKE AquaGen® premium.top

- Greatly extended water refilling intervals (up to 98% recombination rate).
- Reduced risk of damage due to contaminated refilling water.
- Reduction of ventilation requirements by 50%.
- Prevention of dangers by flaming/spark through integrated backfire protection.
- No significant escape of gas or aerosols.
- Reduced maintenance with increased safety.
- Minimum costs – no replacement during battery service life.
Consequences of acid stratification:

Premature aging:
- In the lower cell region: Concentrated sulfuric acid attacks lead harder. The lead of negative electrode in particular the active mass is converted to lead-sulfate. This lead-sulfate falls out (-> capacity loss).
- In the upper cell region: Lead is not stable in diluted acid – it dissolves.

Furthermore:
- Lower energy efficiency of the battery
- Degraded charge acceptance
HOPPECKE Electrolyte Circulation System

Wall-mounted housing contains pump motor and control electronics.

A central tubing system supplies air to all cells.

Emerging air bubbles stir the electrolyte.

Air is blown into every cell through plastic pipes.
HOPPECKE Electrolyte Circulation System

Increase of efficiency and cost savings:

- Typically up to 120% of discharged energy need to be recharged to eliminate acid stratification.

- Application of HOPPECKE electrolyte circulation system reduces required charging factor significantly. Increase of efficiency is up to 15% compared to charging without electrolyte circulation system.

- Less time and energy is required to recharge the battery and to achieve a homogeneous electrolyte distribution.

- The electrolyte circulation system reduces also service costs because of reduced water loss compared to conventional charging.

- Moreover the HOPPECKE electrolyte circulation system increases service life of the battery and provides environmental and economical benefits for the entire battery system.
New Technologies

- Maintenance-free regarding water refilling - due to innovative Gel-technology
- Very high cycle stability during PSoC operation - due to tubular plate design with efficiently charge current acceptance
- Maximum compatibility – dimensions according to DIN 40742 / DIN 40744
- Extended storage intervals up to 12 months at 20°C
- Higher short-circuit safety even during the installation - based on HOPPECKE system connectors
solar.bloc – customer benefits

- **Optimized cycle stability combined with efficient storage capability** - special design of grid electrode for solar applications

- **Minimum maintenance costs with maximum safety** - maintenance-free\(^1\) with sealed AGM\(^2\) technology

- **Easy handling** - battery lid incorporates an integral lifting handle

- **Optimal environmental compatibility** - closed loop for recovery of materials in an accredited recycling system

- **High resistance against mechanical stress** - reinforced impact-proof polypropylene housing

\(^1\) No topping necessary  
\(^2\) Absorbant Glass Mat
Benefits HOPPECKE system connector

- High flexible or massive rigid copper connectors with Santoprene® (Elastomer) rubber moulding
  - prevent short-circuits even during installation
  - permanent touch protection

- Rubber moulded, acid tight cover with lip sealing between terminal and screw
  - No maintenance required

- Solid copper and availability of high cross sections
  - Low voltage drop

- Safety and long operation of battery installation
How to find the right solution:

- analysing your power consumption and usage

- choose the right Battery Technology.

- choose the right Battery type

- use solar.air on daily cycling from Hoppecke

- optimize the system with a fuel cell
References

Tahiti 2010
Rural electrification
AC system
- Battery: OPzS solar.power
- Aqua Gen
References

Cape Town (ZA) 2011

72 x 16OPzV solar.power 2300
Project: House Gaia
Private Power Consumption
References

Namibia 2011
Rural electrification
AC system
- Battery: OPzS solar.power
- Water Refill System
OPzV bloc solar.power

**Middle East 2010**

- Oil & Gas
- Cathodic Protection
- DC system
- Battery used: OPzV bloc solar.power
We warmly invite you to visit us, **Booth B3.276**.

**You are looking** for effective energy storage solutions for maximum profitability in the area of renewable energy? We offer you the optimal solution!

Learn about HOPPECKE sustainable concepts for effective storage of renewable energy. Our new solar product line has been developed especially to fulfill the requirements of cyclic applications.
Your Global Specialist For Energy Storage Systems Solutions

We offer...

- optimized, high-quality energy storage solutions, which are convincing due to their excellent cycle stability
- Founding **market segment „Renewable Energies“**
- Introduction of the **new product line „solar.power“**
- Optimal support by **qualified engineering and sales teams**
- Optimal **cooperations** with market leaders of component producers and system integrators