



Certificate No:
TAE00004H8

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Li-Ion Battery System

with type designation(s)
Renault BT1MN1

Issued to
RENAULT S.A.S.
Boulogne Billancourt, Hauts de Seine, France

is found to comply with
DNV rules for classification – Ships

Application :

Product approved by this certificate is partly accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2022-09-12**

This Certificate is valid until **2027-09-11**.

DNV local station: **France CMC**

for **DNV**

Approval Engineer: **Sverre Eriksen**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2021-03

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Product description

The battery pack is a 2nd life battery pack provided by the original equipment manufacturer Renault. It has been initially designed for automotive applications.

The battery pack consists of battery modules connected in series with an integrated BMS system. A service plug (including a power fuse) allows a manual physical disconnection and overcurrent protection. The Battery Pack is a cast aluminium box.

Thermal runaway propagation protection is based on fresh water flooding of the individual battery packs.

When using this battery pack some additional external features must be implemented before product certification. See details in application/limitation.

Pack including cells and control circuits

Type:	BT1MN1, 2 nd life
Chemistry:	Lithium ion MNO
Number of cells:	192
Cell configuration:	2P96S
Max operating voltage:	395 V
Min operating voltage:	292 V
Max Energy:	15 kWh
Cooling:	Passive air cooling
IP degree	67
Art. No:	BT1MN1

Application/Limitation

1. The battery pack is type approved to be used as a part of a complete battery system. The complete battery system is subject for product certification.
2. Usage of the battery packs is limited to vessel that are not depending on the battery packs for maintaining the vessels main functions. This implies that there shall be sufficient number of other energy sources onboard the vessel such that a failure in the battery system does not impact the main functions.
3. A main power contactors or circuit-breakers that disconnect both poles must be included in the complete battery system.
4. The battery pack shall be installed with the automatic independent overcharge protection / thermal runaway propagation protection by smoke detection and water filling.
5. EMC plan must be made for the battery space (the batteries are only tested up to 2MHz).
6. The 12V DC power supply for the system shall be derived from a power supply unit which is DNV type approved.
7. The Type Approval covers hardware and software for the article number given under Product description

Product certification:

Battery system using these battery packs shall have a product certificate according to DNV Pt.6 Ch.2 Sec.1 Table 4 for each delivery to DNV classed vessels.

For product certification, at least the following documents should be submitted for approval, Ref. to DNV Pt.6 Ch.2 Sec.1 Table 8:

- Reference to this type approval certificate
- Copy of the approved Safety description, amended with the additional implemented safety features for the battery system.
- (E120) Technical specification of the battery system that is subject for product certification
- (E170) Schematic drawing of the battery system showing the battery packs, including switchgear and control gear.
- (Z252) Test procedures for the battery system
- (I030) Project-specific Battery System Block Diagram
- (I020) Project-specific functional description
- (I110) List of control and monitored points

Location classes (DNVGL-CG-0339)

Temperature	Class A
Humidity	Class B
Vibration	Class A
EMC	Partly Class A (EMC plan needed)
Enclosure	IP67

Type Approval documentation

Tests carried out

Tests according to DNV-CP-0418 including DNV-CG-0339.

Marking of product

Renault - BT1MN1 - Battery identification number

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