

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Li-Ion Battery System**with type designation(s)
HQ-100, HQ-180, HQ-200

Issued to

Hydrosta B.V.
Zwartsluis, Overijssel, Netherlands

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Product approved by this certificate is accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2020-02-18**This Certificate is valid until **2025-02-17**.DNV GL local station: **Rotterdam**for **DNV GL**Approval Engineer: **Georgy Abramenko**

Marta Alonso Pontes
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



1. When installed on a ship or offshore unit, the DNV GL class rules for battery installation must be followed (DNV GL Pt.6 Ch.2 Sec.1).
2. The piping system venting the exhaust gases from the rack to open air/safe location and gas detection shall be verified onboard in each case. Requirements in DNV GL rules Pt.6 Ch.2 Sec.1 shall be fulfilled.
3. The Type Approval covers hardware and software listed under Product description.
4. The Type Approval is valid for systems made by production facilities listed under Place of Manufacture.
5. For general design solutions where battery system is directly supplying the DC bus bars in main switchboards, relevant requirements for batteries for batteries protection against over voltage, under voltage, over current and arrangement of alarms for charging/ discharging failures, given in DNV-GL Rules Pt.6 Ch.2 Sec.1 [2.6.2] shall be considered within integration of battery system to electrical system of a ship/ offshore unit.
6. Arrangement of emergency stop system shall be handed within integration of battery system on case by case basis.

Product certification:

Each delivery of the application system is to be certified according to Pt.6, Ch.2, Sec. 1. This includes factory acceptance test to be performed at the manufacturer before the system is delivered to the yard. For each delivery to DNV GL class the following documentation of the battery system is to be submitted for approval:

- Reference to this type approval certificate
- Copy of the approved Safety description
- (E120) Technical specification of the battery system that is subject for product certification
- (I030) Project-specific Battery System Block Diagram
- (I020) Project-specific functional description
- Information on software versions applicable for the particular delivery
- (Z252) Test procedure at manufacturer

Tests carried out

Tests according to DNVGL-CP-0418 and DNVGL-CG-0339, IEC 62619 and IEC 62620.

Marking of product

Manufacturer name, and battery system type designation.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE