Final Status of SG EV

# Report on topics discussed in SG EV in the context of the GTR#15 Amendment#6

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# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

## Low Temperature Test related topics

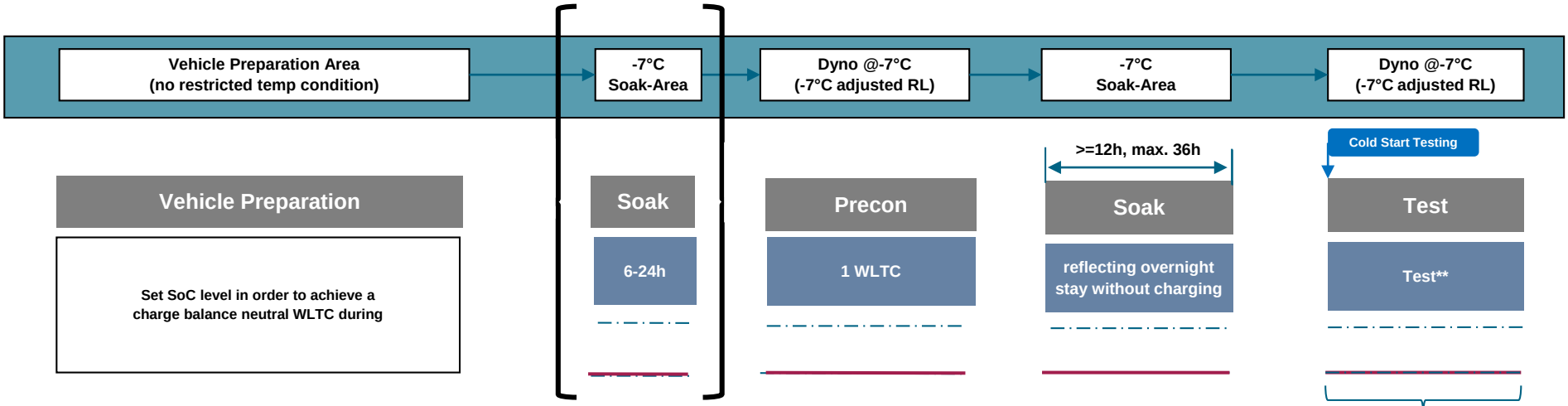
| Item | Status | Remark |
|---|---|---|
| Low Temp Test Procedure for NOVC-HEVs, OVC-HEVs<br>(see slides 3-4) | **Closed*** | *scrutiny during validation exercise; if required: adjustment |
| Low Temp Family concept for NOVC-HEVs, OVC-HEVs<br>(see slide 5) | **Closed*** | *scrutiny during validation exercise; if required: adjustment |
| Low Temp Test Procedure for PEVs<br>(see slide 6) | **Closed*** | *scrutiny during validation exercise; if required: adjustment |
| Low Temp Family concept for PEVs<br>(see slide 7) | **Closed*** | *scrutiny during validation exercise; if required: adjustment |

**Agreed content: See informal document amending working document for GTR#15 Amendment#6**

https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

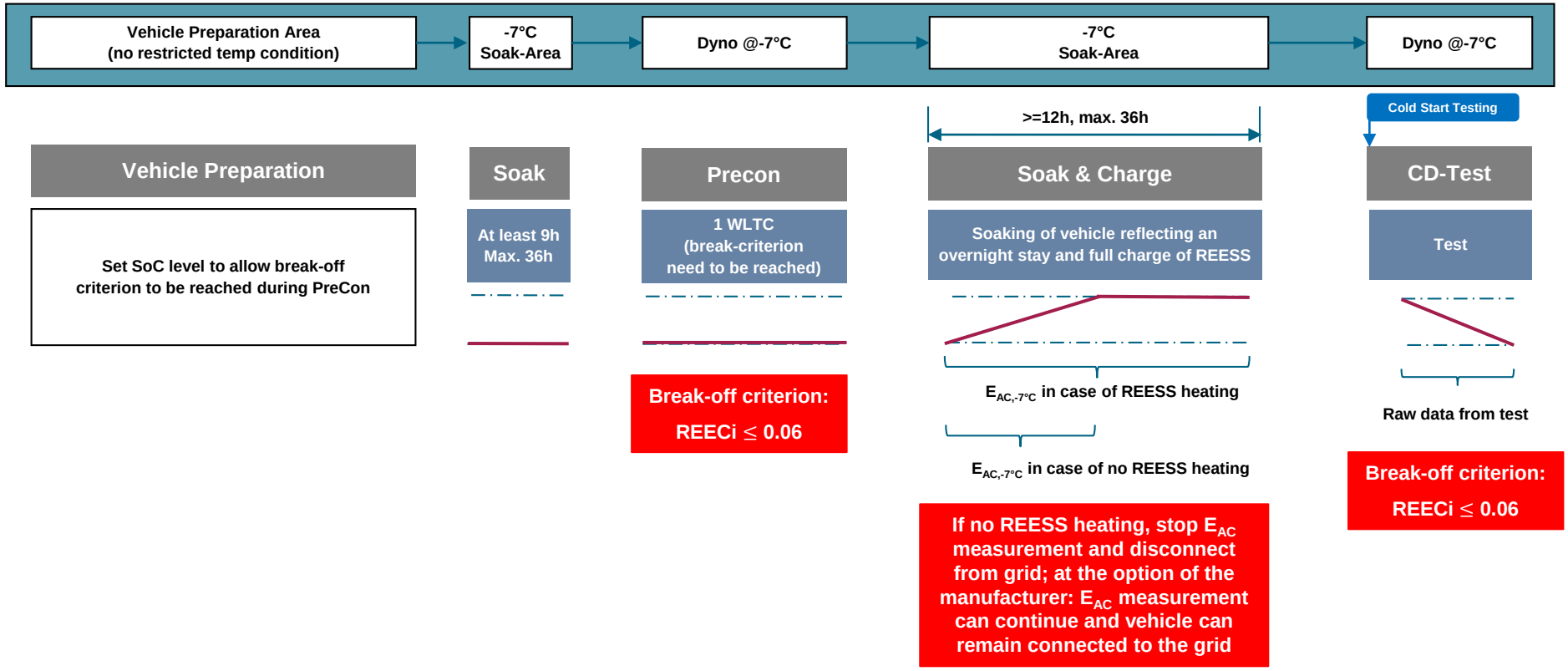
## Agreed Low Temp Test Procedure for NOVC-HEV and for CS-Test of OVC-HEV




**At the request of the manufacturer, and with the approval of the responsible authority, the soak before preconditioning may be omitted if the manufacturer can justify that this soak will have negligible effects on the criteria emissions. As an example, the effects on the criteria emissions may be non-negligible in the case that the vehicle has an aftertreatment system that uses a reagent.**

# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

## Agreed Low Temp Test Procedure for CD-test of OVC-HEV)



# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

## Overview family concept for OVC-HEV

**Selection of OVC-HEVs for Type 6 testing**

In the case of a Type 6 family consisting of OVC-HEVs, the manufacturer shall specify

- at least one vehicle configuration representative for either $PMR_H$ or $PMR_L$, whichever is expected to be the worst-case for criteria emissions

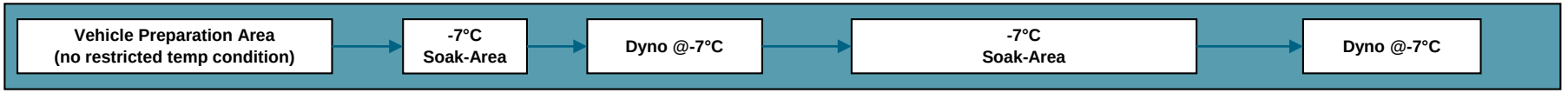
→ measurement for criteria emissions

- the vehicle configuration with the highest combined energy consumption, i.e. the highest combined cycle energy demand and energy consumption for heating. The selection shall be made in agreement between the manufacturer and the approval authority

→ measurement for worst case range and electric energy consumption

# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

## Agreed Low Temp Test Procedure for PEV




**Vehicle Preparation**

Set SoC level to drive max of 50km during preconditioning

**Soak**

At least 9h
Max. 36h

**Precon**

Constant speed
(max.: 50km)

**Soak & Charge**

Soaking of vehicle reflecting an overnight stay and full charge of REESS

$E_{AC,-7°C}$ in case of REESS heating

$E_{AC,-7°C}$ in case of no REESS heating

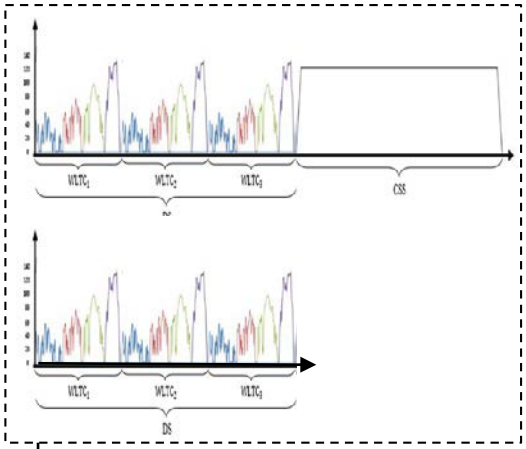
**If no REESS heating, stop $E_{AC}$ measurement and disconnect from grid; at the option of the manufacturer: $E_{AC}$ measurement can continue and vehicle can remain connected to the grid**

Cold Start Testing

**PEV test**

Test

$E_{DC,-7°C}$, UBE, etc.




Family concept PEV

# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

## Overview family concept for PEV

**Selection of PEVs for Type 6 testing**

- At least one vehicle for measuring UBE ratio shall be selected from all vehicle high (VH) of the covered interpolation families in a Type 6 family
  In order to belong to the same family → variation in battery capacity shall not exceed 55 per cent of the test vehicle configuration

➔ Measurement of complete procedure required (3 cycles + constant speed segment)

- At least one vehicle which preferably produced worst case ratio for PER and EC shall be selected from vehicle high (VH) and vehicle low (VL) of the interpolation family in a Type 6 family
  - The measured values of a tested vehicle may be extended without further testing to all family members which fulfil the family criteria defined in paragraph 5.14.2. of this GTR
  - If vehicles within the family include other features which may have a non-negligible influence on the PER and/or EC ratio, these features shall also be identified and considered in the selection of the test vehicle
  - If the responsible authority determines that the selected vehicle does not fully represent the family, an alternative and/or additional vehicle from other vehicle high (VH) and/or vehicle low (VL) of the interpolation families shall be selected and tested

➔ Measurement of reduced procedure required (3 cycles only w/o constant speed segment)

# WLTP SG EV – Final status of GTR#15 Amd#6 related EV topics

## Non low Temperature Test related topics

| Item | Status | Remark |
|---|---|---|
| Update in context of nominal voltage application<br>(detailed information slide 9) | **Closed** | |
| Generic approach for $CO_2$ correction factor application<br>(detailed information slide 10) | **Closed*** | *need to be revisited before transposition into UNR WLTP |
| $CO_2$ correction factor family approach<br>(detailed information slide 11) | **Closed*** | *only for 4 phase WLTP test |
| Expected number of cycles during CD test<br>(detailed information slide 12) | **Postponed** | |
| Amendments in calculations of Annex 8 Chapter 4 → Clarification<br>(detailed information slide 13) | **Postponed** | |

**Agreed content: See informal document amending working document for GTR#15 Amendment#6**

https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

Link the latest version of the informal document updating the working document (GTR#15Amd#6):

https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

# Square bracket topic in WD of WLTP GTR#15 Amend#6

## Update/amendment of the wording of nominal voltage

Intention of proposal:

- Nominal voltage is a fixed voltage value which is not taking care of the voltage decrease of a REESS
- For PEV test procedures, nominal voltage is not allowed at all; but still for the CD-test of an OVC-HEV
- Proposal limits the application of nominal voltage to the CS-conditions of an OVC-HEV and to the low voltage REESSs of PEVs and OVC-HEVs under CD conditions; high voltage REESS under CD condition are not allowed to use nominal voltage

Final status:

- It was agreed by SG EV during the meeting on April 8th to follow JPN proposal (with 60V threshold)
- Only remark: Last line in Table A8.App3/1 („break-off criteria judgment…“) shall be deleted from the proposal

Final text:

See in https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

Conclusion within WLTP SG EV:

- [X] Shall go into GTR#15 Amd#6
- [ ] Shall not go into GTR#15 Amd#6, topic shall be further postponed

Link the latest version of the informal document updating the working document (GTR#15Amd#6):

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# Square bracket topic in WD of WLTP GTR#15 Amend#6

## Generic approach in the context of the $CO_2$ correction factor application of (N)OVC-HEVs

Intention of the proposal:

- Proposal is to give the manufacturer the option to use a worst case approach based on the generic approach from pure ICE vehicles
- These proposals will reduce unnecessary testing without any additional value

Final status:

- JPN and EC support the proposal → support for 4 phase WLTP test and 3 phase WLTP test
- Proposal as under the link below will go into GTR#15 Amend#6
- Proposal need to be revisited before going into UNR WLTP

Final text:

See in https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

Conclusion within WLTP SG EV:

- [X] Shall go into GTR#15 Amd#6 (but further scrutiny before going into UNR)
- [ ] Shall not go into GTR#15 Amd#6, topic shall be further postponed

Link the latest version of the informal document updating the working document (GTR#15Amd#6):

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# Square bracket topic in WD of WLTP GTR#15 Amend#6

## $K_{CO2}$ correction factor family – applicable for OVC-HEVs and NOVC-HEVs

Intention of the proposal:

- Manufacturer should be able to group several interpolation families into one $K_{CO2}$ family
- This proposals will reduce unnecessary testing without any additional value

Final status:

- JPN cannot support the proposal but can accept to apply it to 4 phase WLTP test
- EC supports the concept of having the same family criteria as the CoP family
- Proposal will be applied to 4 phase WLTP test only (need to be considered during drafting)
- During drafting, it need to be discussed which proposed text to follow (ACEA TF EV proposal or Nick-san proposed amendments)

Final text:

See in https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

→ For 4 phase WLTP test only

Conclusion within WLTP SG EV:

- [X] Shall go into GTR#15 Amd#6 (but for 4 phase WLTP test only)
- [ ] Shall not go into GTR#15 Amd#6, topic shall be further postponed

Link the latest version of the informal document updating the working document (GTR#15Amd#6):

https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

X

# Square bracket topic in WD of WLTP GTR#15 Amend#6

## Expected number of cycles in CD mode for OVC-HEV

Intention of the proposal:

- It is not clear what need to be done in the case of a borderline OVC-HEV which reaches in one test the expected numbers of CD cycles but in another test one cycle more or one cycle less than the expected number of CD cycles
- Proposal is providing a solution how to deal with this situation

Final status:

- Necessity seen to take action but no urgent need; at the current stage, this issue can be negotiated with technical service
- EC and JPN agreed to delete the text within the square brackets and to remain with the UNR WLTP text
- Topics can be revisited at a later stage, e.g. in the preparation of the UNR WLTP revision

Final text:

See in https://wiki.unece.org/display/trans/GTR15+Amnd+6+Drafting

→ Proposal contains the deletion of the square bracket text

Conclusion within WLTP SG EV:

- ☐ Shall go into GTR#15 Amd#6
- ☒ Shall not go into GTR#15 Amd#6, topic shall be further postponed (text in square brackets to be deleted)

Link the latest version of the informal document updating the working document (GTR#15Amd#6):

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X

# Drafting topics to be addressed in WD of WLTP GTR#15 Amend#6

## Amendments in calculations of Annex 8 Chapter 4

Background of the proposal:

- Clarification: Add wording “arithmetic” in context of ‘average’ to make clear that the arithmetic average is meant
- Clarification: Adding “and charge-depleting fuel efficiency” in §4.2.2. headline; adding “for OVC-HEVs” in first sentence of §4.2.3.
- Guidance in equation where a division by “zero” is possible: Add wording in case of OVC-HEV equations where a division by “zero” would be possible in case of a pure electric driven CD test or at least one cycle in the CD test ($FE_{CD}$, $FC_{weighted}$, EAER, $EAER_p$)

Final status:

- As the intention of the proposal is to clarify some points but no urgency behind
- EC and JPN stated that these changes can be introduced at a later stage (e.g. when discussing the UNR WLTP revision)

Latest text proposal (will not be considered during drafting):

200514 Amendments in calculation_GTR15 Annex 8 Chapter 4 (rev1).docx

Conclusion within WLTP SG EV:

- ☐ Shall go into GTR#15 Amd#6
- ☒ Shall not go into GTR#15 Amd#6, topic shall be further postponed