Nickel-Cadmium Battery Specification Sheet with partial gas recombination (IEC 62259)

Foreword :

All information relates to Industrial nickel-cadmium batteries complying with IEC 62259 standard for partial gas recombination for use in floating stationary applications.

1) General

The battery shall be constituted of Nickel Cadmium cells with partial gas recombination as per the latest IEC 62259 requirements.

Corresponding IEC 62259 type test approval certificates shall be submitted with the bid.

The battery shall be of double perforated pocket plate. It shall be housed in polypropylene containers. It is acceptable to have containers (including several cells in series) in order to optimize the installation cost.

Battery safety and installation shall comply with EN 50272-2 (Safety requirements for secondary battery installation)

2) Electrodes

The positive and the negative electrodes shall be of pocket plate type where the active materials shall be retained in pockets formed from double perforated Nickel plated steel strips. To achieve the highest mechanical strength and the lowest internal electrical resistance, all steel parts shall be welded together to the bus bar. Pressing or bolting are not acceptable as single perforation due to lower performance.

3) Electrolyte

The electrolyte shall be an aqueous solution of potassium hydroxide (KOH) and lithium hydroxide (LiOH). For permanent temperatures below –20°C a special high density electrolyte shall be used. There is no replacement of electrolyte during the battery service life.

4) Separator

The cell separator shall consist of polypropylene fibrous materials. Separators consisting of plastic grids are not acceptable.

5) Container

The cell containers shall be either:

- For standard type, translucent polypropylene. The electrolyte level is then visible through the side walls. Min. and Max electrolyte level marks shall be displayed at least on two sides of the container.
- For UL94 “V0 rating” flame retardant type, the container is opaque (non translucent), thus electrolyte min. & max. level marks are not required.

6) Venting system

Each cell shall be equipped with flame-arresting flip-top vents for easy maintenance. Recombination feature by adding external gas recombination vents is not acceptable for safety reasons, and such devices are not covered by IEC 62259.

7) Terminals & connections

Positive and negative terminals must be marked by color washers as follows:

- red for the positive pole,
- blue for the negative pole.

In order to protect the battery terminals from external accidental short-circuits resulting from any metallic item falling on top of the battery, components such as intercell connections, insulating covers,

inter-row connecting cables, and collecting bars shall be IP2x compliant (tested and approved according to EN 60529 Ed2.1 Degree of protection provided by enclosure (IP code)).

8) Rated capacity (according to IEC 62259)

Quantity of electricity C_5Ah (ampere-hours) which a single cell can deliver when discharged at the reference test current of 0,2 I_t A to a final voltage of 1,0 V at +20 °C after charging under IEC conditions.

9) Recombination (according to IEC 62259)

The recombination level is more than 90%.

10) Marking

Each cell or block shall be marked as follows:

- Cell designation (as specified by IEC 62259 paragraph 5.1: KGL KGM)
- Name or identification of manufacturer or supplier (as specified by IEC 62259)
- Manufacturing code and/or date
- Country of origin and Safety symbols
- “Ni-Cd” as required by recycling legislation.

11) Charging

Charging modes and voltages in normal operation are to be chosen depending upon application requirements such as voltage window, temperature, required recharge time/ state of charge.
Float voltage single level charge: 1.43 ± 0.01 V/cell
Boost voltage: 1.43 ± 0.01 V/cell. For a charging voltage higher than 1.45V/cell, the current is limited @ 0.1C_5.

12) Final or end-of-discharge voltage (EOD voltage)

It is the voltage per cell at which the discharge is finished.
For Ni-Cd, it is recommended to select a low EOD voltage (e.g. 1.00 V per cell), irrespective of the discharge time.
The number of cells is linked to the voltage window of the load. The EOD voltage per cell and appropriate number of cells shall be calculated by the system supplier or battery supplier, according to the IEEE 1115 method.

13) Service life

The design life of the Ni-Cd battery shall be based on achieving a minimum of 20 years when operating at an average room temperature of 20 to 25°C.

14) Maintenance

Only one topping-up operation is necessary during the battery service life.

At 20/25°C. the electrolyte level readjustment period, under usual floating operation, shall be at least ten (10) years

15) Sizing requirements

Battery sizing must be done in accordance with the IEEE 1115-2000 taking into account the:

a) Specified battery duty cycle (detailed load vs. time profile with peaks)
b) Voltage window
c) Specified battery room temperatures to be used for battery sizing
d) Specified design margin
e) Specified or proposed aging factors
f) K_t factors after prolonged float charged (minimum of 90days). shall be used in the calculation of battery capacity

The IEEE 1115-2000 battery sizing sheet must be submitted with detailed K_t factors, temperature derating factors, aging and required design parameters together with the bid.

16) Design calculation & other documentation

The Bidder shall submit with the bid :

- ISO 9001 and ISO 14001 certificates
- IEC 62259 type test certificate
- IEC 60529 IP2x certificate
- Battery sizing calculation in accordance with IEEE 1115-2000 with all the design criteria.
- Supporting performance table after “long term floating with constant voltage”, and not only “fully charged” performance table

17) Battery racks or stands

Separate, free-standing support racks must be made of steel with a suitable plastic or epoxy coating to provide suitable protection against the effects of electrolyte spillage. The ground clearance shall be at least 120 mm.

18) Environment and recycling

The supplier commits to recycle on his own or to provide solutions to have the delivered batteries recycled at the end of their life. The used batteries shall be delivered by the end-user at his expenses to a collection point approved by the supplier in order to assure proper recycling.

19) Battery supply conditions & storage

Pocket plate batteries with partial gas recombination shall be supplied filled with electrolyte and charged . In this condition, they can be stored for maximum 24 months.