

EVE IWG	
Date	September 21, 2022 – September 22, 2022
Time	09h00 – 17h00 Central European Summer time
Title	EVE IWG Session #57
Informal Document	EVE-57-16e – meeting report-minutes

Submitted by the EVE Secretariat

Report of the 57th Session

Electric Vehicles and the Environment Informal Working Group

Location:	WebEx
Date and Time:	September 21, 2022 at 9:30 – 5:00 CEST September 22, 2022 at 9:30 – 5:00 CEST
Chair and Co-Chair:	Mr. Michael Olechiw (USA) [Present] Ms. Panagiota Dilara (European Commission) [Present]
Vice-Chair(s):	Mr. Hisakazu Suzuki (Japan) [Present*] Ms. Chen Chunmei (China) [Present*]
Secretary:	Ms. Kendelle Anstey (Canada) [Present]

**Present virtually*

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- AECC – Association for Emissions Control by Catalyst**
- BD – Battery durability**
- BMS – battery management system**
- CARB – California air resources board**
- CITA - International Motor Vehicle Inspection Committee**
- EC – European Commission**
- EPA – U.S. Environmental Protection Agency**
- HD or HDV – heavy duty vehicles**
- JRC – Italy’s Joint Research Centre**
- SAE – Society of Automotive Engineering**

OICA - Organisation Internationale des Constructeurs d'Automobiles (automobile organisation)

Overall Summary of Meeting:

Key outcomes from this meeting include a path forward on in-vehicle battery durability provisions for heavy-duty vehicles with a focus on in-situ testing of the battery at beginning of life and during use. EVE IWG will also consider future ways to assess power fade of heavy-duty vehicle batteries. JRC also presented some new data on commercial vehicles which may provide useful outline for the new GTR to be developed focusing on heavy duty vehicles.

Japan and OICA also made proposals for amendments to GTR No 22 which is distributed on the EVE IWG webpage. Japan also made a proposals for assessing one situation in an integrated power system for GTR No. 21 for EVE IWG to consider. More details will be brought from Japan for further discussion on this topic. They also made a proposal on family definitions for GTR No 21. The proposal was agreed to be a good start and will be drafted into the GTR for changes.

The GRPE secretariat also asked for EVE IWG comments on the WP 5. paper “Taking stock of new trends towards electric vehicle charging infrastructure” which asked for input from the EVE IWG on storing vehicle power data with the grid. JRC presented some new data on commercial vehicles which may provide useful outline for the new GTR to be developed focusing on heavy duty vehicles.

SAE also provided updates on their work with diagnostic repair for EVs. SAE will keep EVE IWG updated on this front. SAE will also look into CEN to avoid duplication of work.

Swappable batteries introduced by China continues to be an open discussion item. EVE IWG will continue talks on this item to look for ways to approach these types of batteries should there be solutions. China will provide more information on this topic for EVE IWG to consider.

Further details of the meeting are recorded below. Action items can be found at the bottom of this meeting report.

Comments, questions or changes can be forwarded to Kendelle.anstey@ec.gc.ca.

EVE IWG Meeting, September 21, 2022

	Time	Agenda item	Lead	Working Paper #
0	09:00 – 09:30	Arrival and security check in		
1	09:30 – 09:50	Introductions, introductions of new members, review of agenda, meeting minutes	Chairs	EVE-57-06e
<p>Participants included those from AECC, AVERE, CITA, OICA, ECCC (Environment and Climate change Canada), JASIC, MAN truck and Bus SE, ACEA, MLIT, RDW the Netherlands Vehicle Authority, Swedish Transport Agency, TÜV NORB mobilität, UK department for Transport and the United States Environmental Protection Agency and the European Commission.</p>				
2	09:50 – 10:00	Review of discussion topics Excel sheet	EVE IWG	EVE-57-04e
<p>Summary: For further details look at Excel sheet EVE-57-04e.</p> <p><i>Colour coding system on excel sheet for list of priority items:</i> Green will go ahead, yellow it will also go ahead but is not priority, orange is still under consideration and may or may not go ahead, red colour will not go ahead with (may be removed from the excel sheet).</p> <p>Notes to accompany priority items from discussion:</p> <ul style="list-style-type: none"> • Further research and testing for phase 2 – nothing clear to put more resources. Leave as yellow or orange. • Implementation of monitoring phase – clear item all need to do. For member states mostly. It will happen, just depends when contracting party members introduce GTR No 22. This item is put in yellow as it will occur but is not currently a priority item. <ul style="list-style-type: none"> ○ Comments on this item: <ul style="list-style-type: none"> ▪ U.S EPA Chair – It will be interesting to hear from the contracting party members on the specific language they will use for the adoption of GTR No 22 and how GTR No. 22 is transposed into regulation. The U.S. EPA is now looking at how to put GTR No 22. into regulation. ▪ The European Commission – EC is doing the exact same thing with Euro 7 proposal upcoming. • Setting MPR for range – This will be put as a green item <ul style="list-style-type: none"> ○ Comments: <ul style="list-style-type: none"> ▪ The discussion on this item will continue but more data is needed so the monitoring data will help. OICA also agreed to have this item as green and wait for more data. 				

- There were comments on what data CARB used for supporting data for their range based MPR.
- The U.S. EPA replied that they agree with labelling this item as green. U.S. EPA also comments that although there was discussions with team on difficulty for establishing MPR for range and fuel conditions but none the less California has adopted a range metric as look at GTR adopting for U.S. regulations. Topic of range usually comes up. They don't know if there is a lot of new interest in having a range metric in the U.S.
- Establishment of data collection mechanism – this is for CP to decide.
 - Will be useful for CPs to share information to the EVE IWG as it becomes available
- Advancing UBE indicator – leave as orange
- Establishing a minimum range for EV –
 - EC noted is not going this way for regulation and suggested to keep this in red
 - U.S. EPA suggested to keep this an orange. Up to manufacturer for market and regions will be regulated.
- Setting MPR for category 2 – Green category as it is a priority item
 - To align wording between North America weight guidelines and incorporating category
- Penny – Japan suggested to review annex 2.
- OICA to add review of part A

Need for additional validating testing GTR No 21.

- U.S. EPA - familiar with the GTR – candidate test method originally planned to put in. not priority for EU. Canada aligned with U.S.. U.S has no strong position yet. Not in a rush yet. Only observe useful for modelling ICE vs electric vehicles to get a rated power can't test on the dyno. OICA should keep eye on this for review. Canada did a lot of testing for validation and offered to collaborate where necessary.
- Add family definitions to the excel sheet .

3	10:00 – 10:30	Japan comments on GTR No. 22	Japan	EVE-57-07e
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Summary:

Japan provided some history of last EVE discussions with note that no decisions were made regarding temperature taking for batteries. They also noted the discussion of adding energy throughput. Japan proposed:

1. The adoption of battery temperature instead of ambient temperature
2. Recording **elapsed** time since last charge **day** instead of last time since **date** of last charge (item 9) and
3. Adopting something similar to monitoring temperature of vehicle it is parked.

The EVE IWG also discussed the alignment of Europe’s battery regulation and EVE IWG so there are not multiple requirements for the same thing. Japan is also looking for other views on how to address the date and temperature.

EVE IWG agreed with changes proposed by Japan.

The EVE IWG will put together a list of potential changes in GTR or make notes in GTR No 22. on what to add. Language will be drafted to be commented on.

The EVE co-chair suggested the EVE IWG wait for the battery regulation discussions to finish (within this year) and adopt changes for the June GRPE or around that date.

ACTION Item: Start adding in comments on GTR No 21. Draft for next iteration of GTR.

	10:30 – 11:00	Coffee break		
4	11:00 – 11:30	OICA comments on GTR No. 22	OICA	EVE-57-05e

Summary: OICA proposed some text changes which will be added to the changes to GTR No. 22 document.

Discussion details:

OICA considers Japan suggestions on slide 14 of EVE-57-07e for point 9 a good way forward. OICA provided some wording suggestions considering points 10. OICA was also inquiring about the need for additional data for points 11 and 12 provided by JRC to which there was some side discussions on limiting the data being asked for and taking measures to avoid duplicate requirements from different regulations. In Geneva, OICA asked if some vehicles can be excluded from the samples and if there are thresholds for these points.

Figure one below reflects the points referred to. OICA is discussed values from Annex 2 of GTR No. 22.

Values to be read from vehicles:	
1.	On board SOCE value
2.	On board SOCR value
3.	Odometer (in km)
4.	Date of manufacture of the vehicle
5.	Total distance (sum of the distance driven and the virtual distance) [km], if applicable
6.	Percentage of virtual distance [in per cent], if applicable
7.	Worst case certified energy consumption of PART B family [Wh/km], if applicable
8.	Total discharge energy in V2X [Wh], if applicable
9.	Last charged by more than 50 per cent SOC swing on [Date]
10.	Maximum, minimum, average ambient temperature* the vehicle was exposed to during its lifetime
Note: * ambient temperature to be read as daily averages	

Figure 1: annex 2 points referred in discussion

ACTION: U.S. EPA (Chair) and EC (Co-Chair) will create new draft GTR with recommended changes and can check the box on the excel sheet.				
5	11:30 – 12:00	CITA presentation and comments on the current version of the GTR 22	CITA	EVE-57-12e
<p>Summary:</p> <ul style="list-style-type: none"> ▪ CITA proposed the following: 1. Implementation of safety aspects as well as performance criteria, 2. decrease the measure of uncertainty from 5% to 2%, 3. mandatory validation of SOCE/SOCR as well as confirmation from Technical Services, 4. include ISC Testing in type approval and 5. Validation of the classification in vehicle family. ▪ There was some confusion for members as some of the recommendation for the GTR includes many of items already raised. ▪ The Co-chair has offered to review GTR with CITA to make sure all is well understood before formally proposing any changes. ▪ The GTR was designed with flexibility in mind to accommodate WLTP or US5 cycles. ▪ GTR was also designed to allow OEMs to adopt requirements more stringent than MPRs. 				
	12:00 – 13:30	Lunch break		
6	13:30 – 14:15	Discussion of GTR No. 22 continued	EVE IWG	
Action: Penny to add additions to GTR No. 22 and distribute				
7	14:15 – 14:30	Introduction of WP. 5 paper “Taking stock of new trends towards electric vehicle charging infrastructure”	GRPE Secretariat	https://unece.org/sites/default/files/2022-08/ECE-TRANS-WP5-2022-02e.pdf
<p>Summary: This topic was presented before lunch so is not in the accurate place in this agenda.</p> <p>WP. 5 is working party on transit and economics which is a think tank under ITC, chaired by the Netherlands. The group would like input from EVE IWG on standardization information protocols between EV and standards. Their goal is to have one single harmonized standard for communication between vehicle and charging infrastructure. They recommends <u>to initiate data collection on EVS and vehicle side and grid side</u>. For vehicle side EV battery capacity groups and real time recharging power demand.</p> <p>François Cuenot the GRPE secretariat can bring feedback in next couple of weeks to bring on board.</p> <ul style="list-style-type: none"> ▪ EVE IWG is not sure how this subject could be implemented in current GTRs and if it is relevant enough for the group. EVE IWG can consider if there are potential 				

<p>solutions that EVE IWG can offer. There are concerns on how the vehicle could address power demand and concerns with OEM requirements to store more data on the vehicle.</p> <ul style="list-style-type: none"> ▪ EVE IWG briefly discussed whether vehicles could provide carbon footprint and how energy consumption may translate to that. ▪ It was noted that a lot of these factors are outside the control of the vehicle ▪ EVE IWG to consider proposal on this topic. ▪ EVE IWG to decide whether the method of stating energy consumption item should be removed from ToR. EVE IWG had in ToR in case input was needed. EVE IWG to consider comments for WP. 5 to provide for the GRPE secretariat. 				
8	14:30 – 14:45	Japan comments for updates on GTR No. 21	Japan	EVE-57-08e
<p>Summary: Japan presented a proposal as a solution to one possible scenario to the GTR No. 21 test procedures. This solution is in response to situations where neither test procedure is feasible for certain hybrid configurations. The proposal was suggested as a discussion point with openness towards other possible solutions for other unique challenges with other configurations.</p> <p>Japan provided a sample calculation problem for the front and rear motor front and rear motor output in AWD (sensors difficult to install in this type of system). The alternative method doesn't work since no demonstration is feasible. Japan suggested to use a ratio as a possible solution by calculating R1/R2 branch power based on measured REESS powder and distribution ratio by torque command from the CAN bus.</p> <p><i>Comments from EVE IWG</i></p> <ul style="list-style-type: none"> ▪ Need to confirm the distribution ratio ▪ OICA wants to discuss more internally to avoid using default factors. They would like to find a way through more discussion <p>EVE IWG had technical discussion on whether the torque and distribution is related to the actual ratio of the current going to the front and rear axles and whether this can be verified. There were also discussions on whether this value needs to be calculated or not. The current cannot be verified due to the integration of the system. There are also questions about whether this can be broadly applied and if other samples are difficult to measure (such as applying the method to an example where measurements can be taken).</p> <p>Action: Japan indicated that they will confirm on their technical side on how to establish the ratio.</p> <p>Action: Drafting coordinator to write general concept in GTR No. 21</p>				
9	14:45 – 15:00	Japan comments on GTR No 21. regarding family definitions	EVE IWG	EVE-57-09e

Summary: Japan proposed the following parameters to start to define the family definitions for GTR No. 21.

parameters	GTR21 Family Requirements
(a) Hybrid system configuration	Same system layout *
(b) Engine nominal performance	UNR85 engine single unit output
(c) Motor nominal performance	UNR85 motor single unit output
(d) Battery performance	UNR100 REESS specification

Japan also proposed elements from “UNR100 Annex1 –Appendix 1 3. REESS” to further refine family definitions by including battery specifications such as; cell chemistry, configuration, nominal voltage and maximum current. Some items from the appendix list are excluded as they do not affect battery output.

OICA, U.S. EPA, JRC agree that the proposal from Japan is a good start for resolving the problem for family definitions.

The representative from the UK suggested to harmonize the family definitions from GTR No. 22 with GTR No. 21 if there are linkages.

The Chair noted that there are currently no family requirements for GTR No 21. The U.S. EPA also noted that current family definition in GTR No. 22 does not require current. This would have to be considered if it is necessary for the family definition for GTR No. 21.

ACTION ITEM – Japan to reconcile comments and see if families for GTR22 can harmonize with GTR 21 and whether there are unique considerations.

	15:00 – 15:30	Coffee break		
10	15:30 – 15:45	OICA experience of GTR No. 21	OICA	EVE-57-03e

Summary: OICA only had a few items to share with the group for this agenda section. These were namely showing their results for Test procedure 1 (TP1) and Test procedure 2 (TP2) from the validation tests conducted for GTR No. 21.

- OICA test results which remained anonymous on the vehicle type showed very little variation in test results. TP1 showed less variation than TP1 and was also slightly higher with power results. TP2 varied in power more. The deviation between the two values was less than 0.8%.
- OICA indicated they will continue working on the measurements. They also noted that China showed similar results before.

The discussion moved on to further GTR issues and candidate method.

11	15:45 – 16:00	Further discussion time for GTR No. 21		
<p>In reference to the excel sheet () with the priority items, the topic of moving forward with a candidate method will remain as a yellow category as there is not a strong urgency to move forward with it yet.</p> <p>Family concept is one of the top in the list of changes to GTR No. 21.</p> <ul style="list-style-type: none"> ▪ GTR No. 21 drafting coordinator will look at GTR No. 21 and draft some language for the items brought up in the GTR No. 21 discussions. Family definitions will be prioritized and text will be drafted for Japan’s proposal regarding the discussion on ratio of current to torque. ▪ OICA is still considering internal proposals on this topic <p>Consideration of candidate method</p> <ul style="list-style-type: none"> ▪ One idea is to have annex 3 as a reserve section to cover the candidate method if the EVE IWG choses to move forward with a candidate reference method. ▪ EVE IWG remains open to concept but would require a lot of work in absence of pressing demand. <p>ACTION ITEM: U.S. EPA GTR No. 21 drafting coordinator to look at current GTR draft and begin adding text regarding family definition and draft text regarding Japans distribution ratio concept with torque and current for integrated systems.</p>				
12	16:00 – 16:15	CARB updates from U.S. EPA (ACCII)	U.S. EPA	EVE-57-13e
<p>Key highlights:</p> <ul style="list-style-type: none"> • CARB proposal changed slightly from original after hearing was made. • CARB differing on non-conformance compared with EVE IWG • California has warranty requirement defined • CARB requirements done by model year with requirements increasing later on • CARB requirement is based on fleet average (average of all electric vehicles as oppose to one) which may be more lenient. CARB would have less testing data/samples than GTR too • CARB treating regulation as more environmental justice regulation vs GTR which looks more at substandard products • Question asked whether EPA is considering California’s rules or GTR. EPA progress still being decided but year from now their proposal will have some requirements regarding durability. • Europe indicated they cannot announce yet what they are planning but they are working on Euro 7. • The UK and Japan also noted they are also investigating the durability requirements into legislation. 				

13	16:15 – 16:45	SAE the status of the standardization work done by the J1979 working group about the CARB and UNECE requirements for in-vehicle battery durability	Andrew Zettel (virtually)	EVE-57-11e
<p>Summary of discussion: Mr. Andrew Zettel from GM and who works on SAE standardization work highlighted new work being conducted by the group on diagnostic repairs through the on-board diagnostics. This include coming out with new diagnostic repair codes and ways to inform the customer what type of repairs are needed. Andrew also highlighted what California is doing in regarding similar work on EVs. These notes are below. The main outcome from this discussion was for Andrew to look into what CEN is doing in Europe to avoid duplication efforts on battery standards.</p> <p>More details of discussion: Andrew Zettel discussed some standardization work amongst EVE IWG. A lot of the discussion went towards that there is already work being done on this by similar groups in Europe. Concerns were about having different standards and not enough harmonization. Concepts discussed as well: Background introducing concept of ZEVDRS (diagnostic repair standardization)</p> <ul style="list-style-type: none"> ▪ Introduced concept of ZEVDRS (diagnostic repair standardization). ZEVDRS has the path to change the current view of OBD (On-board diagnostics) from emissions diagnostics back to actual diagnostics. OBD has historically been strongly associated with emission regulation and a tool for regulating emissions. SAE is working hard to develop diagnostic trouble codes for ZEVs. <ul style="list-style-type: none"> ○ Working on providing diagnostic trouble codes; some that indicate where the customer should bring the vehicle for specific types of problems (indirectly indicates level of safety risk to customer and ability to save customer money whether its a dealer only repair or small repair shop) ▪ CARB pushing for communication of the vehicle with networks. ▪ Document with table presented can only be shared through SAE portal for members. ▪ Working on algorithms for SOH and data storing. ▪ OICA brought up a safety concern regarding customer’s ability to make informed repair choices at home (as seen under Standardized DTC’s in the presentation). Andrew explained that the intent of providing this information to customers is so they can make informed decisions on whether the repair could be done at home or if professional help will be needed. ▪ EVE IWG should not give up considering range and distance as this is something that customers really understand ▪ Concern for broad highlight for CPs is trying to make vehicles affordable and accessible to as many parties as possible. 				

- California has been requiring communication of the vehicles with (UBS) where ACII is lobbying to transition the ZEV market place to have more modern communication framework. Some of this communication is harmonized with technical work for safety systems in Europe. If California adopting those systems they would have proprietary systems.
- Another part of work is standardizing off board work which requires a connector and physical connection. ACCII does not provide as many definitions of what they want.
- CARB may want to monitor V2X usage
- OICA mention that some of the work Sae is doing may already be overlapping with working groups in Europe (CEN). It would be useful for them to share information to prevent double work.
- EVE IWG appreciates SAE’s work and welcomes suggestions to improve the work of the EVE IWG as it becomes available

14		Presentation from JRC on commercial vehicles	JRC	EVE-57-14e
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Summary:

JRC presented on first results for live commercial vehicles provide simplified models using driving data. JRC looked at four fully electric vans with different battery sizes and energy consumption. JRC looked at different realistic driving scenarios used commercially and incorporating parameters such as different loads (payload). There were some comments and discussions on accessory load assumptions. Japan noted they would have a further look at the presentation. EVE IWG also noted potential pathways towards regulation such as setting performance limits at 75% (SOCE). EVE IWG also noted to consider comparing with warranties or looking at literature data for additional analysis on energy consumption and payload. The U.S. EPA mentioned they could provide estimates on energy consumption when considering payload.

Action: Japan will have a closer look at the presentation for further comments

Action: U.S. EPA to provide estimate son energy consumption when considering load for HD vehicles.

14	16:45 – 17:00	Wrap of day 1 of meeting agenda, suggestions for changes for day 2	Chair Secretary	
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EVE IWG Meeting, September 22, 2022

	Time	Agenda item	Lead	Working Paper #
15	09:30 – 09:45	Meeting goals, review of Agenda	Chairs Secretary	
16	9:45 – 10:00	China presentation swappable batteries and discussion	China	EVE-57-02e

Summary of discussion:

China discussed the need for measurements to consider standardization of swappable batteries when they are in the vehicle such as making sure the algorithms properly indicate SOCE and SOCR that aligns when the same type of battery (assumption) is placed in the vehicle (assuming same model types).

The EVE IWG needs further information on this topic to consider. Discussions went over how it could and could not fit within the scope of GTR No. 22. There were also mentions of Europe’s battery regulation and the need to review that to consider overlapping of regulations. EVE IWG has no consensus yet on this topic but will support further discussion on how to assess and consider swappable batteries.

The EVE IWG discussion on swappable batteries also put to question the consideration of battery replacements and regulations concerning those. Battery recycling was briefly mentioned as a topic. This is a topic for further consideration and discussion by the EVE IWG.

Some outcomes of this presentation and discussion are suggestions for China to present more details on swappable batteries. The EVE IWG would also like to see a presentation explaining more details of Europe’s battery regulation for further consideration of this topic.

Details of discussion:

China makes a proposal for EVE IWG to consider the durability of swappable batteries for electric vehicle standards as more OEMs are mentioning swappable batteries. These vehicles are vehicles that are designed to have batteries swapped out.

China explained that they are working on standard development in china for swappable batteries and infrastructure to support swappable batteries. China notes that the health of the battery can also be monitored not only in the vehicle but also in the swap station and that it extends battery life by swapping, centralized charging and maintenance. China’s presentation shows in more detail the benefits on the battery of having swappable batteries.

China also mentioned they have conducted monitoring or durability performance in which the data can be shared.

2015 two major players in China NIO and BJEV (BAIC)

China suggests the following changes and considerations for GTR No 22.

- Look at GTR No 22. text and suggest that all forms of battery in operation meet standards.
- Ensure the range measures accurately between vehicles when the battery is replaced (currently there is some stagnation and differences between values for vehicles of the same model).
- Change the applicability question in annex one to allow exclusions for swappable batteries (Regarding if the battery has been changed or not)
- Add definitions for swappable batteries to the GTR

Post presentation discussion

- There are concerns that the current methodologies would not work for swappable batteries as the current text is meant for original batteries kept in the vehicle from the original manufacturer. Regulating the battery itself would be outside the scope of this group as it is also outside of the manufacturer's control. There would have to be a different concept to look at this and more elaboration or ideas.
- China emphasizes that there needs to be modifications so that the monitoring aspects is more accurate when the batteries are replaced into the system as the two are linked. A sort of regulation of the monitoring system or platform to monitor all of the batteries in the system to keep the SOH (SOCE SOCR) updated.
- Technical concerns on different vehicle performance levels and uncertainty around how a swappable battery would be adapted to each vehicle. Some questions:
 - If the battery is swappable, how do you know that every battery is of the same capacity with the same physical connection
 - If the battery has the same physical connection but the battery chemistry is different then it is harder to assess durability with current goals
- If the battery is swappable then maybe there is no concern with durability as the battery can just be changed. Then this is not a durability issue.
- Other discussions brought up about cars potentially outliving their batteries – replacement batteries and swappable batteries being different where swappable batteries lays outside the responsibility of the manufacturer.
- Ideally the SOH monitor should recalibrate itself such as in cell phones.

China mentioned they would like to present on the difference between the swappable battery type vehicles and regular. They also mentioned they don't want to exclude this topic, but to find a way to evaluate this technology, especially considering their benefits towards sustainability.

No consensus yet on this topic.

Some ideas from discussion

- If the vehicle manufacturer owns the batteries maybe there is a way to manage that
- Could refer to replacement batteries within the GTR.
- OICA supports further discussion on this topic
- Discussed that Europe already has a battery regulation in place for battery manufacturers. EVE IWG should be mindful of avoiding double regulations.
- Would be helpful for EVE IWG to have a presentation on the battery regulation in Europe to further consider how to implement swappable batteries and to avoid regulations that are doubled
- EVE IWG also started a discussion on what to do with replacement batteries
 - California may already be working on something similar to this with regards to consumer protection
 - EVE IWG could think about this as a future GTR
- UK suggesting annual report on warranty claims to keep up on batteries and how they are performing and assess whether technologies for longer lasting batteries are swappable batteries are taking precedence.
- Also issue of what happens to batteries if they are outlasting the vehicles.
- GTR 21 and 22 will have edits and updates and excel sheet has update.

Action: China to present more details on swappable batteries

Action: EVE IWG to further consider how to approach replacement batteries

Action: Presentation on battery regulation in Europe

17	10:00 – 10:30	Additional discussion time on LD battery durability topics as needed. And any other LD topic.		
	10:30 – 11:00	Coffee break		
18	11:00 – 12:00	Continued discussion on HD from presentation EVE 56 and other HD discussion points	OICA (HD)	EVE-57-10e

Framework presented

- OICA made proposal to begin a GTR similar to GTR No. 22 with a two step approach with part A and part B to make it suitable for HDV trucks.
- Look at battery at beginning of life with reference to the cycle certification process used to determine the useable battery energy content. Then the battery health would be looked at during in use. The second test should be conducted under the same manner as the first test at the beginning of life.

Comments on proposed framework

- Some comments from EVE IWG to also consider if vehicle records are correct and verifiable.

- Energy throughput for HDV energy segments is what matters compared to vehicle age.
- HDV to work on component basis
- OICA is open to other procedures if they are better for in service testing such as chassis dyno test.
- Taking the battery out of the vehicles is too difficult to come out of heavy trucks so the testing must be done in-situ
- Recommendation to also consider charge and discharge testing

Power fade items

- Based on segment and application
- Lack of knowledge in the field on this
- Some power fade related to warranty between OEM and customer. OEM focuses on giving customer power they need. Measurement is difficult due to the high power systems.
- Some cases of vehicles have more power than the customer needs and others are at risk of not having enough power. Power fade becomes an issue when the customer can no longer use it for their business case.
- Regulate based on capacity and then consider range.
- In some cases even if the battery can deliver the power sometimes the power is modulated so there are difficulties
- Consider monitor phase to see how technology develops and gather data.
- Idea of looking at ratio of power available to motor needs to consider vehicles at risk of power fade.
- OICA also had internal proposal from ACEA which they can present later if there is an agreement. This would be a potential proposal for the next meeting. Proposal would consider taking into account light commercial vehicles and reflect usage of vehicles.

	12:00 – 13:30	Lunch Break (move to floor below)		
19	13:30 – 15:00	HD GTR development framework discussion and potential formation of task forces	EVE IWG	

Summary:

EVE IWG decided to use OICA’s suggested framework OICA to make proposal to begin a GTR similar to GTR No. 22. This GTR would consider a two-step approach with part A and part B to make it suitable for HDV trucks. The framework would look at the battery at the beginning of its life with reference to the cycle certification process and to also assess the battery during its use with the second test being conducted under the same manner as the first test.at the beginning of batteries life. EVE IWG to send proposal prior to upcoming GRPE session.

HD GTR framework discussion

- Refer to excel sheet for priority items
- Need drafting coordinator to lead framework
- Suggestion to come up with classes where power fade could be an issue
- A new drafting coordinator will be needed for the new HDV GTR.
- The GTR proposal that was discussed will be used as a framework. The proposal will include a limited scope, family definitions as well information on Capacity deterioration.
- Feedback for drafting volunteers will be needed before the 10th of October
- Framework presented by OICA good start
- ToR updates can be presented a few weeks before the next GRPE

	15:00 – 15:30	Coffee break		
20	15:30 – 16:15	Other EVE IWG items: battery recycling, method of stating energy consumption, LCA	Chairs	

Other EVE IWG discussion items

Battery recycling:

- CARB developed a label specific for recycling with a QR code on it where third parties will populate a database. CARB program is not a national program.
- EC does not think recycling should be covered by the IWG
- Another view is that Industry is changing a lot that recycling may be better to be left alone considering other Europe ambitions
- Concerns from public that batteries will end up in landfill but conclusion is that they are too valuable to be left in the landfill.
- U.S. EPA mentioned inflation reduction act – battery recycling/tracking of battery material could be a part of this act

Life cycle analysis:

- Future areas of work would include ensuring LCA is accurate and robust – not just in the usage phase but also in the manufacturing and post life phase
- EVE IWG will be called on time to time to provide technical input with regards to method of stating energy consumption such as in paper WP. 5. EVE IWG will continue to monitor work with the GEE to assess CO2 emissions associated with charging. Note Action item below.
- EVE IWG could consider a small workshop on issues separate from the proper work of the EVE IWG.
- There was a previous workshop on LCA at GRPE now formally taken up as a new IWG

ACTION Item: EVE IWG to have comments back to WP. 5 on paper regarding LCA (ideally October 7)				
21	16:15 – 16:30	Next EVE sessions and locations (future meeting planning)	Chairs Secretary	
<ul style="list-style-type: none"> ▪ Next EVE IWG meeting will be November 21 and 22, 2022. ▪ Next EVE IWG meetings, Spring 2023 in U.S (Ann Arbor) and Fall 2023 in Canada (Ottawa). Also EVE IWG will still have meetings in conjunction with GRPE in June and January. ▪ The next in person EVE IWG meeting is in conjunction with GRPE in January on Tue 10 Jan 2023 9.30 - 12.30 CET. 				
22	16:30 – 16:50	Action items, goals of next meeting	Chairs Secretary	
<ol style="list-style-type: none"> 1) Need volunteers for HDV GTR drafting group and to find a drafting coordinator. 2) China to present more information of swappable batteries (how they work, lifetimes) 3) Secretary to post excel priority list on EVE IWG website 4) Mr. Andrew Zettel to follow up with CEN to make sure there is not duplication of efforts on batteries/battery replacements and monitors. 5) Start adding in comments on GTR No 21. Draft for next iteration of GTR. 6) Japan to confirm on their technical side how to establish the ratio for power determination 7) Mr. Mike Safoutin (GTR No 21 drafting coordinator) to look at current GTR draft and begin adding text regarding family definition and draft text regarding Japans distribution ratio concept with torque and current for integrated systems 8) Japan to reconcile comments and see if families for GTR22 can harmonize with GTR 21 and whether there are unique considerations. 9) EC to present more details on Europe’s battery regulation 10) EVE IWG to comment on WP. 5 on paper regarding LCA 11) Secretary to draft proposal out for HDV GTR in time for GRPE formal submission (October 18). 12) Ms. Penny Dilara to draft language to reflect Japan’s recommendations for #9 and #10 in GTR No. 22 and to add new draft with current amendments proposed so far 13) Mr. Mike Safoutin to keep a running draft of proposed changes to GTR No 21 (including additions from Japan’s proposal on ratio and family concepts) 14) U.S. EPA to look into being able to provide energy consumption values (per cargo weight increases in vans) for JRC modelling 15) EVE IWG to map out categories for MPR (category 2 vehicles/heavy duty) to see how they apply for durability GTR No. 22. 16) Secretary to draft changes to ToR to include new proposal timeline for HDV battery durability 				

- 17) All drafting parties to report back on HDV segmentation
- 18) Leading team to plan future meetings and geographic rotation
- 19) EVE IWG to further consider how to approach replacement batteries
- 20) Japan to have further comments on JRC presentation
- 21) EVE IWG to suggest classes where power fade could be an issue.

Goals for next meeting:

- Continue to talk about three GTR's in play and updates to GTR 22 and 21 and progress towards next GTR. Get update on outstanding action items. Talk about proposal, proposal for GTR, worth revisiting. Firmer meeting plan for 2023.

23	16:50 – 17:00	Meeting conclusion, other last items	EVE IWG	
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