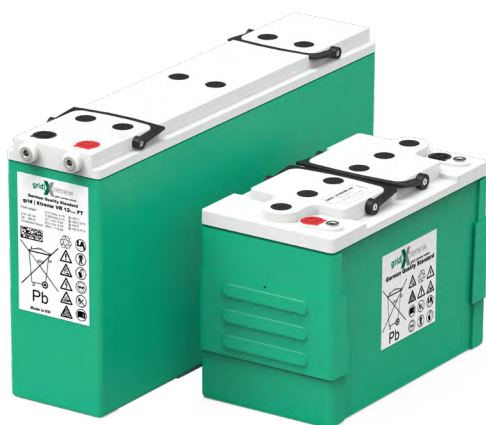


grid | Xtreme VR

MAXIMUM PERFORMANCE WITH GOOD CYCLABILITY



The HOPPECKE grid | Xtreme VR pure lead battery can also be used in applications with frequent charging and discharging cycles and display its specific advantages. The potential of this technology is to maximize the number of electrodes installed, also known as thin plate technology. The resulting increase in the electrochemical reaction surface for a given volume allows the use of active masses, which are generally reserved for cycle-resistant and long-life batteries. grid | Xtreme VR batteries are therefore not only extremely powerful, but also characterized by a long cycle life.

The charging and discharging processes that occur permanently in cyclic applications and the associated transformation of the active masses usually lead to electrolyte stratification in AGM batteries and also place maximum stress on the battery housing material due to volume change.

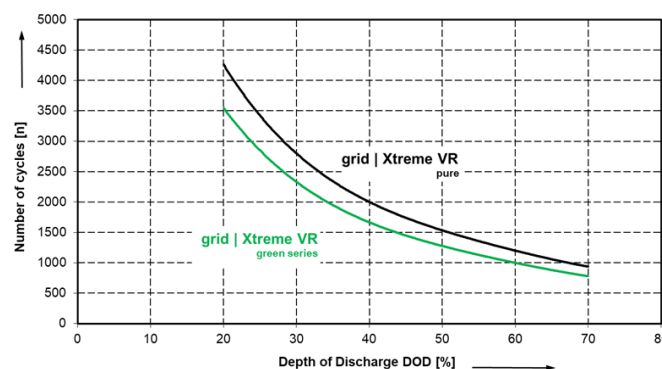
A reduced performance of the battery system with aging and the impairment of the electrochemical behavior of the outer cells affected by the deformation of the battery vessel are the consequences. grid | Xtreme VR pure lead batteries were therefore equipped with the ESS technology (Enhanced Stability Standard) operationally proven at HOPPECKE.



The risk of electrolyte stratification in cyclic applications and the associated reduction in discharge performance and cycle life could thus be safely counteracted.

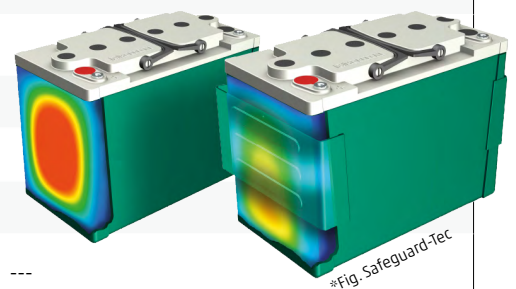
Furthermore, the patented and innovative Safeguard-Tec for Top Terminal variants (optionally available) offers optimum dimensional stability over the entire service life of the battery. Inhomogeneities in the cell compound of a battery block, which can occur particularly under cyclic load and/or at elevated ambient temperatures and impair performance, are eliminated. This increases the reliability of the entire battery system and also leads to a longer cycle life.

Service life in cycles and Depth of Discharge



Performance features for cyclic applications:

| Performance features | | grid Xtreme VR (pure) | grid Xtreme VR (green series) | Customer benefits |
|--|---------|---|---|--|
| Design | | Top- and Frontterminal | Top- and Frontterminal | High flexibility and compact installation |
| Temperature range | | -40°C up to 55°C | -35°C up to 50°C | Suitable for high temperature applications |
| Shelf life @ 20°C | | up to 24 months | up to 24 months | Easy storage |
| Design Life | 20°C | 15 years | 15 years | --- |
| | 30°C | 10 years | 8 years | Lower TCO's |
| Charging current | | 5 – 40 A/100Ah (fast charging capability) | 5 – 40 A/100Ah (fast charging capability) | Fast charging capability |
| Float charge voltage | | 2.3 Vpc (+/-1%) | 2.3 Vpc (+/-1%) | --- |
| Boost charge voltage | | 2.40 Vpc | 2.40 Vpc | |
| Cycle ability | 30% DOD | 2800 | 2330 | |
| | 50% DOD | 1500 | 1300 | |
| | 70% DOD | 940 | 780 | |
| Max. depth of discharge in cyclic applications | | 70% DOD | 70% DOD | --- |
| Energy density (E10 – 1.80 Vpc, 20°C) | | ≥ 95 Wh/ltr. | ≥ 93 Wh/ltr. | Low space requirement |
| Power density (P10min – 1.60 Vpc, 20°C) | | ≥ 220 W/ltr. | ≥ 215 W/ltr. | Low space requirement |
| Safeguard-Tec | | Optional for TT batteries | Optional for TT batteries | High dimensional stability throughout battery life and improvement of electrical performance, especially under elevated temperature and cyclic load conditions.* |
| Fully automated, digitized manufacturing processes | | Yes | Yes | More flexibility and common parts due to parallel connection (up to 10 strings at 48V) |
| Flammability class acc. UL 94 | | V0 | V0 | More safety due to higher fire classification |
| Measuring point for impedance measurements | | Available | Available | Simple and precise condition determination after installation and regular maintenance |



All of our cells and batteries should be installed, commissioned and operated in accordance with:

- ▶ HOPPECKE Operational Manual / Recommendations / Instructions
- ▶ International Standard IEC 62485-2 Safety requirements for secondary batteries and battery installations
- ▶ Regional / National / Local Standards for the Environment

Optimal environmental compatibility - closed material cycle in certified recycling system

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grid | Xtreme VR



green series