
**Fuel cell road vehicles — Cold start
performances under sub-zero
temperature — Vehicles fuelled with
compressed hydrogen**

*Véhicules routiers à piles à combustible — Performances de
démarrage à froid à des températures inférieures à zéro — Véhicules
alimentés en hydrogène comprimé*

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Foreword

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This document was prepared by Technical Committee ISO/TC 22 *Road vehicles*, Subcommittee SC 37, *Electrically propelled vehicles*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Fuel cell road vehicles — Cold start performances under sub-zero temperature — Vehicles fuelled with compressed hydrogen

1 Scope

This document describes the test methods for the cold start performances of fuel cell hybrid electric vehicles (FCHEV) under sub-zero temperature conditions.

This document applies to FCHEV as passenger cars and light duty trucks with a maximum authorized total mass of 3 500 kg (hereinafter referred to as vehicle) and fuelled with compressed hydrogen.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TR 8713, *Electrically propelled road vehicles — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 8713 and the following 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](https://www.iso.org/obp/ui/#iso:code:tr:92108ed6/iso-tr-17326-2023)

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

3.1

ADT

applicable driving test

single driving test schedule which is specified for a relevant region

Note 1 to entry: Chassis dynamometer test schedules for a relevant region are the worldwide light-duty test cycle (WLTC) or the urban dynamometer driving schedule (UDDS).

[SOURCE: ISO 23274-2:2021, 3.1]

3.2

FCHEV

fuel cell hybrid electric vehicle

electrically propelled vehicle with a *rechargeable energy storage system (RESS)* (3.6) and a fuel cell system as power sources for vehicle propulsion

[SOURCE: ISO 23828:2022, 3.7]

3.3

fuel cell stack

assembly of two or more fuel cells, which are electrically connected

[SOURCE: ISO 6469-3:2021, 3.20]

**3.4
fuel cell system**

system typically containing the following subsystems: *fuel cell stack* (3.3), air processing system, fuel processing system, thermal management, water management, and their control system

[SOURCE: ISO 6469-3:2021, 3.21]

**3.5
rated power of the fuel cell system**

maximum continuous power output from the *fuel cell system* (3.4) as specified by the vehicle manufacturer

**3.6
RESS
rechargeable energy storage system**

rechargeable system that stores energy for delivery of electric energy for the electric drive

EXAMPLE Battery, capacitor, flywheel.

[SOURCE: ISO 6469-1:2019, 3.22]

**3.7
RESS SOC
RESS state of charge**

residual capacity of *rechargeable energy storage system (RESS)* (3.6) available to be discharged

[SOURCE: ISO/TR 11954:—¹), 3.11]

4 Abbreviated terms

ECU electronic control unit

VIN vehicle identification number

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5 Test instrumentation

The test instrumentation has the accuracy levels as given in [Table 1](#), unless otherwise specified in the relevant regional ADT standard.

Table 1 — Accuracy of measured values^a

Item	Unit	Accuracy
Time	s	±0,1 s
Distance	m	±0,1 %
Speed	km/h	±1 %
Mass	kg	±0,5 %
Temperature	°C	±1 °C

^a If necessary, DC current and voltage accuracy are specified by the vehicle manufacturer.

6 Vehicle conditions

The vehicle conditions are the following:

- the outline structure and technical parameters of the vehicle is maintained by default;

1) Second edition under preparation. Stage at the time of publication: ISO/DTR 11954:2023.