

Single cell range

LCE/LBE MC/MB HC/HB

Ni-Cd
BatteriesInstallation and
operating
instructions

Safety precautions

- **WARNING: Risk of fire, explosion, or burns. Do not disassemble, heat above +70°C or incinerate.**
- **Never smoke while performing any operation on the battery.**
- **For protection, wear rubber gloves, long sleeves and appropriate splash goggles or face shield.**
- **The electrolyte is harmful to skin and eyes. In the event of contact with skin or eyes, wash immediately with plenty of water. If eyes are affected, flush with water, and obtain immediate medical attention.**
- **Remove all rings, watches and other items with metal parts before working on the battery.**
- **Use insulated tools.**
- **Avoid static electricity and take measurements for protection against electric shocks.**
- **Discharge any possible static electricity from clothing and/or tools by touching an earth-connected part "ground" before working on the battery.**
- **Ventilation, in accordance with the IEC 62485-2 standard, is mandatory during commissioning and operation.**

1. Receiving the shipment

Do not overturn the package. Upon receipt of the goods, any transportation damage, electrolyte spillage or irregularities must be reported to the carrier and to Alcad. If the cells are shipped filled and charged the cells are ready for assembly.

2. Storage

The battery must be stored in a dry and clean indoor location, on open, well ventilated shelves away from direct sunlight between 0°C and +30°C (+32°F and 86°F).

To ensure maximum protection of the cells always store the product in its original packaging. Do not store in direct sunlight or expose to excessive heat.

- **Cells filled and charged**
 - If cells are stored filled, they must be fully charged prior to storage.
 - Cells may be stored filled and charged for a period not exceeding 12 months from date of dispatch from factory. Storage of a filled battery at temperatures above +30°C (+86°F) can result in permanent change and loss of product performance, depending on the duration of the storage above the maximum recommended temperature.
- **Cells empty and discharged**
 - Alcad recommends to store cells empty and discharged. Storage of a battery at temperatures above +30°C (+86°F) can result in permanent change and loss of product performance, depending on the duration of the storage above the maximum recommended temperature
 - Cells can be stored like this for many years.

3. Installation

3.1 Location

Install the battery in a dry and clean room. Avoid direct sunlight and heat. The battery will give the best performance and maximum service life when the ambient temperature is between +10°C to +30°C (+50°F to +86°F). For cells with handles, both must be used when lifting and moving. To prevent electrolyte spillage, do not tip cells.

3.2 Mounting

Verify that cells and that the connectors are correctly torqued with the appropriate polarity. Connections between the battery and the load shall be made with nickel plated cable lugs. Tightening torque for the terminals must be:

- M6 = 11 ± 1.1 N.m (97.4 ± 9.8 lbf.in)
- M8 = 20 ± 2 N.m (177.0 ± 17.7 lbf.in)
- M10 = 30 ± 3 N.m (265.0 ± 26.6 lbf.in)

The connectors and terminals should be corrosion-protected by coating with a thin layer of anti-corrosion oil, grease (NO-OX) or approved equal.

3.3. Ventilation

During operation the battery emits an amount of gas mixture (oxygen and hydrogen). Ventilation inside the battery room must be adequately managed, comply with IEC 62485-2 and local regulations.

3.4. Electrolyte

- **Cells delivered filled by the factory:**
If electrolyte is ever spilled from a cell and the level is 30 mm below the minimum (lower) level mark, then refilling with E22 electrolyte is required. Contact your local Alcad representative for more details.

Do not top up with deionized or distilled water prior to initial charge to avoid overfilling a cell. After commissioning, when the level is stabilized, the electrolyte level should be between approximately 5 mm below maximum (upper) level mark.

- **Cells delivered empty and discharged**
Important: The commissioning charge must start within 24 hours but not before 4 hours after the electrolyte has been filled.

If the electrolyte is supplied dry, prepare it according to its separate electrolyte instructions sheet. The electrolyte to be used is E22. Fill the cells about 20 mm above the minimum (lower) level mark with electrolyte. Start the commissioning charge within 24 hours but not before 4 hours.

4. Commissioning

Verify that the vents are closed and ventilation, in accordance with the IEC 62485-2 standard, is provided during this operation.

A good commissioning is important and mandatory. Charge at constant current is preferable. After commissioning, the battery shall be charged permanently according to section 5. Prior and during commissioning charge, record all data requested in the commissioning report available on www.alcad.com

4.1. Constant current charge

If the current limit is lower than indicated in the Table A or B, charge for a proportionally longer time.

- **For cells filled and charged by the factory and stored up to 6 months:**
Charge for 10 h at 0.2 C₅ A (see Tables A or B).

- **For cells filled on location or for filled cells which have been stored more than 6 months:**

- Charge for 10 h at 0.2 C₅ A (see Tables A or B)
- Discharge at 0.2 C₅ A to 1.0 V/cell
- Charge for 10 h at 0.2 C₅ A (see Tables A or B).

Note: At the end of the charge, the cell voltage may reach the level of 1.85 V per cell, thus the charger shall be able to supply such voltage. When the charger maximum voltage setting is too low to supply constant current charging, divide the battery into two parts to be charged individually.

4.2. Constant voltage charge

- **For cells filled and charged by the factory and stored up to 6 months:**
Charge for 24 h at 1.65 V/cell, current limited to 0.2 C₅ A or charge for 48 h at 1.55 V/cell, current limited to 0.2 C₅ A (see Tables A or B).

- **For cells filled on location or for filled cells which have been stored more than 6 months:**
 - Charge for 30 h at 1.65 V/cell with current limited to 0.2 C₅ A (see Tables A or B)
 - Discharge at 0.2 C₅ A to 1.0 V/cell
 - Charge for 30 h at 1.65 V/cell with current limited to 0.2 C₅ A or charge for 48 h at 1.55 V/cell current limited to 0.2 C₅ A (see Tables A or B).

The battery container temperature is to be monitored during charge. If the temperature exceeds +45°C (+113°F) during charging, then it must be stopped to reduce the temperature. The charging can be resumed when battery container temperature drops below +40°C (+104°F).

4.3. Electrolyte adjustment after commissioning

After commissioning, when the level is stabilized, the electrolyte level should be between approximately 5 mm below maximum (upper) level mark.

Note: The full battery performance is required for capacity test purposes, the battery has to be charged in accordance with IEC 60623.

Reliability inside

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