

Test procedure for OVC-FCHV´s

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Justification

The GTR15 has a definition and a test procedure for NOVC-FCHV but not for OVC-FCHV.
As there are first vehicles on market this gap should be closed.

Example for a vehicle on Market: MERCEDES BENZ GLC F-CELL



Proposal for GTR 15 modification

- Add definition for OVC-FCHV
- Add a testing procedure for OVC-FCHV

Definition

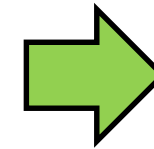
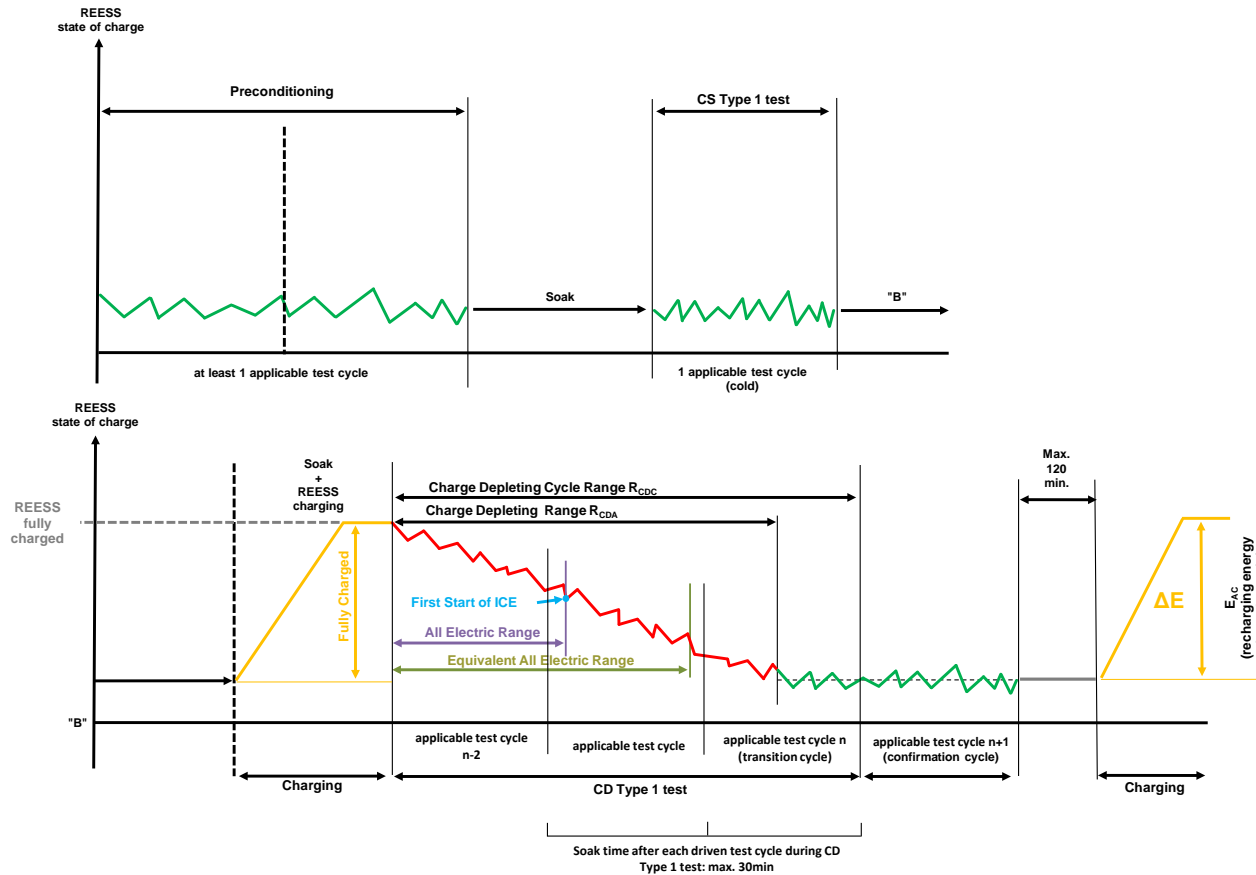
Proposal:

"Off-vehicle charging Fuel Cell Hybrid vehicle" (OVC-FCHV) means a Fuel Cell hybrid electric vehicle that can be charged from an external source.

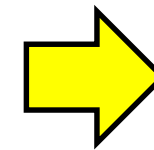
Testprocedure

For an OVC-Hybrid vehicle the test procedure contains of a Charge sustaining test procedure and a Charge depleting test procedure:

Figure A8.App 1/4 OVC-HEVs, charge-sustaining Type 1 test with subsequent charge-depleting Type 1 test



Test procedure for CS is already available



Test procedure for CD exist only for OVC-HEV but this procedure can also be used for OVC-FCHV if CO₂ is replaced by H₂ in the relevant formulas

Testprocedure Charge depleting

The following formulas has to be modified in case of OVC-FCHV (CO2 is replaced by H2):

$$EAER = \frac{FC_{CS} - FC_{CD,avg}}{FC_{CS}} \times R_{CDC} \quad EAER_p = \left(\frac{FC_{CS,p} - FC_{CD,avg,p}}{FC_{CS,p}} \right) \times \frac{\sum_{j=1}^k \Delta E_{REESS,j}}{EC_{DC,CD,p}} \quad R_{CDA} = \sum_{c=1}^{n-1} d_c + \left(\frac{FC_{CS} - FC_{n,cycle}}{FC_{CS} - FC_{CD,avg,n-1}} \right) \times d_n$$

Use of OVC-HEV Fuel Consumption formulas (unmodified)

$$FC_{weighted} = \sum_{j=1}^k (UF_j \times FC_{CD,j}) + (1 - \sum_{j=1}^k UF_j) \times FC_{CS}$$

- Overtake all testing boundary conditions for OVC-HEVs (preconditioning, Soaking, charging, driving mode selection, measurement of current and voltage, break off criteria, soaking time between driving cycles, utility factor,...)
- Utility factor reflects the user behavior and not dependent on vehicle type, hence it is proposed to use the same utility factor as that of OVC-HEV
- Measurement procedure for hydrogen is already defined in Annex 8 Appendix 8

Drafting

A proposal was provided how to modify the latest GTR15 version.

- Overtake all testing boundary conditions for OVC-HEVs (preconditioning, Soaking, charging, driving mode selection, measurement of current and voltage, break off criteria, soaking time between driving cycles, utility factor,...)

TASK: Add wherever necessary “and OVC-FCHV”

- Utility factor reflects the user behavior and not dependent on vehicle type, hence it is proposed to use the same utility factor as that of OVC-HEV

TASK: Add “and OVC-FCHV”

- Measurement procedure for hydrogen is already defined in Annex 8 Appendix 8

TASK: Add “and OVC-FCHV”

- Define new paragraph with all relevant formulas and tables for stepwise post processing

TASK: Copy relevant paragraphs of OVC-HEV and replace CO₂ by H₂

- Check all references

TASK: Due to we have to create new paragraphs some references may be changed