Progress Report of the
VIAQ (Vehicle Interior Air Quality)
Informal Working Group

Webex, November 25th 2021

Chair: Andrey KOZLOV, Russian Federation
Secretary: Andreas WEHRMEIER, BMW
ToR for the Third Stage

Terms of reference and rules of procedure for the IWG on Vehicle Interior Air Quality

Background. The group considered the inclusion in the scope of interior air pollutants from outside sources as a possible extension of the mandate at third stage. As an extension of the existing Mutual Resolution on VIAQ, this will take into account not only interior air emissions generated from interior materials and exhaust gases from the vehicle entering into the cabin but also outside air pollution sources. The list of outside air pollutions could include CO, NO, NO2, SO2, O3 volatile organic compounds (VOC), aldehydes, aromatic and aliphatic hydrocarbons, particulate number (PN) and mass (PM) and microbiological substances, e.g. allergens, fungi, bacteria and viruses. As an extension of the existing Mutual Resolution on VIAQ, this will take into account not only interior air quality but also the air cleaning efficiency of the vehicle air handling & treatment system.

Objective. This proposal expands on the issues of the vehicle interior air quality, addressing outside air pollutants entering into the vehicle cabin and the interior air cleaning efficiency, to develop a test procedure in a recommendation by including Part 4 in the Mutual Resolution No. 3.

Scope and work items. Outside air pollutants entering into the vehicle cabin and their cleaning efficiencies
(a) Collect the information and research data on relevant air pollutants and similar issues, and understand the current regulatory requirements with respect to vehicle interior air quality in different markets.
(b) Review, assess and develop new test procedures suitable for the measurement methods of air pollutants entering into the vehicle cabin and their cleaning efficiencies (including test modes, sample collection methods and analysis methods, etc.)
(c) Discuss the potential of air pollutants in the vehicle interior air with toxicologists.
(d) Develop a draft for test procedures in a recommendation.
➢ 22\textsuperscript{nd} VIAQ IWG Meeting

- Webex, 27\textsuperscript{th} April 2021
- Half a day
### Timeline

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**Stage 3. Phase 1**

- PM Draft
- +Gas Draft

**Stage 3. Phase 2**

- Final Draft
The objective and tasks for the Phase 1

Objective:

globally: development of a harmonized (at the UN level) methodology for assessing the effectiveness of air cleaning in the cabin of a complete vehicle

1 phase of work: development of a methodology for the concentration of particles measuring in the passenger compartment of a car in real driving conditions and assessment of the effectiveness of the cabin air cleaning systems regarding particles

Tasks:

1. Development of the draft of the test procedure
2. Carrying out field experiments on various vehicles in various driving conditions with various settings / configurations of the interior ventilation system
3. Analysis of the obtained data (with the development of the method of post-processing of the data), their submission for consideration in the VIAQ group
4. Development of a methodology for measuring the concentration of particles in the passenger compartment under real driving conditions
5. Analysis of the data obtained with an assessment of the effectiveness of the cabin air cleaning system
6. Development of a methodology for assessing the effectiveness of a cabin air cleaning system for a car regarding to particles in real driving conditions
7. Presentation of the methodology and results of experimental studies on the VIAQ group
Comparative analysis of different VIAQ test methodologies

The purpose of this analysis is to compare different vehicle interior air test approaches to develop PM measurement test method.

The items

1. Vehicle Category
2. Criteria for excluding a vehicle from tests
3. Test Vehicle age/millage
4. Meteorological Conditions
5. Test Conditions
6. Sampling Points/Sampling Lines
7. Background air pollution level
8. Cabin air filter age
9. PM and gas components to be Measured
10. Measurement Methods
11. Test equipment requirements
12. Gas Analysers Calibration
13. Test Modes
14. HVAC Modes
15. Test Procedure
16. Test Protocol
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<td>CabinAir</td>
<td>Cha Y. Dynamic and stationary measurement of in-vehicle PM2.5 and the filtration. <a href="#">VIAQ-21-07</a></td>
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Literature Review

Analysis conclusions

1. The analytical review of published papers describing VIAQ research showed a wide range of approaches, measured substances and particle dimensions, different test modes and conditions, different HVAC settings etc. Most works are research or pilot study.

2. Only some publications contain of relatively detailed description of test methodology and test conditions and they were analysed in this document.

3. Most comprehensive test methodology description is in the document CEN/WS 103 N 23.

4. Our informal working group could use this information for developing our own harmonized methodology taking into account researchers experience worldwide.

5. Most important criterions for our methodology will be: to find worse case scenario; to minimize cost and test time; to ensure accuracy and repeatability of tests in different laboratories; to harmonize test conditions and test procedure worldwide.
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<td>VolvoCars</td>
<td>Dixin Wei</td>
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<td>CabinAir</td>
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Feedback from:

- CEN/WS 103*
- OICA Members
- CLEPA (EU Association of Supplier)
- UTAC/ESTACA (Paris saclay)
- Korea Automobile Testing & Research Institute
- CabinAir Sweden AB

The full text feedback tables are in the document VIAQ-23-09

*CEN/WS 103 items from the document “Real drive test method for collecting vehicle interior air quality data” // Doc. CEN/WS 103 N. 23, 2021
Next VIAQ IWG Meetings

➢ **24th VIAQ IWG Meeting (TBD)**
  
  • Geneva, Switzerland, January, 2022
  
  • Half a day

➢ **25th VIAQ IWG Meeting (TBD)**
  
  • Brussels, Belgium, April-May, 2022
  
  • or Paris, France, April-May, 2022
  
  • Two days