

**Overview of Hydrogen Fuel Cell Vehicle
Phase 2 Project
Global Technical Regulations No.13
GRSP-71-09**

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UNECE/WP.29/GRSP**

Outline

- Hydrogen fuel cell vehicle (HFCV)
GTR background
- Scope of work
- Summary of work in 6 taskforces
of IWG

Chair: USA NHTSA
M. Koubek

Vice Chair: JPN METI
K. Sato

Vice Chair: KOR KATRI
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CP: CN CATARC
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CP: EU
B. Acosta-Iborra
R. Ladret Piciorus

CP: USA NHTSA
I. MacIntire

Secretary: Toyota
Y. Fujimoto/A. Ryan

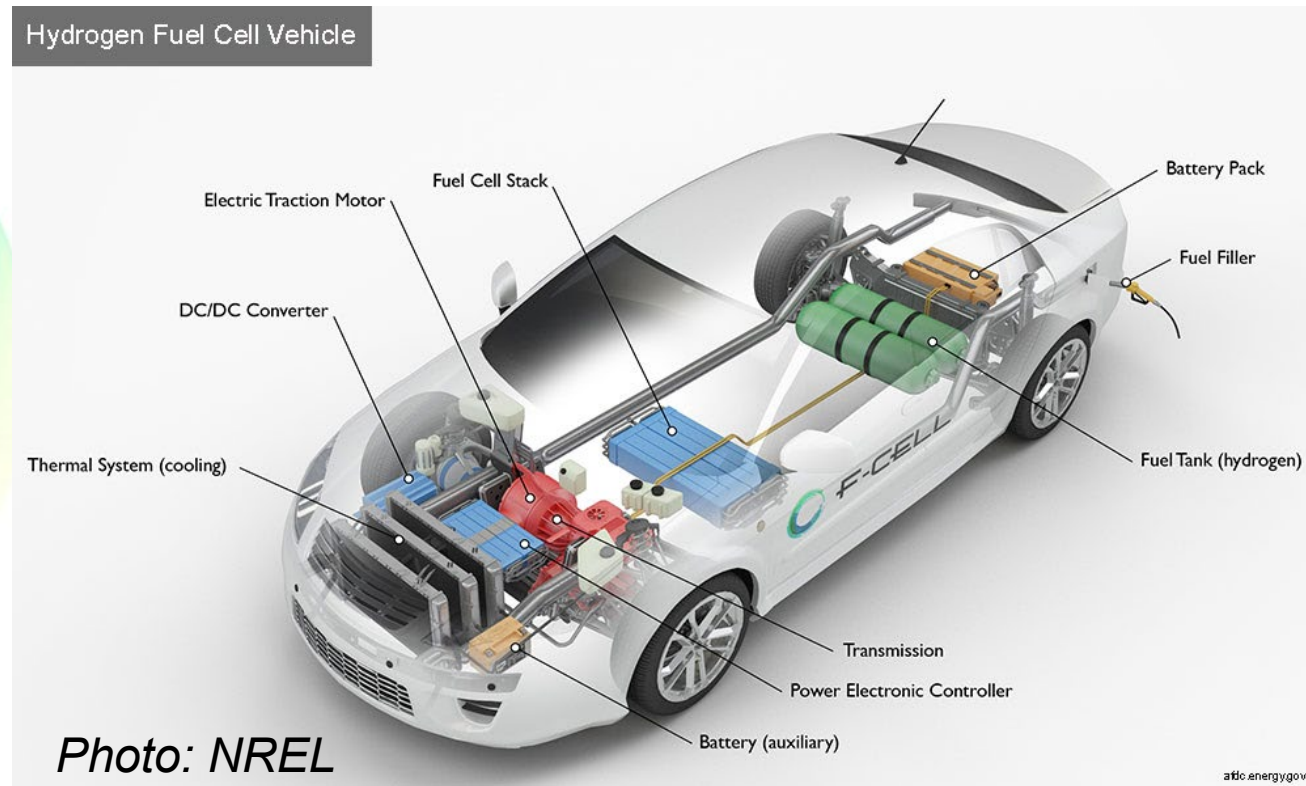
CP: Transport Canada
K. Hendershot

CP: UK DFT
M. Levet

Government
OICA
CLEPA
Container mfrs
Standards Orgs
Laboratories
Academia

HFCV GTR Background

- In 2009, a working group was established under the 1998 Global Agreement to develop a GTR that would address the safety and environmental concerns associated with **fuel-cell compressed gaseous and liquid hydrogen vehicles**.
- Sub-group on Safety (SGS): GTR for hydrogen vehicles ensuring **high pressure container safety, hydrogen fuel system including FC and exhaust system, and high voltage electrical safety**.



HFCV GTR Background

- GTR 13-Phase 1 was adopted by AC3 in June 2013 – see also UN R134 for its transposal into 58 Agreement.
- Development of Phase 2 started in 2017 – see TOR (doc WP29/2018/75).
- IWG meetings have been taking place since Oct 2017
- IWG mandate was extended till December 2022
- Technical work taking place in 5 taskforces, headed by government/industry leaders

Phase 1 Scope

- This GTR applies to all hydrogen-fueled light vehicles with a gross vehicle mass (GVM) up to 10,000 pounds:
 - Category 1-1, 1-2
 - Compressed gaseous hydrogen system for FCEV
 - Liquefied hydrogen system
- GTR establishes safety requirements for:
 - High pressure fuel container system: 35/70 MPa NWP
 - Fuel system at vehicle level: in-use and post-crash hydrogen leakage limits
 - Electrical integrity of high voltage system: in-use and post-crash

Phase 2 Scope

- GTR for Hydrogen-Powered Vehicles was adopted in June 2013 as GTR 13
- Phase 2 is being sponsored by EU, Japan, Korea and US
- Expected completion of Phase 2 by the end of 2022
- Main topics:
 - Expand scope to other vehicle classes
 - Requirements for fueling receptacle design
 - Performance-based test for long-term stress rupture
 - Update test procedures based on research data of phase 1
 - Revised initial burst pressure requirement
 - Service life extension

Taskforce #1: Heavy Duty Vehicles & Buses

Co-led by A. Schuessling and Y. He

Goal: Address safety issues associated with heavy vehicles and buses

- Extension of the scope to cover Commercial/Heavy Duty Vehicles
- Service life of the container (15 → 25 years)
- Crash requirements/sled test
- Thermally activated pressure relief device (TPRD) venting direction
- Container permeation and pneumatic cycling

Taskforce #2: Fuelling Receptacle

Led by L. Gambone

Goal: To standardize references to fuelling receptacle designs

- Specifying fuelling receptacle profile ensures that vehicles of lower Nominal Working Pressure (NWP) are not fuelled at hydrogen dispensers operating at a higher NWP
- Ensures vehicles fuelled by hydrogen are not fuelled by other gaseous fuel dispensers



Taskforce #3: Test Requirements & Procedures

Led by L. Gambone

Goals:

- To correct editorial errors and test specs from Phase 1
- To modify test procedures based on industry experience
- To incorporate requirements for medium and heavy-duty vehicles
- To incorporate requirements for new storage technologies



Taskforce #4: Fire Test

Led by G. Scheffler

Goal: To improve the repeatability and reproducibility of the fire test

- Burner specifications
- Pre-test check of fire test
- Accommodate vehicle specific components
- Extend the application of the fire test to containers on heavy vehicles and to conformable containers

Taskforce #5: Interoperability

Led by A. Tchouvelev

Goal: To review safety dependencies between hydrogen refuelling station and HFCV

- Fueling station components (e.g., dispenser)
- Fueling protocol
- Vehicle to station communication
- References to relevant industry documents (ISO, SAE)



Taskforce #0: Phase 2 Drafting and Editing

Co-led by: A. Ryan and I. MacIntire

Goal: To develop informal draft of GTR13

- TF0 members include CP and industry
- Take agreements among CP, industry from various discussions and taskforces to draft language for Part 1 (Rationale) and Part 2 (Mandatory Requirements)



Next Steps

- Review of informal document
- IWG scheduled for June to discuss comments from GRSP
- Formal document submission for December GRSP



Thank You