



IEC/TC OR SC:	SECRETARIAT:	DATE:
<b>69</b>	<b>BE</b>	<b>2020-01</b>

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### A STATE TITLE AND SCOPE OF TC

TC69 “Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks”

*Scope: To prepare publications on electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks (hereafter EV) drawing current from a rechargeable energy storage system (RESS). Possibilities to transfer power/energy include conductive power/energy transfer, wireless power/energy transfer and battery swap.*

*The different publications can cover, but are not limited to:*

- *general requirements (e.g. safety, EMC, construction, testing);*
- *functional requirements (e.g. charging modes);*
- *communication between the EV and the EV supply equipment.*
- *electrical power/energy transfer between EV and supply network (G2V and V2G).*
- *management of the corresponding infrastructures in view of offering the associated value-added services.*

*EV include but are not limited to passenger cars and buses, two and three-wheel and light four-wheel vehicles, trucks and goods vehicles, trailers and special and industrial trucks.*

*Trains, trams and trolleybuses are out of scope of TC69.*

## **B Management Structure of the TC**

The current organization of TC 69 can be summarized as follows. Activities on vehicle performance, vehicle safety and hybrid vehicles have been transferred to ISO TC22 SC37.

- WG7: Electric vehicle wireless power transfer (WPT) systems

One standard and two technical specifications (IEC 61980 series) have been developed. Edition 2 of the standard -1 is well advanced, Edition 1 of the future standards -2 and -3 has started.

The document ISO/IEC 19363 will cover vehicle-related aspects and is being dealt with in the same way as ISO/IEC 17409.

- WG9: Electric vehicle charging roaming service

It is intended to develop IEC 63119 series on Information exchange for Electric Vehicle charging roaming service. Part 1 which deals with General was published. The NWIP of the other 3 parts have been approved.

- WG10: Light Electric Vehicles conductive power supply systems

Work on technical specifications for Light Electric Vehicles was initially started by the IEC 61851-3 joint project team.

It has been decided by TC 69 that IEC TS 61851-3 series are related to EV supply equipment where protection relies on double or reinforced insulation. Parts 4 to 7 have been approved.

- WG12: Electric Vehicles conductive power supply system

The scope is to maintain IEC 61851-1 and coordinate common definitions within IEC TC 69 publications in order to enhance complementarity and compatibility.

- WG13: Electric vehicle battery exchange infrastructure safety requirements

IEC TS 62840-1 on General and Guidance as well as IEC 62840-2 on safety requirements have been developed.

- MT5: Maintenance of IEC 61851-23 and IEC 61851-24

The parts IEC 61851-23 and IEC 61851-24 pertaining to d.c. charging have been developed in PT 61851-23 and PT 61851-24 and are now maintained in MT5.

- MT61851-21-2: EMC requirements for off board electric vehicle charging systems

The development of IEC 61851-21-2 has been completed and maintenance will start in order to publish Edition 2 not before 2021.

- MT62576: Electrically propelled vehicles, energy storage, electric double-layer capacitors and hybrid capacitors

IEC 62576 Edition 2 has been published.

- PT61851-23-1: Electric vehicle conductive charging system - Part 23-1: DC Charging with an automatic connection system

The development of IEC 61851-23-1 is ongoing.

- PT61851-25: Electric vehicle conductive charging system - Part 25: DC EV supply equipment where protection relies on electrical separation

The CDV of IEC 61851-25 has been approved.

- PT62576-2: Electrical characteristics test methods of EDLC Module for Electric road vehicles

The development of the standard about Electric Double Layer Capacitor module for EV is ongoing.

- PT63243: Dynamic electric vehicle wireless power transfer systems

The development of the standard about interoperability and safety of dynamic wireless power

transfer systems is ongoing.

- JWG1: Vehicle to Grid Communication Interface (V2G CI)

Mode 5 cooperation with ISO TC 22 SC31 is used for development and maintenance of ISO 15118 series of standards on the so-called High-Level Communication between EV and EV Supply Equipment.

- JWG11: Management of Electric Vehicles charging and discharging infrastructures

IEC 63110 series will comprise three different standards: Part 1 on basic definitions, use cases and architectures, Part 2 on technical protocol specifications and requirements, Part 3 on requirements for conformance tests. For the time being, only the work on Part 1 has started.

The future work programme will monitor the effectiveness of the existing TC 69 standards related to electrically propelled road vehicles. The suitability of the basic standard requirements (for battery-electric vehicles) to other electrically propelled vehicles such as neighbourhood electric vehicles, industrial electric vehicles, electric trucks and buses, hybrid vehicles (including plug-in hybrids) and fuel cell vehicles needs to be carefully monitored for future consideration.

## **C BUSINESS ENVIRONMENT**

TC 69 "Electric Road Vehicles and Industrial Trucks" was established in 1969 for preparing international standards for road vehicles, totally or partially electrically powered from self-contained power sources, including charging infrastructures for these vehicles, and for electric industrial trucks.

TC69 was formed at a time when advancements in technology made electric automobiles a practical alternative to traditional ICE vehicles that were under regulatory pressure with respect to environmental and petroleum supply concerns. Initial work was conducted by five working groups in the areas of vehicle performance measurement, motors and motor controllers, on-board electrical energy storage, power supply and chargers (infrastructure), and hybrids. Several standards and technical reports were issued during the 1980s.

During the 1990s, automotive industry involvement in TC 69 has contributed to the development of charging system architecture standards consistent with their needs and national demonstration programmes in anticipation of commercialization. This activity has resulted in cooperative standards development with other IEC TC/SCs and some ISO TCs. Informal coordination has also been established with SAE, CENELEC, CEN and JEVA.

New developments for the 21<sup>st</sup> century, with the advent of electric and fuel cell vehicles, create new opportunities for the continuation of the work of TC 69, maintaining its published standards and preparing new documents in the areas where such is deemed useful. Standards and technical specifications are prepared on power transfer systems (conductive (AC or DC), or wireless) for charging or discharging (reverse power flow) of any types of electric vehicles. Communication standards for smart charging between the EV and the EV supply equipment as well as with the smart grid are developed too.

In urban traffic, due to their beneficial effect on environment, electrically propelled vehicles are an important factor for improvement of traffic and more particularly for a healthier living environment. Electrically propelled vehicles (this term encompasses battery-electric, hybrid and fuel cell vehicles) are a key element of the future personal and fleet transportation product offerings of vehicle manufacturers. Growing concern for the environment and for the security of energy supply will necessitate further development of electrically propelled vehicles, with new markets emerging in industrializing countries where energy supply issues are a strong incentive for this technology.

## **D MARKET DEMAND**

Since a few years, the direct customers of the TC 69 standardization work are the automotive, electrical equipment and electric utility industries. The automotive industry and component suppliers utilize TC 69 standards for vehicle hardware and system architecture for future models. The electrical equipment and utility industry utilize TC 69 standards for developing EV charging equipment and planning growth. Furthermore, the availability of TC 69 standards facilitates regulatory processes by governments and local authorities.

**E TRENDS IN TECHNOLOGY AND IN THE MARKET**

During the past decade auto manufacturers and national EV demonstration programmes have proven the feasibility of electric road vehicle technology. Limited progress in battery performance and limited commercial availability of advanced batteries initially had biased the offer in battery-electric vehicles towards smaller vehicles in specific applications like urban environments, where range and speed are consistent with technological capability. Recent interests and progress in battery technology together with the emergence of plug-in vehicles however have led to a new interest in the grid-recharged electric vehicle and its infrastructure.

The electric drive train technology with its on-board components is also used in vehicles which are now penetrating the market, as well as in fuel cell vehicles which are being developed for the future. Grid connecting infrastructures are also applicable to plug-in vehicles which offer interesting opportunities and which are presenting themselves as a key step towards electrification of transport. There is a strong demand for the development of standardized infrastructures for this application.

Additionally, TC 69 standardization work and general EV technology is applicable to electric industrial trucks and electrically propelled buses.

Electrically propelled vehicle technology, which encompasses battery-electric, hybrid and fuel cell vehicles, has the potential for improving environmental conditions particularly in congested urban areas through allowing the deployment of zero-emission vehicles, and for enhancing energy security, through diversification of primary energy sources, improved energy efficiency and more effective environmental control techniques

**F SYSTEMS APPROACH ASPECTS (REFERENCE - AC/33/2013)**

The growing interest for electric vehicles has been reflected in the participation to TC 69, with new countries opting for P-member status and the number of active experts growing considerably.

The ongoing liaison cooperation with ISO TC 22 SC31 and SC37 (previously SC3 and SC21 respectively) is essential for the realization of efficient vehicle-related standards and needs to continue. The same applies for the collaboration within IEC with TC 21, SC 23H, SC 23E, TC 57, TC 61, TC 64, IEC TC 120 and IEC SC 121B on relevant matters. Furthermore, some work is coordinated with IEC TC 77, CISPR/B, CISPR/D, ITU-R and ACEC where appropriate in order to ensure compliance with EMC standards. In view of the development of the complete set of standards for the management of electric vehicles charging and discharging infrastructures on one hand and the impact of electrical energy storage systems on the charging infrastructures on the other hand, the effectiveness of liaisons with TC 57 and TC 120 is very important. In this regard a JWG has been established with TC 57. A new JWG will be established with TC 120 for V2G purposes as vehicle batteries will be a part of the aggregated Distributed Energy Resources used to offer services to grid operators.

All the liaison modes between IEC TC 69 with ISO TC 22 and its relevant SCs have been defined project by project.

Furthermore, a coordination between the main technical committees involved in electro-mobility (including TC 64, TC 21, SC 23E, SC 23H, SC 121B, ISO TC 22 SC31 and SC37) has been sought. A corresponding Joint Working Group was established, and it gave some recommendations on protection against electric shock.

**G CONFORMITY ASSESSMENT**

N/A

**H 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES**