

Battery Energy Storage System (BESS)

DRAFT

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1. Battery Energy Storage System (BESS) Description

The Battery Enclosure is the building block of the Battery Energy Storage System (BESS) configuration.

A BESS has one or more Battery Enclosures, a power conversion system, and associated auxiliary equipment.

Auxiliary equipment includes AC switchgear, meters, relays, and telecommunications equipment. Enclosures are usually interconnected to form larger systems.

2. Scope

Li-ion batteries (BESS) are classified as Dangerous Goods for transport according to the UN Model regulation for the Transport of Dangerous Goods.

They are classified under,

- Class 9, UN 3480, Lithium-Ion Batteries
- Class 9 UN 3481, Lithium-Ion Batteries contained in equipment or packed with equipment

In both above cases placards 9A are required.

Class 9 hazard: Miscellaneous dangerous substances and articles						
9	-	7 vertical stripes in upper half: black	White	9 underlined (black)		-
9A	-	7 vertical stripes in upper half: black; battery group, one broken and emitting flame in lower half: black	White	9 underlined (black)		-

3. Handling Hazardous Cargo

The areas approved to handle cargo (loading & unloading) are listed below, this does not include storage of hazardous cargoes.

APPENDIX A1

BORDER FORCE CUSTOMS APPROVAL - TEES DOCK, PORT OF TEES & HARTLEPOOL

APPROVED AREAS

The wharf approval with regard to the loading, unloading of hydrocarbon oils, chemicals, gas, in bulk is restricted to the Oil Jetty heads and the berthing manifold terminal connections of the pipelines.

1. Approved Wharves identified in green on enclosed plan dated 21/09/2021

a) Approved for the loading and unloading of containers, driver accompanied trailers, unaccompanied trailers, and all classes of goods subject to any exemptions listed in Appendix B.

▪ Tees Dock	RoRo No. 1 Quay RoRo No. 2 Quay Number 1 Quay Teesport Container Terminal No. 2 Quay
▪ Teesport Container Terminal	Teesport Container Terminal No. 1 Quay
▪ Riverside RoRo Compound	RoRo No. 3 Quay
▪ Oil Jetties	Arthur Taylor Jetty West Byng Jetty QEII Jetty

The cargo can remain in a state of transit as an import, which is currently <7days on quay. For the cargo be to remain on quay longer than this period a full risk management plan would be required, including monitoring protocols.

In all cases prior to handling there will be mandatory pre-requisites included in the Regulatory & Compliance Framework, in summary;

- Hazardous Cargo General Awareness Training
- Quality Certification
- A summary report of the UN Manual of Tests and Criteria
- State of Charge (SoC) certificate

4. Regulatory & Compliance Framework

In the case of BESS (Battery Energy Storage Systems) by IMDG (International Maritime Dangerous Goods Code) and ADR (The Carriage of Dangerous Goods and Use of Transportable Pressure Regulations 2009).

During the planning stages a copy of the UN38.3 test report summary must be presented, which is a mandatory document (per UN Manual of Tests and Criteria, Section 38.3) confirming that lithium cells or batteries have passed eight specific safety tests (T.1-T.8) for transportation.

It ensures compliance against fire, explosion, or leakage, including altitude simulation, thermal, vibration, shock, short circuit, impact, overcharge, and forced discharge.

According to REACH (Regulation (EC) No 1907/2006) batteries are identified as articles with no intended release of the substances they contain. Therefore, providing a Safety Data Sheet in Europe is not mandatory for articles.

Prior to any shipment, the compliance with the following requirements points must be fulfilled:

- The Transport of Li-ion batteries (Dangerous Goods) is organized by appropriately trained persons.
- In accordance with the requirements of the UN Model Regulation, Chapter 2.9.4, the manufacturer of the battery or the battery pack shall make available on request of the Competent Authority the evidence that a Quality Certification program is in place in its manufacturing facility for Lithium-ion batteries.
- The Lithium-Ion battery is of the type proved to meet the tests requirements of the UN Manual of Tests and Criteria, Part III, sub-section 38.3; A summary report of the tests shall be available on request.
- Every BESS unit must have a State of Charge (SoC) certificate upon entry.
Recommended SoC for transit is 30% or less.

In addition, Specific legislations apply to each mode of transportation: ADR/RID (road/rail transport) and IMO (maritime transport).

5. Risk Management Plan

BESS units are "active" cargo, they cannot be "set and forgotten".

Monitoring Protocols

- **Thermal Imaging:** Security or safety teams must conduct daily infrared (IR) scans of all BESS containers to detect internal heat spikes before smoke is visible.
- **Visual Inspection:** Daily checks for physical damage, bulging, or leakage of electrolyte fluid. (BESSCS rev1 24.02.26).
- **BMS Integration:** Where possible, require the owner to provide "read-only" access to the Battery Management System (BMS) via cloud portal for remote monitoring of cell temperatures.

Infrastructure Requirements

- **Segregation:** Units must be stored in a designated "Hazardous Zone" with a minimum of **6 metres (20ft)** clearance from other cargo, buildings, and property lines to prevent thermal runaway propagation.
- **Hardstand Zoning:** Units must be placed on non-combustible surfaces (concrete, not asphalt which can melt/fuel a fire).
- **Drainage Control:** Dedicated runoff capture systems to prevent contaminated firewater (containing hydrofluoric acid) from entering the harbour or local water table.

Emergency Services Response Plan

In the event of a **Thermal Runaway**, the strategy shifts from "extinguishment" to "containment and cooling."

Phase 1: Identification & Isolation

- **Alarm:** Immediate evacuation of a 100-metre radius.
- **Wind direction** may increase evacuation radius.

Phase 2: Fire Suppression Strategy by the Emergency Services

- **Defensive Cooling:** Apply high volumes of fresh water to adjacent containers to prevent the fire from spreading. **(Under no circumstances should sea water be used as it may increase production of hydrogen and hydrogen fluoride gas).**
- **Direct Suppression:** Use large volumes of fresh water for cooling the BESS unit itself.
- **(Under no circumstances should sea water be used as it may increase production of hydrogen and hydrogen fluoride gas).**



Phase 3: Post-Incident Handling

- **Toxic Gas Monitoring:** Deploy atmospheric sensors to monitor for Hydrogen Cyanide (HCN) and Hydrofluoric Acid (HF) before allowing personnel back into the zone.

