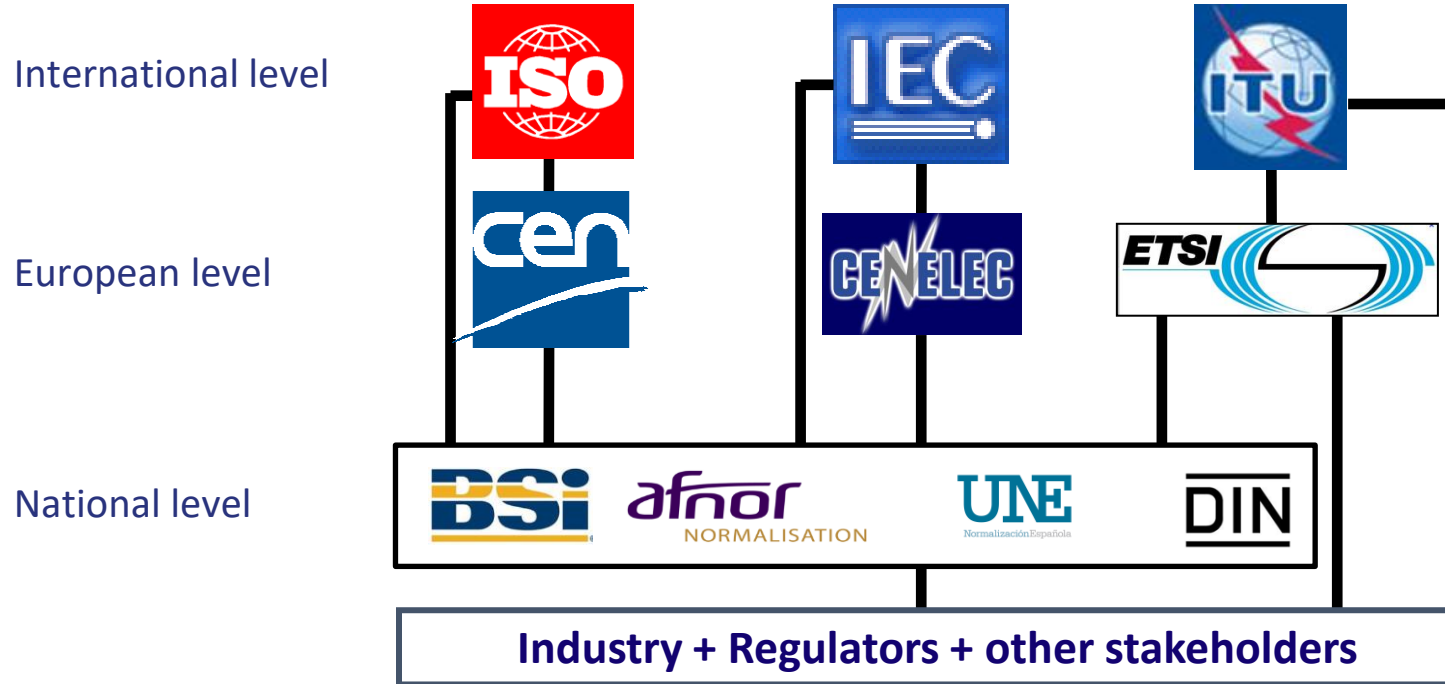




DEFACTO

SAFETY STANDARDS AND CERTIFICATION
FOR BATTERIES IN EV

ISO/IEC Safety standards for batteries for EV



ISO/IEC Safety standards for batteries for EV



ISO/IEC Safety standards for batteries for EV

ISO 6469-1:2019 Electrically propelled road vehicles — Safety specifications — Part 1:
Rechargeable energy storage system (RESS)
(for the whole system)

IEC 62660-3:2016 Secondary lithium-ion cells for the propulsion of electric road vehicles -
Part 3: Safety requirements
(at cell level)



ISO 6469-1:2019 Electrically propelled road vehicles — Safety specifications — Part 1: Rechargeable energy storage system (RESS)

This document specifies safety requirements for rechargeable energy storage systems (RESS) of electrically propelled road vehicles for the protection of persons.

It has replaced former **ISO 12405-3:2014 Electrically propelled road vehicles — Test specification for lithium-ion traction battery packs and systems — Part 3: Safety performance requirements**



ISO 6469-1:2019

Technical requirements

1) Mechanical requirements

2) Climatic requirements

- Thermal shock cycling

3) Simulated vehicle accident requirements

- Vehicle crash
- Immersion into water
- Exposure to fire

4) Electrical requirements

- Isolation resistance
- Clearance and creepage distance
- Short-circuit protection



ISO 6469-1:2019

Technical requirements

5) Functional requirements

- General
- Overcharge protection
- Overdischarge protection
- Protection against internal overheating

6) Requirements for the emission of hazardous gases and other hazardous substances



ISO 6469-1:2019 Electrically propelled road vehicles — Safety specifications — Part 1: Rechargeable energy storage system (RESS)

Developed within ISO/TC 22/SC 37 Electrically propelled Vehicles, the specific subcommittee of ISO/TC 22 Road Vehicles which develops standards for specific aspects of electrically propelled road vehicles, electric propulsion systems, related components and their vehicle integration



IEC 62660-3:2016 Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 3: Safety requirements

This standard specifies test procedures and the acceptance criteria for safety performance of secondary lithium-ion cells and cell blocks used for the propulsion of electric vehicles (EV) including battery electric vehicles (BEV) and hybrid electric vehicles (HEV)





IEC 62660-3:2016 Technical requirements

- 1) Mechanical tests
 - Vibration
 - Mechanical shock
 - Crush
- 2) Thermal test
 - High temperature endurance
 - Temperature cycling
- 3) Electrical tests
 - External short circuit
 - Overcharge
 - Forced discharge
 - Internal short circuit test



IEC 62660-3:2016 Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 3: Safety requirements

Developed within IEC TC 21 TC 21 Secondary cells and batteries, which develops standards for all secondary cells and batteries related to product (dimension and performance), safety (including marking and labelling), testing, and safe application (installation, maintenance, operation) irrespective of type or application or configuration (hybrid, stand alone, module).



ISO/IEC Performance standards for batteries for EV



ISO 12405-4:2018 Electrically propelled road vehicles — Test specification for lithium-ion traction battery packs and systems — Part 4: Performance testing

This document specifies test procedures for the basic characteristics of performance, reliability and electrical functionality for the battery packs and systems for either high-power or high-energy application

Developed within ISO/TC 22/SC 37 Electrically propelled Vehicles, the specific committee of ISO/TC 22 Road Vehicles for EV



IEC 62660-1:2018 Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 1: Performance testing

This document specifies performance and life testing of secondary lithium-ion cells used for propulsion of electric vehicles including battery electric vehicles (BEV) and hybrid electric vehicles (HEV). This document specifies the test procedures to obtain the essential characteristics of lithium-ion cells for vehicle propulsion applications regarding capacity, power density, energy density, storage life and cycle life.



IEC 62660-2:2018 Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 2: Reliability and abuse testing

It specifies test procedures to observe the reliability and abuse behaviour of secondary lithium-ion cells and cell blocks used for propulsion of electric vehicles including battery electric vehicles (BEV) and hybrid electric vehicles (HEV)



ISO/IEC Safety standards for batteries for EV



- ✓ These are the two main standards for safety of batteries for EV, and some other for performance;
- ✓ You can download the **Report on the standardization landscape and applicable standards** from the website of **DEFACTO** (battery DEsign and manufacturing **Optimisation through multiphysic modelling**) project, which contains a catalog of standards for batteries for high-capacity applications;
- ✓ Within the **DEFACTO** project, we have defined a test profile according to IEC 62660 for characterizing the cells, because these test are used in our target market.



ISO/IEC Safety standards for batteries for EV



- ✓ Usually, standards are required by the market;
- ✓ But sometimes, they are also required by regulation:
 - ✓ **UN Manual of Tests and Criteria (UN Transportation Testing)**, recommends IEC 62660-1 (performance) for determining the rated capacity of a battery.

 - ✓ The proposal for a **REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning batteries and waste batteries** foresees four new European Standards (EN) related to:
 - Performance and durability aspects of portable rechargeable and non-rechargeable batteries
 - **Performance and durability aspects of rechargeable batteries with internal energy storage**
 - **Re-use and repurposing of rechargeable batteries with internal energy storage**
 - Safety aspects of stationary battery energy storage systems with internal energy storage





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Thank you for your attention

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