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Electrically propelled road vehicles — Vocabulary

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Electrically propelled road vehicles — Vocabulary

Véhicules routiers électriques — Vocabulaire



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Contents

Page

Foreword	iv
1 Scope	1
2 Terms and definitions	1
Annex A (informative) Examples of propulsion systems for electrically propelled vehicles	8
Bibliography	10

Foreword

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This first edition cancels and replaces the second edition (ISO 8713:2005) which has been revised as a Technical Report.

Electrically propelled road vehicles — Vocabulary

1 Scope

This Technical Report establishes a vocabulary of terms and the related definitions used in ISO/TC 22/SC 21 standards. These terms are specific to the electric propulsion systems of electrically propelled road vehicles, i.e. battery-electric vehicles (BEV), hybrid-electric vehicles (HEV, PHEV), and (pure and hybrid-electric) fuel cell vehicles (FCV, FCHEV).

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

air processing system

system that processes the incoming air for the fuel cell system

EXAMPLE Filters, meters, conditions, and pressurizes.

2.2

auxiliary electric system

on-board vehicle system, other than the propulsion system, which operates on electric energy

2.3

balance of electric power system

remaining portion of a voltage class B (2.72) electric circuit when all RESS (2.61) and fuel cell stacks are disconnected

2.4

barrier

part providing protection against direct contact from any usual direction of access

2.5

basic insulation

insulation applied to live parts for protection against direct contact under fault-free conditions

NOTE Basic insulation does not include insulation used exclusively for functional purposes.

2.6

basic protection

protection against direct contact with live parts under fault-free conditions

2.7

battery cell

basic rechargeable energy storage device, consisting of electrodes, electrolyte, container, terminals and usually separators, that is a source of electric energy obtained by direct conversion of chemical energy

2.8
battery control unit
BCU

electronic device that controls or manages or detects or calculates electric and thermal functions of the battery system and that provides communication between the battery system and other vehicle controllers

2.9
battery-electric vehicle
BEV

electrically propelled vehicle with only a traction battery as power source for vehicle propulsion

NOTE The abbreviation BEV is often shortened to EV.

2.10
battery pack

mechanical assembly comprising battery cells and retaining frames or trays, and possibly components for battery management

2.11
battery system

energy storage device that includes cells or cell assemblies or battery pack(s) as well as electrical circuits and electronics, e.g. BCU (2.8), contactors

NOTE Battery system components can also be distributed in different devices within the vehicle.

2.12
capacity

total number of ampere-hours that can be withdrawn from a battery under specified conditions

2.13
cell electronics

electronic device that collects and possibly monitors thermal and electric data of cells or cell assemblies and contains electronics for cell balancing, if necessary

NOTE The cell electronics may include a cell controller. The functionality of cell balancing may be controlled by the cell electronics or it may be controlled by the BCU (2.8).

2.14
charge balance of battery

change of charge in battery during fuel consumption measurement

NOTE Normally expressed in Ah.

2.15
charger

set of equipment to condition the power of the external electric energy source for charging the RESS (2.61)

2.16
clearance

shortest distance in air between conductive parts (2.17)

2.17
conductive part

part capable of conducting electric current

2.18
coulomb efficiency
Ah efficiency

efficiency of the battery based on electricity (Coulomb) for a specified charge/discharge procedure, which is expressed by output electricity divided by input electricity

2.19

creepage distance

shortest distance along the surface of a solid insulating material between two conductive parts (2.17)

2.20

direct contact

contact of persons with live parts

2.21

double insulation

insulation comprising both basic insulation and supplementary insulation

2.22

driving enabled mode

the only mode in which the vehicle can be moved by its own propulsion system(s)

2.23

electric chassis

conductive mechanical structure of the vehicle whose potential is taken as reference

2.24

electric drive

combination of traction motor, power electronics and their associated controls for the conversion of electric to mechanical power and vice versa

2.25

electric power train

power train, consisting of electric drive (2.24) and drive train

2.26

electric shock

physiological effect resulting from an electric current passing through a human body

2.27

electrically propelled vehicle

vehicle with at least one electric drive (2.24) for vehicle propulsion

2.28

enclosure

part providing protection of equipment against direct contact from any direction

2.29

energy balance of battery

change of energy in battery during fuel consumption measurement

NOTE 1 Normally expressed in Wh.

NOTE 2 For practical use, the following is an approximate definition: charge balance of battery multiplied by the nominal voltage, normally expressed in Wh.

2.30

energy density

amount of stored energy related to the battery pack (2.10) or system volume

NOTE 3 Expressed in Wh/l.

NOTE 4 The battery pack or system includes the cooling system, if any, to the point of a reversible attachment of the coolant lines or air ducts, respectively.

2.31
energy efficiency
Wh efficiency

efficiency of the battery based on energy, for a specified charge/discharge procedure, which is expressed by output energy divided by input energy

2.32
exposed conductive part

conductive part (2.17) of the electric equipment that can be touched by an IPXXB test finger after removing barriers/enclosures which can be removed without using tools and which is not normally live, but which may become live under fault conditions

NOTE For the specification of the IPXXB test finger, see ISO 20653.

2.33
excess flow valve

valve which automatically shuts off, or limits, the gas flow when the flow exceeds a set design value

2.34
externally chargeable HEV

HEV (2.42) with RESS (2.61) that is intended to be charged from an external electric energy source

NOTE Externally chargeable HEVs are widely known as plug-in HEVs (PHEVs).

2.35
fuel cell
FC

electrochemical device that generates electricity by the conversion of fuel and an oxidant without any physical or chemical consumption of the electrodes or electrolyte

2.36
fuel cell hybrid-electric vehicle
FCHEV

electrically propelled vehicle (2.27) with an RESS (2.61) and a fuel cell (2.35) system as power source for vehicle propulsion

2.37
fuel cell stack

assembly of two or more fuel cells (2.35)

2.38
fuel cell system

system containing the fuel cell stack (2.37), air processing system (2.1), fuel processing system (2.40), thermal management, water management, and their control system

2.39
fuel cell vehicle
FCV

electrically propelled vehicle (2.27) with a fuel cell system (2.38) as power source for vehicle propulsion

NOTE An FCV can additionally have an RESS (2.61) or another power source for vehicle propulsion [FCHEV (2.36)].

2.40
fuel processing system

system that converts (if necessary) and/or conditions the fuel, as stored in the on-board fuel storage, into fuel suitable for operation in the fuel cell stack (2.37)

2.41
fuel system

combination of the on-board fuel storage and the fuel processing system (2.41)

2.42

hybrid-electric vehicle HEV

vehicle with both a rechargeable energy storage system and a fuelled power source for propulsion

EXAMPLE Internal combustion engine or fuel cell systems are typical types of fuelled power sources.

2.43

hybrid power train

power train of an HEV (2.42), consisting of a fuelled power source and an electric power train (2.25)

2.44

hybrid vehicle

vehicle with two (or more) different power sources for vehicle propulsion

NOTE Examples of power sources for vehicle propulsion are RESS (2.61), FC systems (2.38), internal combustion engine etc.

2.45

isolation resistance

resistance between live parts of the voltage class B (2.72) electric circuit and the electric chassis as well as the voltage class A (2.71) system

2.46

isolation resistance monitoring system

system which periodically or continuously monitors the isolation resistance between live parts and the electric chassis

2.47

live part

conductor or conductive part (2.17) intended to be electrically energized in normal use

2.48

main hydrogen shut-off valve

valve designed to automatically isolate the high pressure hydrogen source

2.49

maximum allowable working pressure

MAWP

maximum working pressure at which a component or system may be normally operated without damage including leakage and deformation

NOTE The maximum allowable working pressure is used in determining the setting of pressure-limiting/relieving devices installed to protect the part or system from accidental over-pressurizing.

2.50

maximum working voltage

highest value of a.c. voltage rms or of d.c. voltage which may occur in an electric system under any normal operating conditions according to manufacturer's specifications, disregarding transients

2.51

nominal voltage

suitable approximate value of a voltage used to designate or identify a component or a system

2.52

nominal working pressure

service pressure

NWP

pressure level at which a component or system typically operates

2.53

non-externally chargeable HEV

HEV (2.42) with RESS (2.61) that is not intended to be charged from an external electric energy source

2.54

potential equalization

electric connection of exposed conductive parts (2.17) of the electric equipment to minimize differences in potential between these parts

2.55

power management module

control module in FCHEV (2.36) that manages the flow of power/energy from the FC system, from/to the RESS (2.61), and to/from the electric drive according to the driver's commands and the vehicle's propulsion strategy in FCHEV operating mode

2.56

propulsion system

combination of on-board power source for vehicle propulsion and power train

2.57

protection degree

protection provided by a barrier/enclosure related to the contact with live parts by a test probe

EXAMPLE A test finger (IPXXB), a test rod (IPXXC), or a test wire (IPXXD), as defined in ISO 20653.

2.58

pure fuel cell vehicle

pure FCV

FCV with only a fuel cell system as power source for vehicle propulsion

2.59

purge

process of eliminating unwanted gas constituents from a system

2.60

rated capacity

supplier's specification of the total number of ampere-hours that can be withdrawn from a fully charged battery pack or system for a specified set of test conditions such as discharge rate, temperature, discharge cut-off voltage, etc.

2.61

rechargeable energy storage system

RESS

system that stores energy for delivery of electric power and which is rechargeable

EXAMPLE Batteries, capacitors etc.

2.62

reference energy consumption

quantity of electric energy from the mains needed to charge the traction battery, divided by the distance covered after the vehicle has been driven through the specified test sequence

NOTE The reference energy consumption is usually expressed in watt-hours per kilometre (Wh/km).

2.63

reference range

distance covered by an electrically propelled vehicle (2.27) over a designated test sequence on a fully charged traction battery, to the end of the test sequence as defined by the end of test sequence criteria

NOTE The reference range is usually expressed in kilometres (km).

2.64

regenerative braking

braking with conversion of kinetic energy into electric energy for charging the RESS (2.61)

2.65

reinforced insulation

insulation of live parts for protection against electric shock equivalent to double insulation

NOTE Reinforced insulation does not imply that the insulation shall be a homogeneous piece. The reinforced insulation may comprise several layers which cannot be tested individually as supplementary or basic insulation.

2.66

specific energy

amount of stored energy related to the battery pack (2.10) or system mass

NOTE Expressed in Wh/kg.

NOTE The battery pack or system shall include the cooling system, if any, to the point of a reversible attachment of the coolant lines or air ducts, respectively. For liquid cooled systems, the coolant mass inside the battery pack or system shall be included.

2.67

state of charge

SOC

available capacity in a battery pack (2.10) or system expressed as a percentage of rated capacity (2.60)

2.68

supplementary insulation

independent insulation, applied in addition to basic insulation for protection against electric shock in the event of a failure of the basic insulation

2.69

temperature triggered pressure relief device

TPRD

non-reclosing device triggered by excessive temperature that opens to vent gas to protect the fuel container from rupture

2.70

traction battery / propulsion battery / battery

collection of all battery packs which are electrically connected for the supply of electric power to the electric drive and possibly auxiliary electric systems

2.71

voltage class A

classification of an electric component or circuit with a maximum working voltage of less than a.c. 30 V rms or d.c. 60 V rms

2.72

voltage class B

classification of an electric component or circuit with a maximum working voltage between a.c. 30 V rms and a.c. 1 000 V rms or between d.c. 60 V and d.c. 1 500 V

Annex A (informative)

Examples of propulsion systems for electrically propelled vehicles

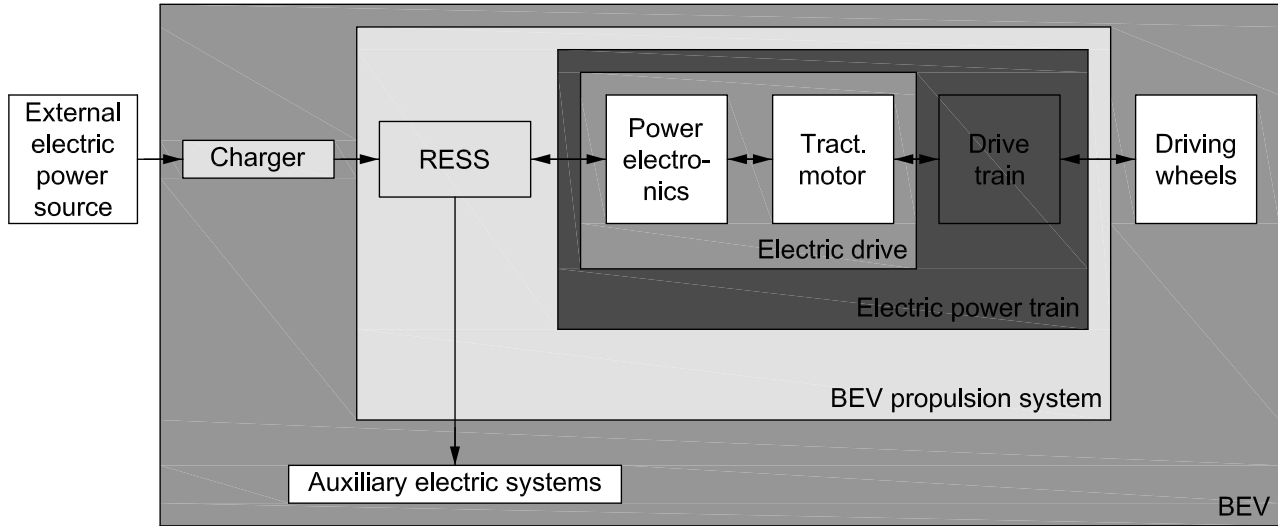


Figure A.1 — Example of BEV

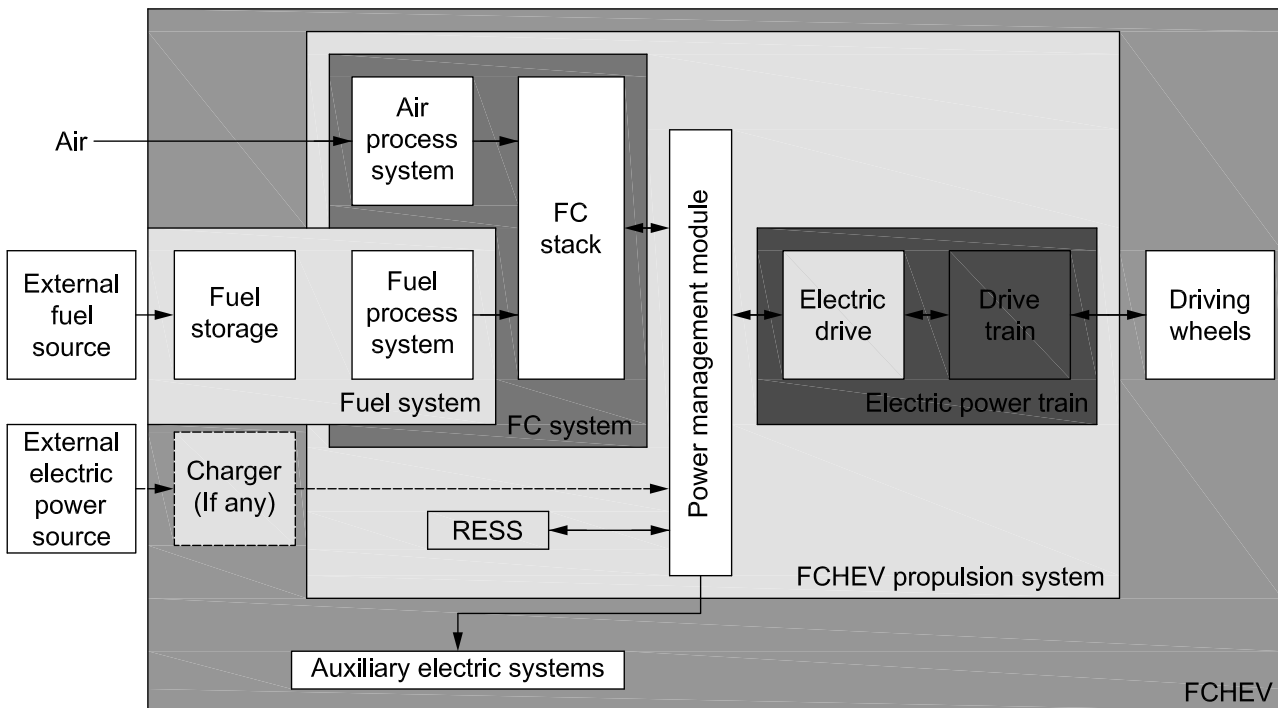


Figure A.2 — Block diagram — Example of FCHEV

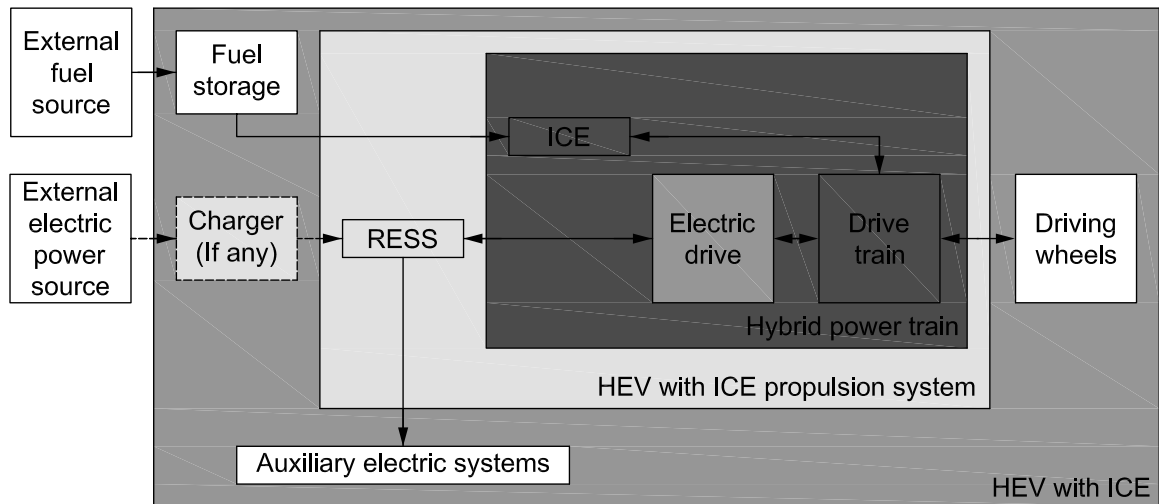


Figure A.3 — Block diagram — Example of HEV with internal combustion engine (ICE)

Bibliography

- [1] ISO 6469-1, *Electrically propelled road vehicles — Safety specifications — Part 1: On-board rechargeable energy storage system (RESS)*
- [2] ISO 6469-2, *Electrically propelled road vehicles — Safety specifications — Part 2: Vehicle operational safety means and protection against failures*
- [3] ISO 6469-3, *Electrically propelled road vehicles — Safety specifications — Part 3: Protection of persons against electric shock*
- [4] ISO 8714, *Electric road vehicles — Reference energy consumption and range — Test procedures for passenger cars and light commercial vehicles*
- [5] ISO 8715, *Electric road vehicles — Road operating characteristics*
- [6] ISO/TR 11955, *Hybrid-electric road vehicles — Guidelines for charge balance measurement*
- [7] ISO 12405-1, *Electrically propelled road vehicles — Test specification for lithium-ion traction battery packs and systems — Part 1: High-power applications*
- [8] ISO 12405-2, *Electrically propelled road vehicles — Test specification for lithium-ion traction battery packs and systems — Part 2: High energy application¹⁾*
- [9] ISO 12405-3, *Electrically propelled road vehicles — Test specification for lithium-ion traction battery packs and systems — Part 3: Safety performance requirements²⁾*
- [10] ISO 20653, *Road vehicles — Degrees of protection (IP-Code) — Protection of electrical equipment against foreign objects, water and access*
- [11] ISO 23273-1, *Fuel cell road vehicles — Safety specifications — Part 1: Vehicle functional safety*
- [12] ISO 23273-2, *Fuel cell road vehicles — Safety specifications — Part 2: Protection against hydrogen hazards for vehicles fuelled with compressed hydrogen*
- [13] ISO 23274, *Hybrid-electric road vehicles — Exhaust emissions and fuel consumption measurements — Non-externally chargeable vehicles*
- [14] ISO 23828, *Fuel cell road vehicles — Energy consumption measurement — Vehicles fuelled with compressed hydrogen*

1) To be published.

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