WLTP UNR Development (based on WLTP-28-09e)

Proposals in discussion within WLTP Sub Group EV

Proposals for amendment

Update/amendment to include extrapolation for OVC-HEVs

Intention of the proposal:

- Extrapolation is defined for OVC-HEVs but to avoid mistakes in the extrapolation two additional aspects need to be considered, to ensure that the extrapolation is right and correct
  - By extrapolation below VL, the amount of CD-cycles need to be identical between VL and the extrapolated vehicle below VL; if VL was not able to drive CD in pure electric operation, also no pure electric operation for the extrapolated vehicle below VL allowed
  - By extrapolation above VH, the amount of CD-cycles need to be identical between VH and the extrapolated vehicle above VH; if VH was able to drive CD in pure electric operation until SoC_{min}, also pure electric operation for the extrapolated vehicle above VH required

Feedback during meeting on October 9th 2019:

- Further evidence on necessity needed → to be provided for web-audio on October 16th
- JPN and EC stated that not necessary to include it now, can be done later

Latest version: 190930_WLTP-GTR-Proposals_EV_extrapolation_OVC-HEVs.pdf

Draft text included in document: 191013_Extrapolation_OVC-HEV_interpolation extrapolation PEV.docx

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Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):

☐ Supported and shall go into UNR WLTP first edition

☒ Further discussion in web-audio before October 21st, discussion of further proceeding

☐ Not supported

Proposals for amendment

Update/amendment to include extrapolation for PEVs

Intention of the proposal:

- No extrapolation defined for PEVs
- Proposals adds this option and defines a value up to which an extrapolation shall be allowed

Feedback during meeting on October 9th :

- JPN and EC support the proposed concept but is not able to support the "3Wh/km" because of lack of evidence
- JPN in addition asks for also adding an absolute interpolation range for PEVs (similar to the CO_2 range for HEVs)

Agreed further proceeding:

- For October 16th: providing additional text regarding absolute interpolation range
- Support on the concept; text to be inserted in working document of UNR WLTP [square brackets]

Old version: 190930_WLTP-GTR-Proposals_EV_extrapolation_PEVs.pdf

Updated version and draft text included in document: : 191013_Extrapolation_OVC-HEV_interpolation extrapolation PEV.docx

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Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):

☐	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21st, discussion of further proceeding
☐	Not supported

Proposals for amendment

Update/amendment of OVC-HEV and PEV family (on charge electric energy converter)

Intention of the proposal:

- The interpolation family criteria are including the electric energy converter between recharge-plug-in and REESS
- A vehicle, which is identical in all interpolation family criteria except of the onboard-charger, would need to be split into two separate families which means to separate measurements
- These two separate measurements are caused by a component which has only influence on the recharged energy E_{AC} (DC energy consumption, fuel consumption, CO_2 are identical), so you are doing the same measurement procedure twice just to measure the recharged energy with a different device
- Proposal describes that the measurements with the less efficient charger can cover the measurements with the more efficient charger(s) as less efficient charger is the "worst case" in case of the recharged energy E_{AC}

Feedback during meeting on October 9ᵗʰ:

- Proposal can be supported by EC and technical services in EU; JPN needs to further scrutinize
- Wording of proposal need to be reworked: be more clear and easier to understand

Old version: 190930_WLTP-GTR-Proposals_EV_family criteria vehicle charger.pdf

Updated version: not available yet...when available, link to document will be posted here

Decision of SG EV and IWG WLTP (28ᵗʰ WLTP-meeting, Bern, September 2019):	
☐	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21ˢᵗ, discussion of further proceeding
☐	Not supported

Proposals for amendment
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
- For low voltage REESS, nominal voltage application should be allowed in any case as these REESS are small and the voltage decrease over SoC is small

Feedback during meeting on October 9th :

- EC supports the proposal
- JPN need to further scrutinize and come back with feedback in web-audio on October 16th; if required: bilateral exchange between ACEA EV (which prepared proposal) and JPN either via web-audio or e-mail

Latest version: 190903_ACEA TF EV proposal nominal voltage_with_comment_and_changes.docx

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Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):

☐	Supported and shall go into UNR WLTP first edition
☒	Further discussion in web-audio before October 21st, discussion of further proceeding
☐	Not supported

Proposals for amendment

Update/amendment of calculation formula of $M_{CO2,weighted}$, $FC_{weighted}$, $EC_{AC,weighted}$, EAER

Intention of the proposal:

- Weighted CO_2 mass emission is currently based on declared CS CO_2 and measured CD CO_2 mass emission
- In case of a "golden" measurement of the CD-test during type approval, the manufacturer runs into the risk that a vehicle measured by a third party is not matching the "golden" measurement
- Solution is to use in case of the weighted CO_2 mass emission also the declared value of the CD CO_2 mass emission
- Following equations need to be adjusted in addition: $FC_{weighted}$, $EC_{AC,weighted}$, EAER

Feedback during meeting on October 9th:

- JPN supports the proposal but will have a final check until October 16th
- EC support the proposal but will have a final check until October 16th
- It need to be taken care within the transitional provisions that this change is only affecting future type approvals

Latest version: 190903_M_Co2_weighted_Annex_6_7_8_for_declared value implementation.docx

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Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):

☐	Supported and shall go into UNR WLTP first edition
☒	Further discussion in web-audio before October 21st, discussion of further proceeding
☐	Not supported

Proposals for amendment

Update/amendment of adjustment of phase specific range values of PEVs

Intention of the proposal:

- In case of PEVs, there is currently no alignment of the phase specific PER range values based on the ratio between declared total cycle value and measured total cycle value

- Currently, it is not allowed to align the phase values (see paragraph 1.2.4.3. of Annex 6)

- Proposal is adding this with the intention that the phase specific values fit to the total cycle values (see table A8/10 and A8/11)

Feedback during meeting on October 9th :

- EC/JPN: Proposal sounds reasonable, but needs to be checked why paragraph 1.2.4.3. of Annex 6 has been inserted into Amd#1 of GTR#15

- Further scrutiny until October 16th, discussion and decision on further proceeding on October 16th

Latest version: 190903_M_Co2_weighted_Annex_6_7_8_for_declared value implementation.docx

Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):	
	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21st, discussion of further proceeding
	Not supported

Proposals for amendment

Update/amendment of Annex 8, Appendix 4, Paragraph 2.2.3. (Charging)

<u>Intention of the proposal:</u>

- The end-of charge-criterion has currently no reference to the soaking time
- Proposal is adding this reference

<u>Feedback during meeting on October 9th :</u>

- EC and technical services in EU stated that the proposal needs to be reworked
- The end of charge criterion does not need to be linked to the soaking time as charging is not only done during soaking but also after the test and end of charge could be reached before the minimum required soaking time
- ACEA TF EV will prepare an updated proposal for October 16th
- Drafting Coordinator: remove "either" in paragraph 2.2.3.1. (editorial) – agreed by the group that this word not belongs there

Old version: topic described in 190926_Drafting Input for SG EV_1443 (but also see next slide)

Updated version: not available yet...when available, link to document will be posted here

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Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):

☐	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21st, discussion of further proceeding
☐	Not supported

Proposals for amendment

Update/amendment of Annex 8, Appendix 4, Paragraph 2.2.3. (Charging)

Annex 8, Appendix 4 (Charging)	
Current text:	**Proposal:**
2.2.3. Application of a normal charge	2.2.3. Application of a normal charge
Normal charging is the transfer of electricity to an electrified vehicle with a power of less than or equal to 22 kW.	Normal charging is the transfer of electricity to an electrified vehicle with a power of less than or equal to 22 kW.
Where there are several possible methods to perform a normal AC charge (e.g. cable, induction, etc.), the charging procedure via cable shall be used.	Where there are several possible methods to perform a normal AC charge (e.g. cable, induction, etc.), the charging procedure via cable shall be used.
Where there are several AC charging power levels available, the highest normal charging power shall be used. An AC charging power lower than the highest normal AC charging power may be selected if recommended by the manufacturer.	Where there are several AC charging power levels available, the highest normal charging power shall be used. An AC charging power lower than the highest normal AC charging power may be selected if recommended by the manufacturer and by approval of the responsible authority.
2.2.3.1. The REESS shall be charged at an ambient temperature as specified in paragraph 2.2.2.2. of Annex 6 either with the on-board charger if fitted.	2.2.3.1. The REESS shall be charged at an ambient temperature as specified in paragraph 2.2.2.2. of Annex 6 either with the on-board charger if fitted.
In the following cases, a charger recommended by the manufacturer and using the charging pattern prescribed for normal charging shall be used if:	In the following cases, a charger recommended by the manufacturer and using the charging pattern prescribed for normal charging shall be used if:
(a) No on-board charger is fitted, or	(a) No on-board charger is fitted, or
(b) The charging time exceeds the soaking time defined in paragraph 2.7. of Annex 6.	(b) The charging time exceeds the soaking time defined in paragraph 2.7. of Annex 6.
The procedures in this paragraph exclude all types of special charges that could be automatically or manually initiated, e.g. equalization charges or servicing charges. The manufacturer shall declare that, during the test, a special charge procedure has not occurred.	The procedures in this paragraph exclude all types of special charges that could be automatically or manually initiated, e.g. equalization charges or servicing charges. The manufacturer shall declare that, during the test, a special charge procedure has not occurred.
2.2.3.2. End-of-charge criterion	2.2.3.2. End-of-charge criterion
The end-of-charge criterion is reached when the on-board or external instruments indicate that the REESS is fully charged.	~~The end of charge criterion is reached when the on-board or external instruments indicate that the REESS is fully charged.~~
	The end of charge criteria corresponds to a charging time of 6 hours except if a clear indication is given to the driver by the on-board or external instruments that the battery is not yet fully charged.
	The charging time shall not exceed the soaking time defined in paragraph 2.7. of Annex 6.

Proposals for amendment

Adding a procedure for OVC-FCHVs

Intention of the proposal:

- No procedure in GTR which describes how to test an OVC-FCHV
- Proposal is adding the text portions which are describing this procedure
- OVC-FCHV procedure is based on the procedure for OVC-HEVs, replacing CO_2 by H_2

Feedback during meeting on October 9ᵗʰ :

- JPN supports concept; further internal scrutiny on H_2 flowmeter measurement before October 16ᵗʰ
- EC supports the proposal but also needs further internal discussion before October 16ᵗʰ
- Manufacturer stated that the proposed concept is not touching the reference method and candidate method approach which is already in force in GTR#15. This will not be addressed in this proposal
- Final decision on further proceeding in web-audio on October 16ᵗʰ

Latest version: 190611 Proposal OVC FCHVs first draft.docx; 190611 Test procedure for OVC-FCHV´s explanation slides.pdf

Decision of SG EV and IWG WLTP (28ᵗʰ WLTP-meeting, Bern, September 2019):	
☐	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21ˢᵗ, discussion of further proceeding
☐	Not supported

Proposals for amendment
Adding a definition for NOVC-FCHVs and OVC-FCHVs*

Intention of proposal:
- No definition in GTR for NOVC-FCHVs and OVC-FCHVs*
- Proposal is adding these definitions which are at least required for NOVC-FCHVs which are already in the GTR

Feedback during meeting on October 9th :
- JPN supports the proposal to add the definition(s)
- EC supports the proposal to add the definition(s)

Latest version: 190611 Proposal OVC FCHVs first draft.docx; 190611 Test procedure for OVC-FCHV´s explanation slides.pdf

* Definition for OVC-FCHVs only required if procedure for these vehicles is going into the UN R WLTP

Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):	
X	Supported and shall go into UNR WLTP first edition
	Further discussion in web-audio before October 21st, discussion of further proceeding
	Not supported

Proposals for amendment
Exempt humidity measurement for PEVs, NOVC-FCHVs and OVC-FCHVs*

Intention of proposal:

- Humidity measurement and tracking important in the context of pollution emission measurement
- In case of PEVs, NOVC-FCHVs and OVC-FCHVs*, no pollutant emission need to be measured as there are no pollutant emissions, so proposal is to exempt humidity measurement for those vehicles

Feedback during meeting on October 9th :

- JPN supports the proposal
- EC supports the proposal

Draft text proposal for UNR: <to be provided>

* OVC-FCHVs only required if procedure for these vehicles is going into the UN R WLTP

Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):	
X	Supported and shall go into UNR WLTP first edition
	Further discussion in web-audio before October 21st, discussion of further proceeding
	Not supported

Proposals for amendment
Alternative option for COP testing of PEVs

Intention of proposal:

- JAMA is proposing an alternative method (option) to the existing COP procedure (first cycle of the PEV test procedure for DC energy consumption confirmation) as in current procedure, vehicle is coming out of the test with a high SoC because procedure is starting with a fully charged battery and only one cycle is being driven
- If vehicle is shipped by plane, there is a requirement to have a maximum SoC of 30% which means that for those vehicles, the manufacturer needs to discharge the REESS down to this level
- Alternative procedure is following the same methodology like the existing procedure but starting with lower SoC and therefore avoiding this discharge of the REESS after the first cycle

Feedback during meeting on October 9th :

- General concern on timeline; for the web-audio on October 16th, further evidence and draft text to be provided
- Final decision on proceeding in web-audio on October 16th

Presentation describing proposal: PEV Test Procedure for COP_JAMA.pdf

Draft text proposal for UNR: <to be provided>

Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):	
☐	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21st, discussion of further proceeding
☐	Not supported

Proposals for amendment

COP-procedure for OVC-HEVs: REESS preconditioning in case of complete CD-test

Intention of proposal:

- A REESS mounted into a new car first needs to learn where its SoC boundaries are; this needs at least a discharge and charge event but best is to ask the manufacturer recommendation (see run-in for PEVs according to Annex 8)
- Without this "preconditioning", the full battery capacity would not be available for the COP-test ($EC_{AC,CD}$ in COP would be greater than $EC_{AC,CD}$ in Type Approval and vehicle would fail, but would pass with preconditioning)
- Proposal adds the requirement of a run in case of the complete CD-test during COP;
- Alternatively, a REESS preconditioning factor may be determined and provided by the manufacturer for this vehicle family/category

Feedback during meeting on October 9th :

- Further discussion on this topic in web-audio on October 16th
- Final decision on proceeding on October 16th

Presentation describing proposal: 191010_COP_OVC-HEV CD-test_REESS preconitioning requirement.pptx

Covered in Draft text proposal for UNR: 191010 - Draft UNR WLTP CoP requirements-v1_JPN_Nick_MaN.docx

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Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):

☐	Supported and shall go into UNR WLTP first edition
X	Further discussion in web-audio before October 21st, discussion of further proceeding
☐	Not supported

Proposals for amendment

COP-procedure for OVC-HEVs: REESS preconditioning in case of complete CD-test

5.3.1.1.   Charge-Depleting Type 1 test procedure

The vehicle shall be tested according to the charge-depleting Type 1 test procedure as described in paragraph 3.2.4. of Annex B8. During this test, the electric energy consumption $EC_{AC,CD}$ shall be determined according to step 9 of Table A8/8 of Annex B8. Preconditioning of the traction REESS is required and shall be done according to manufacturer's recommendation. In agreement and with approval of the responsible authority, preconditioning of the REESS may be omitted and a REESS preconditioning factor may be used determined and provided by the manufacturer.

Proposals for amendment

COP-procedure for OVC-HEVs: REESS preconditioning in case of complete CD-test

Current agreement within WLTP Sub Group EV on electric consumption verification of OVC-HEV

Additions in red

Homologation	COP Test		
ICE operation in first cycle @CD condition	Test Cycle	Values to be evaluated (individual veh. values)	
No	CD-Test	EC_AC_CD	Preconditioning of REESS required: According to OEM recommendation or application of determined PreCo-factor*
No	First Cycle only	EC_DC_first	
Yes	CD-Test	EC_AC_CD	Preconditioning of REESS required: According to OEM recommendation or application of determined PreCo-factor*

*PreCo-Factor = Reflecting the effect of a REESS which is not preconditioned and therefore has not its full capacity

Proposals for amendment

CO_2 correction factor determination (Annex 8 App. 2) – Drafting issue in §4.1.1.3.

<u>Intention of the proposal:</u>
- Removing redundant text in paragraph 4.1.1.3., <u>no content change</u>
- KCO_2 is mentioned in the formula and in the legend below the formula
- Text see next slide
- Task for the drafting coordinator?

<u>Feedback:</u>
- New proposal
- Not discussed yet
- No feedback available yet

Proposal: 191014_based on Amendment 5_REESS energy change-based correction procedure.docx

Decision of SG EV and IWG WLTP (28th WLTP-meeting, Bern, September 2019):
☐ Supported and shall go into UNR WLTP first edition
☒ Further discussion in web-audio before October 21st, discussion of further proceeding
☐ Not supported

Proposals for amendment

CO2 correction factor determination (Annex 8 App. 2) – Drafting issue in §4.1.1.3.

4.1.1.3.   If the correction of the charge-sustaining CO_2 mass emission is required according to paragraph 1.1.3. of Appendix 2 to this annex or in the case that the correction according to paragraph 1.1.4. of Appendix 2 to this annex was applied, the CO_2 mass emission correction coefficient shall be determined according to paragraph 2. of Appendix 2 to this annex. The corrected charge-sustaining CO_2 mass emission shall be determined using the following equation:

$$M_{CO2,CS} = M_{CO2,CS,nb} - K_{CO2} \times EC_{DC,CS}$$

where:

$M_{CO2,CS}$ is the charge-sustaining CO_2 mass emission of the charge-sustaining Type 1 test according to Table A8/5, step No. 3, g/km;

$M_{CO2,CS,nb}$ is the non-balanced CO_2 mass emission of the charge-sustaining Type 1 test, not corrected for the energy balance, determined according to Table A8/5, step No. 2, g/km;

$EC_{DC,CS}$ is the electric energy consumption of the charge-sustaining Type 1 test according to paragraph 4.3. of this annex, Wh/km;

K_{CO2} is the CO_2 mass emission correction coefficient according to paragraph 2.3.2. of Appendix 2 to this annex, (g/km)/(Wh/km).