Task Force “Toxic Gases” progress update #3

27th GTR EVS meeting

27 -29 June 2023

Current status

- Round Table question #1 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of electrolyte leakage still be considered suitable/adequate?”
- Round Table question #2 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of venting still be considered suitable/adequate?”
- Round Table question #3 “If your answer is “NO” to Q1 and/or Q2, please elaborate and propose alternative verification method.”

Input received from India, Korea, OICA and USA

Round Table question #1

- Round Table question #1 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of electrolyte leakage still be considered suitable/adequate?”

	Response	
Australia	Yes	
Canada	-	
China	Yes	
EU	Yes	With comment
India	Yes	
Japan	Yes	
Korea	Yes	
OICA	Yes	
USA	Yes	

Round Table question #1

- Round Table question #1 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of electrolyte leakage still be considered suitable/adequate?”

JRC have performed research on potential approaches to make visual inspection to verify the occurrence of electrolyte leakage more robust:

Detection of airborne electrolyte components in the gas phase:
S. Hildebrand, F. Ferrario, N. Lebedeva, Comparative overview of methods for detection of airborne electrolyte components released from Li-ion batteries, submitted to Energy Technology.

Chemosensors:
Karaiskakis, G., Da Costa Barata, R. and Lebedeva, N., Detection of liquid electrolyte leakage from Li-ion batteries by signalling the presence of Li ions, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/147384, JRC133056.
JRC Publications Repository - Detection of liquid electrolyte leakage from Li-ion batteries by signalling the presence of Li ions (europa.eu)

European Commission

Round Table question #1

- Round Table question #1 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of electrolyte leakage still be considered suitable/adequate?”

Detection of airborne electrolyte components in the gas phase:
JRC research has shown that at present there is no sufficiently simple and inexpensive, specific (i.e. non-cross-sensitive), robust and off-the-shelf method available to quantitatively evaluate a concentration of a given “representative” gas in a complex gas mixture.

Chemosensors:
JRC research has shown what a possible “appropriate coating”, mentioned in the UNECE GTR EVS Phase 1 text, can be. The overview also helps identifying properties required from a chemical sensor compound(s) that can be a functional component(s) of such a coating, which facilitate(s) detection of Li ions and also allow(s) distinction between electrolyte and coolant release.

JRC will draft a regulatory text proposal to reflect these results in the rationale part of Phase 2 GTR EVS text.

Round Table question #1

- Round Table question #1 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of electrolyte leakage still be considered suitable/adequate?”

  Approach adopted in Phase 1 can be maintained:

  - Visual inspection without disassembling any part of the Tested-Device can be considered as an adequate verification method for the occurrence of electrolyte leakage

Round Table question #2

- Round Table question #2 “Can current approach - *"…visual inspection without disassembling any part of the Tested-Device”* - adopted in Phase 1 of the EVS GTR as a method for verification of the occurrence of venting still be considered suitable/adequate?”

	Response	
Australia	Yes	
Canada	-	
China	Yes	With comment
EU	Yes	With comment
India	Yes	
Japan	Yes	
Korea	Yes	
OICA	Yes	
USA	Yes	

Round Table question #2

China pointed out that visual inspection without disassembling any part of the Tested-Device can be considered an adequate method for venting verification for thermal runaway propagation test. However, in other tests, such as thermal shock and overcharge protection, there may be only a small amount of vented gas, which main components are invisible such as CO, CO_2 and H_2. Therefore, China believe that the verification method needs further discussion.

JRC agreed that visual inspection is adequate for vigorous venting with large amount of smoke. It is less suitable for detection of initial stages of venting with small amount of gas/smoke released, but hazards of such venting: a) toxicity and flammability, b) change of the gas properties in the pack leading to HV discharge need to be carefully considered.

Given the time limitations in Phase 2, JRC agree to retain visual inspection as a verification method for venting.

Approach adopted in Phase 1 can be maintained:

- Visual inspection without disassembling any part of the Tested-Device can be considered as an adequate verification method for the occurrence of venting

Round Table question #3

- Round Table question #3 “If your answer is “NO” to Q1 and/or Q2, please elaborate and propose alternative verification method.”

China mentioned that by arranging CO, H_2 and other combustible gas sensors at appropriate positions, the venting can be better verified than visual inspection in some of the tests. However, the detailed test conditions need further discussion and technical research. China hope to establish a method in Phase III.

Thank you

European Commission