EVE-72-03r1e

Japan Positions on Discussion Points for HD Battery Durability

prepared by Japan

@EVE72

17th & 18th June 2024

“HD Battery Durability GTR” Discussion Points and Japan Positions (1)

BLUE : updated
2024.6.17

Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
2. Scope	an originally installed batteries	focus on “an originally installed batteries” and exclude “exchangeable and/or swappable batteries” at this stage **DONE**	✓ follow ToR
Definition, Annex3 3.2.6.4.	Cut-off voltage	* delete **DONE**	✓ authorities/3rd parties are not able to verify its correctness → inappropriate as a test procedure
Definition,	equivalent full cycles	* delete at this stage **DONE**	✓ more discussion is necessary ✓ seems to be inappropriate parameter for durability evaluation
Table 1~5	energy counter	* accept if monitoring purpose **DONE**	✓ one of useful data for future discussion
	energy counter parameter	* accept for energy throughput delete equivalent full cycles at this stage **DONE**	✓ “energy throughput” can cover “equivalent full cycles” for future discussion
	MPR per categories	* ~~no concrete proposal (follow IWG decision)~~ → please refer slide 19 **expect to include into the text (as a CP option)**	~~✓ possess no technical evidence at this stage~~

“HD Battery Durability GTR” Discussion Points and Japan Positions (2)

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Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
5.2.	virtual distance vs total km	* either formula is OK but need verification process (Part C) of “total discharge energy while driving” and “total discharge during V2X +PTO+… or total discharge energy“ **follow IWG decision, then delete one of formula**	✓ same logic as GTR#22
6.1.1.	Part A family	* (e) ~~: add “if fast charge is applied”~~ → can be deleted ? (f) : if (c) covers type of battery – Ni-MH, Li-ion, Solid, etc, OK as it is (g) : if method 2 became optional, no longer necessary **expect to close during “family definition” meeting**	✓ Even though declared (permissible) highest charging power is different, charge event during certification and Part A shall be done with normal charge in a last portion. ✓ just confirmation
6.1.2.	Part B family	* (g) : should be in-line with Part A family description (e) **expect to close during “family definition” meeting**	✓ avoid confusion
6.3.2.	Vehicle selection	appreciate for incorporating the proposal and slightly modified Homologation : move to Annex3 ISC : modified the description **DONE**	✓ should procure the test vehicles from the variety of category to avoid manipulation **“category” should be replaced by “Part B family”**
6.5.	Part C	* depend on application of either “virtual distance” or “total km” **DONE**	✓ to avoid mis-use **“50km” may be replaced by “XX km”**

“HD Battery Durability GTR” Discussion Points and Japan Positions (3)

BLUE : updated
2024.6.17

Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
Annex 1 Vehicle Survey	dynamic charging technology	* need further explanation why this criteria is added for our decision (keep or *delete) **DONE**	✓ may be beneficial to verify the robustness of SOCE algorithm ✓ these vehicles are still valid for Part B
Annex 3 elsewhere	Testing operation mode	~~* no longer necessary~~ → withdraw **DONE**	✓ improve the test efficiency especially for OVC-HEV
Annex 3 Para. 1	optional usage of UBC	* ~~withdraw~~ **DONE**	✓ no technical evidence/observation is available to determine the appropriate MPR for UBC
Para. 2	Test vehicle	* move parts of para. 6.3.2. description (test vehicle) to here **DONE**	✓ better position **Deletion of “Part A” in the title means including homologation ? If so, better to specify for only Part A**
Para. 2.1.	order of test method	* current : bidi → test track → on road proposal : test track → (on road) → bidi→ chassis dynamometer	✓ Japan proposes “bidi” should be one of optional methods since “bidi” is minority in EU ~~and has discharge power limitation in JPN~~ **based on potential concerns, “Method1a” may be excluded. JPN has no concern to do so.**
Para. 2.2.2.	measurement frequency	* Room temperature : at least 0.033Hz Voltage/current : at least 20Hz	✓ In-line with other GTRs (i.e. #15)
	Electrical power/ Discharge rate/ Bidirectional charger…	* delete **NOT DONE YET**	✓ can be covered by voltage and current measurement
Para. 3.	test procedure	・(Method 1a : base), Method 1b : regional option, ・Method 2 : optional with restriction, ・CDY : regional option	✓ Method 1b : Japan has a difficulty to apply under current regional law ✓ Method 2 : minority in EU, should have capability to duplicate Method 1a/1b discharge rate

based on potential concerns, “Method1a” may be excluded. JPN has no concern to do so.

“HD Battery Durability GTR” Discussion Points and Japan Positions (4)

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Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
Annex 3 3.1.1.4 3.2.4.	initial setting of REESS	keep as it is, no option is allowed DONE	✓ JPN supports current text for robust test procedure <in case that OICA propose to omit> OK but it shouldn’t be an option for fair requirement
3.1.1.5. 3.2.5.	soak	keep as it is, no option is allowed DONE	✓ JPN supports current text for robust test procedure <in case that OICA propose to omit> OK but it shouldn’t be an option for fair requirement
3.1.1.6.1. 3.2.6.1.	Monitored parameter	* can be deleted NOT DONE YET	✓ As long as testing is performed under the regional speed range, these information is no longer valid for test validity
3.1.1.6.3. 3.2.6.3.	charge rate	* What does it mean by “the highest normal charging power available” ? charge station or vehicle specification?	✓ make the text more robust to avoid mis-interpretation
3.1.1.6.4.	tolerance in final segment	* -7 km/h (if US prefers mph, -8 km/h ≒ 5 mph is also OK) DONE	✓ lower speed leads less UBE fluctuation within same Part B family
	UBE $_{charge}$	* delete NOT DONE YET	✓ Authorities (EC, US EPA and JPN) are interested in vehicle performance during the discharge event rather than charge event

“HD Battery Durability GTR” Discussion Points and Japan Positions (5)

BLUE : updated
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Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
Annex3 3.1.1.6.5. 3.2.6.5.	repetition of test	* please refer slide 16 **DONE**	
3.1.2.	on road testing	no strong position (might be essential to be in-line with 1a) **based on potential concerns, “Method1a” may be excluded. JPN has no concern to do so.**	✓ Japan regional law does not allow the vehicle driving prior to registration
3.2.6.4.	discharge rate	* discharge rate by using “bidi” should be within a range to duplicate the regional characteristic speeds and payload, no need to be constant **DONE**	✓ to be in-line with Method 1
	break-off criteria	* 4 second rule same as Method 1a Japan does not accept the “cut-off voltage” criteria **DONE**	✓ to be in-line with Method 1 ✓ authorities/3rd parties are not able to verify its correctness → inappropriate as a test procedure
	UBE measurement during charge event	* should be deleted **NOT DONE YET**	✓ Japan (and EC, USEPA) is interested in vehicle performance during the discharge event rather than charge event

“HD Battery Durability GTR” Discussion Points and Japan Positions (6)

(mainly editorial error)

BLUE : updated
2024.6.17

Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
Annex3 Table A3/1	Measurement items and required accuracy	delete “frequency”, “electrical power”, “discharge rate” and “bidi spec”	✓ frequency : not right position ✓ others : not “measurement items”
Annex3 Table A3/2	Selection of the testing methods	Method1b → [Method 1b] Alternative Method → Method 3	✓ Method 1b : per IWG decision ✓ Alternative method : same level as others
2.1.1.1.	General test requirements	delete “descriptions of obstacles … “	✓ ambiguous text → can be used for unfair treatment
2.1.1.1.2. 2.1.1.1.4. others	Test room Soak area	test room for driving : shall have a temperature set point of 25 °C. The tolerance of the actual value shall be within ±5 °C **at the beginning of test** Soak/charge area : shall be maintained at 25 °C ±5 °C	✓ hard to control the room temperature during entire test run due to higher heat release
2.1.1.1.3. 2.1.2.1.3. 2.2.1.2.	Cooling fan	need more clear descriptions	✓ fan for battery? vehicle? ✓ fan for during charge? soak ?
2.1.1.1.5. 2.1.2.1.5. 2.2.1.4. 2.3.1.1.5.	Measurement frequency	20 Hz for current and voltage and 0.033Hz for temperature	✓ Frequency should be determined per required accuracy

“HD Battery Durability GTR” Discussion Points and Japan Positions (7)

(mainly editorial error)

BLUE : updated
2024.6.17

Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
2.1.1.6. 2.1.2.1.6. 2.2.1.5. 2.3.1.1.5.	Required information	can be deleted	✓ no impact on test procedure and/or test results
2.1.1.7.	On-board voltage	OK also during type-approval if sensor specification is identical	✓ Reduce the test burden
2.1.1.2.5.	Vehicle pre-conditioning	delete “until temperature stabilization (average temperature shall not vary more than +/-1°C”	✓ unclear, temperature for what ?, average for how long ?
2.1.1.2.7.	Method 1a test	* delete “warning indicator for break-off criterion”	✓ avoid manipulation
		charge event after discharge is mandatory for homologation test only	✓ reduce testing burden
2.1.2.	all	keep same procedure as Method 1a as much as possible, if IWG accepts the Method 1b	
2.1.2.2.7.	Method 1b test	* Manufacture should demonstrate the equivalency between the warning light condition and the 4 seconds rule ?	✓ Just confirmation, how to “demonstrate” the equivalency ? It might be almost impossible.

"HD Battery Durability GTR" Discussion Points and Japan Positions (8)

(mainly editorial error)

BLUE : updated
2024.6.17

Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
2.2.	all	keep identical requirement as Method 1 as much as possible	
2.2.1.	General test requirements	"VRTE" should be replaced	✓ test procedure is going to determine UBE, not efficiency
2.2.2.1.	General	* should be delete whole section	✓ mislead, i.e. waring light for when ? Unnecessary test data is required….
2.2.2.5.	the given speed	* better to use another terminology to distinguish "given speed" in Method 1 i.e. discharge rate derived from the regional characteristic speed and payload per Gross Vehicle Weight (GVW) and Gross Combination Weight (GCW) in agreement with the responsible authorities	✓ unclear
2.2.2.7	Method 2 VRTE test	Method 2 test	✓ efficiency is not required parameter
	C-rate	* should be deleted	✓ should duplicate the same discharge rate as Method 1

“HD Battery Durability GTR” Discussion Points and Japan Positions (9)

(mainly editorial error)

BLUE : updated
2024.6.17

Draft GTR	items	Japan Positions (* : excluding JAMA)	Justifications
2.3.	Alternative method	propose “Method 3” instead of alternative	✓ one of test procedures to determine UBE, not unique test procedure
	all	keep identical requirement as Method 1/2 as much as possible (except 2.3.1.1.3.)	
2.3.1.1.7.	on-board current data	should be deleted	✓ not allow to do so for Method 1/2
2.3.1.2.6.	Vehicle soak and charge	delete “The temperature of the battery shall be checked before starting the test”	✓ reduce testing burden (no criteria means unnecessary procedure)
2.3.1.2.8.	The transient cycle method. test	add “betten_41”	
2.3.1.2. 9.1. 2.3.1.2.9.2.		** the UBE testing procedure shall be in phase 1 and phase2/The end time of the test is the beginning time of the electric power balance stage ← not correct	✓ UBE measurement ends up @ break-off criteria
elsewhere		local ? regional ?	

updated comments for 72nd IWG

previous comments

e-HDVs tests: open questions EVE IWG 69th

Open points of the draft HDV GTR:

still "open" based on the 71st IWG meeting
due to potential inaccurate test results under the Method 1b

- Proposal to merge Method 1a and Method 1b (OICA proposal EVE IWG 66) : to be discussed; in Japan [illegible]od 1b is not applicable. If merged, only Method 1a will remain. OICA to verify internally the proposal. To keep both ✓ agreed
- Vehicle selection type approval and for Part A verification (Japan proposal EVE IWG 66): to be discussed
- Driver breaks: km vs time based: time based favourable ✓ JPN: should be confirmed no conflict with RDE ✓ agreed
- Run-in HD-PEV and HD-OVC-HEV: draft in the text ✓ JPN supports draft GTR description ✓ agreed
- Break-off criterion: For HD-PEV, speed or power not kept any longer. ✓ For HD-OVC-HEV draft proposal next slide
- Cruise control use: possible to be used ✓ EU, Japan, US EPA ok to use it ✓ agreed
- Verification and qualification of the on-board data (voltage) (OICA proposal): see next slide (current and voltage) ✓

Where can we see ?

- Steps of the test procedure (schemes and text in the draft GTR): updated schemes and text in the draft ✓ agreed
- Temperature, road grading/slope, acceleration to the target speed,…Method 1a & 1b: to be discussed
- Alternative method: draft text added in the GTR
- Test repetitions: Removed ✓ agreed
- MPR and metric: to be discussed

- **EVE IWG 69th: Four items to report to EVE IWG 70th**
  - **Temperature**
  - **Road grading/slope**
  - **Break-off criterion for HD-OVC-HEVs**
  - **Alternative method**

e-HDVs test open questions: temperature ✓?

ALTERNATIVE TO CONSIDER

- Pre-conditioning, soak and charge to be carried out in a test room/soak area, [23 °C ±5; ± 7 °C] [25 °C ±7; ± 10 °C] → 25 °C ±5;
- If test room/soak area not available, not applicable…, allowed to use pre-warming of the battery in cold environment with internal designed functional systems with measurement of the energy

- from RDE moderate conditions (0 to 35 C)

Japan: to improve practical test execution, propose RDE moderate conditions (0 ~ 35 C).
based on technical justification, OK to expand the 5% tolerance in case of outside range from 18 ~ 30C.

PLUS THIS REQUIREMENT ON EXTERNAL SYSTEM

- Not allowed the pre-warming of the battery with an external system, different from a charging station

OK with current tolerance (5%)
but flexible to modify based on technical justification

- Part A verification: A parameter discu

To provide your views

tems to be reported to EVE IWG 70th

- **Temperature. Still open. To discuss further**
- **Road grading/slope**
- **Break-off criterion for HD-OVC-HEVs**
- **Alternative method**

slide_11

e-HDVs tests open questions: acceleration, road grading/slope ✓ ?

Japan:
to improve practical test execution, propose to apply same conditions as RDE requirement means that "the cumulative elevation gain" shall be less than 1,200m / 100km

- Road grading/slope, accuracy on UBE to add?
- Effect of the acceleration to the target speed with road grading/slope
- Effect on the last portion of the test: grading, payload, speed, power request … near the break-off point

EVE IWG 70th favourable

PROPOSAL TO CONSIDER

- Proposal to apply same conditions as RDE requirement on all the route/test: "the cumulative elevation gain" shall be less than 1,200m / 100km and be determined according to ……(*RDE Appendix 7b as example, regional regulations, …*).

…e end of the test to be reported

…a

OK with same requirement as RDE
Practically impossible to set additional criteria at the point of break-off event. If the absence of the additional criteria lead inaccurate results, one of ideas is to exclude Method 1b

To provide your views

EVE IWG 69th: Four items to be reported to EVE IWG 70th

- Temperature
- Road grading/slope. Still open. To discuss further
- Break-off criterion for HD-OVC-HEVs
- Alternative method

slide_12

e-HDVs tests open questions:
Break-off criterion

- Break-off criterion **Method 1a, 1b**:
  - For HD-PEV speed or power not kept any longer
  - For HD-OVC-HEV draft proposal in the next slide
  - Proposal on cumulative UBE to be revised to reflect distance driven, operational mode etc.
  - If auxiliary systems are used to complete the battery discharge: break-off criterion; the level of warning signal should be equivalent to the 4 seconds criterion, …

may be more efficient,
Manufacture provide the specific distance per battery size/vehicle configuration, or define the distance based on ….

Sorry, difficult to figure out

to demonstrate the equivalency, need to run on the test truck or chassis dynamometer. Then why Method 1b is necessary ???

To provide your views

- EVE IWG 69th: Four items to be reported to EVE IWG 70th
  - Temperature
  - Road grading/slope
  - Break-off criterion for HD-OVC-HEVs. Still open
  - Alternative method