

# centurion akku

## de akku met de meeste plussen

Centurion Akku  
Nederlandse Accumulatoren  
Productie BV  
PO box 2427 6040 EA Roermond  
The Netherlands (Europe)  
montageweg 1 6045 JA Roermond  
telefoon : +31(475)32.41.47  
telefax : +31(475)32.29.99  
internet : [www.centurion-akku.nl](http://www.centurion-akku.nl)  
e-mail : [info@centurion-akku.nl](mailto:info@centurion-akku.nl)

### 1. SAFETY PRECAUTIONS.

#### WARNING – READ BEFORE INSTALLATION

The use of lead-acid batteries is not hazardous provided strict precautions are taken:

#### DO

- Keep the batteries upright.
- Wear goggles when handling electrolyte and batteries.
- Use tools with insulated handles.
- Wear protective clothing when handling electrolyte or batteries.

#### DON'T

- Smoke or permit open flames near the batteries when charged.
- Spill electrolyte on skin or clothing. Diluted sulphuric acid is corrosive to skin and cotton.
- Allow metal objects to rest or fall on batteries, short circuiting the battery.
- Wear nylon clothing as they can create static electricity.



*In case of electrolyte contact with skin or eyes, wash immediately with running water. If eyes are affected, keep rinsing with water and obtain immediate medical attention.*

### 2. DELIVERY OF BATTERIES

- Check batteries for any indication of damage in transit.
- If batteries are not put into service immediately, they should be stored in a

clean, dry, cool and well-ventilated room and not be exposed to direct sunlight.

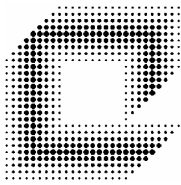
- Electrolyte in cells should be at specified maximum level and plugs should be firmly in position.
- Filled batteries can be stored without attention for up to 3 months maximum, depending on temperature and humidity. For longer storage duration, always check the specific gravity (s.g.) of the electrolyte every 3 months. If s.g. drops below 1.250 kg/dm<sup>3</sup>, (1.210 for batteries with "tropical" acid) then the batteries should be charged until the s.g. is 1.280 or 1.240 when supplied with "tropical acid". The charging current should not exceed 20% of the nominal capacity of the battery.
- Before taking filled batteries into operation check the s.g.: this should be 1.280 (1.240) at 20°C and the electrolyte level that should be at MAX. If these conditions aren't met, recharge or top up the batteries.
- Dry charged batteries must be filled with sulfuric acid 1.280 or 1.240 kg/dm<sup>3</sup> in tropical conditions (prolonged temperature > 35°C) up to the MAX level. Recheck the level 20 minutes after filling.
- Charge the batteries if the s.g. falls below 1.280 (1.240 kg/dm<sup>3</sup>) 1 hour after filling. The charging current should not exceed 20% of the nominal capacity. Clean the top of the battery if any electrolyte has been spilled.

*Never seal filled batteries completely; the batteries have either a central gas outlet or the plugs have vent openings.*

*After initial filling with electrolyte, NEVER refill with diluted sulphuric acid, only with distilled water.*

### 3. INSTALLATION.

Normal building materials are suitable for the walls of rooms housing lead-acid batteries. Vented gasses are not corrosive. In some countries an acid resistant floor is required. The room should be kept clean and dry at all times and direct sunlight and heat on the batteries should be avoided. A temperature between 15 and 25° C is best for the service life.



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During charging the hydrogen and oxygen mixture, vented from a battery, is an explosive mixture and for this reason sufficient ventilation must be provided to keep the  $[H_2+O_2]$  content to a very low value. Air bricks or grills should be placed as high as possible in the room since hydrogen is less dense than air. Batteries mounted in very confined spaces may require forced ventilation. Where forced ventilation is necessary to obtain the required air changes, the air should be drawn in from a low location in the room. If it is necessary to draw air out, then a explosion safe fan must be used and placed high. Emission of gasses is dependent on the charging current.

Ventilation rate ( $m^3/h$ ) can be calculated with the help of the following formula:

$$Q = 0,05 \times \text{charging current (A)} \times \text{no. cells}$$

- A ventilated room of  $2,5 \times Q$  does not need forced ventilation
- The above is for mean hydrogen concentration of 1%.
- All data are based on maximum gas evolution, although this only occurs at end of charge or on overcharge.

#### 4. CHARGING.

The amount of electrical energy stored in a battery is defined by its capacity in ampere-hours. Ampere-hours is the arithmetical product of the current (A) taken from the battery and the time in hours (h) for which that current can be drawn from the battery up to a given cut off voltage.

To fully charge a lead acid battery a defined overcharge is required, normally 5 to 20 % of the withdrawn capacity. This *charge factor* (1,05 to 1,20) is dependent on charging current and temperature.

*Example: if a 100 Ah battery is 50% discharged, it requires  $50 \text{ Ah} \times 120\% = 60 \text{ Ah}$  charge. A battery charger (constant current) that provides 10A should be connected for six hours.*

Always check the s.g. after charging; the battery is fully charged when the hydrometer reads  $1.280 \text{ kg/dm}^3$  for battery acid or  $1.240 \text{ kg/dm}^3$  if initially filled with tropical acid.

**DO NOT overcharge a battery (CF > 1,2) !**  
**Overcharging as well as charging with a current higher than 20% of the battery capacity will greatly increase water loss and reduce battery life.**

#### 5. ROUTINE MAINTENANCE.

- Batteries must be kept clean and dry at all times as dust and damp cause current leakage.
- Terminals and connectors should be kept clean and any electrolyte spillage during maintenance should be wiped with a clean cloth. Deposits should be removed with careful use of a stiff non-metallic brush and warm water. Vent caps and flame arresting vent plugs must be tightly fitted. Do not use solvents for cleaning.
- Terminals and connectors should be kept lightly greased with vaseline or similar.
- The electrolyte level should be kept at MAX; frequency of refilling with distilled water depends on charging voltage and duty cycle, as well as on temperature.
- It is recommended that on new installations batteries on automatic charge should initially have electrolyte levels checked at monthly intervals to determine the frequency of refilling (with distilled water) required. The electrolyte level is never to be allowed to fall below the minimum level, and after filling the level should never exceed the maximum. Always top up *AFTER* charging.
- The specific gravity (s.g.) of electrolyte depends on the state of charge. A fully charged battery has a reading of  $1.280 \text{ kg/dm}^3$  or 1.240 for tropical acid. A fully (100%) discharged battery has a s.g. reading of  $1.080 \text{ kg/dm}^3$ . The process expires linear.
- All terminals and electrical connections should be checked for tightness as part of regular maintenance. Flexible cables should be examined to ensure insulation is in good condition.

