BS ISO/SAE 12906:2024

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Road vehicles — Test procedures for electric vehicles to determine charging performance

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National foreword

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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SAE International
400 Commonwealth Dr.
Warrendale, PA, USA 15096
Phone: 877-606-7323 (inside USA and Canada)
Phone: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
Website: www.sae.org

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Foreword

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This document was jointly prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 37, *Electrically propelled vehicles* and SAE Hybrid – EV Committee.

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Introduction

The test procedures were derived from typical use cases. Both test procedures and use cases were established based on the following premises:

— Comparability: the charging performance determined according to this document enables a comparison of the performance of different electrically propelled vehicles in realistic scenarios. The application of specific optimizing features to improve the charging performance (e.g. battery thermal preconditioning based on navigation systems) is taken into account.

— Imitability and plausibility: the possibility to retrace the determined charging performance in principle.

— Reproducibility: the specified test conditions, test methods and test processes ensure reproducibility within common measurement tolerances. It was important to leave as little space as possible for inadvertent deviations or manipulations.

The test results serve for information purposes, e.g. for vehicle operator interfaces or manufacturer specifications.

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Road vehicles — Test procedures for electric vehicles to determine charging performance

1 Scope

This document specifies test procedures to determine the charging performance of electric vehicles. This document facilitates clear and consistent comparisons of realistic charging capabilities of electrically propelled vehicles (EVs) via commercially available electric vehicle supply equipment. It provides details about test conditions, test methods and test processes derived from typical use cases. Furthermore, it specifies requirements regarding the information for the vehicle operator.

This document is applicable to EVs, including plug-in hybrid EVs.

This document does not provide requirements for mopeds and motorcycles.

Unless specified otherwise, all test procedures can be applied to AC, DC or wireless charging methods.

NOTE Specifications for reverse power transfer are under consideration.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
applicable driving test
ADT
driving test provision including test procedure and requirements for homologation in the intended market

EXAMPLE Worldwide harmonized light vehicles test procedure; SAE J1634.

3.2
ADT schedule
collection of one or more driving cycle(s)

EXAMPLE Worldwide light-duty test cycle; urban dynamometer driving schedule.

3.3
DC electric energy consumption
EC_{DC}
$R_{EC,DC}$
energy withdrawn per unit of distance from the *RESS* (3.9) for operating the *EV* (3.5) as measured by the combined test procedure defined in the *ADT* (3.1)

Note 1 to entry: Charging losses due to AC charging are excluded.

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Note 2 to entry: The unit of the distance referred to depends on the specification in the ADT.

Note 3 to entry: In the worldwide light-duty test cycle, the consumption of the combined test procedure is called $EC_{DC,WLTC}$.

3.4
discharged battery energy
DBE
E_{DBE}
energy removed from the *RESS* (3.9) during the *ADT schedule* (3.2)

Note 1 to entry: At the end of the ADT schedule the DBE equals the usable battery energy.

3.5
electrically propelled vehicle
EV
vehicle with one or more electric drive(s) for vehicle propulsion

[SOURCE: ISO 6469-3:2021, 3.15 — The abbreviated term "EV" has been added.]

3.6
EV supply equipment
EVSE
equipment or combination of equipment that provides dedicated functions to supply electric energy from a fixed electrical installation or supply network to an *electrically propelled vehicle* (3.5) for the purpose of charging

[SOURCE: IEC 61851-1:2017, 3.1.1, modified – Examples were deleted.]

3.7
indicated state of charge
indicated SOC
residual capacity of *rechargeable energy storage system* (3.9) available to be discharged as indicated to the vehicle operator

Note 1 to entry: Indicated state of charge is normally expressed as a percentage of full charge.

[SOURCE: ISO/TR 11954:2024, 3.11, modified — The term was originally RESS state of charge and "as indicated to the vehicle operator" has been added.]

3.8
optimizing features
all vehicle functions that positively impact the test results when activated either automatically or by the vehicle operator

EXAMPLE Battery thermal preconditioning functions activated by navigation systems, specific charging modes selected by the vehicle operator.

3.9
rechargeable energy storage system
RESS
rechargeable system that stores energy for delivery of electric energy for the electric drive

EXAMPLE Battery, capacitor.

[SOURCE: ISO 6469-1:2019, 3.22, modified — "Flywheel" has been deleted from the examples.]

3.10
recharged usable battery energy
rUBE
E_{rUBE}
calculated share of *UBE* (3.13) that is recharged within a certain period

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