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Report on the proposal for Amendment 1 to gtr No. 5 (Worldwide Harmonized Heavy Duty On-Board Diagnosis Systems (OBD))

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its sixty-fourth session to introduce Amendment 1 to gtr No. 5 (ECE/TRANS/WP.29/GRPE/64, para. 40). It is based on the justification included in ECE/TRANS/WP.29/GRPE/2012/12/Rev.1 and follows the proposal for the development of amendments to gtr No. 5 contained in ECE/TRANS/WP.29/AC.3/30. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Executive Committee AC.3 for consideration.

* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, programme activity 02.4), the World Forum will develop, harmonize and update regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Statement of technical rationale and justification

A. References to ISO and SAE standards regarding OBD Communication protocols, Module A - paragraph 4.4.1, paragraph 9, and Annex 1:

1. Reference to the temporary ISO/PAS document will become obsolete when the ISO document will be issued (third Quarter of 2011).

2. Reference to SAE J1939-71 should be completed by reference to SAE J1939-73 because SAE J1939-71 is the vehicle application layer, while SAE J1939-73 is the diagnostic / scan tool layer.

3. The concerned paragraphs require the manufacturer to use one of the listed standards. However they do not require the manufacturer to only use the DTC's defined in these standards and permits, when allowed by these standards, to use without further limitation manufacturer specific DTC's.

4. In the United States' rules, it is described when and how the certification authority may permit such an usage: *"The lack of available SAE-defined fault codes, uniqueness of the diagnostic or monitored component, expected future usage of the diagnostic or component, and estimated usefulness in providing additional diagnostic and repair information to service technicians. Manufacturer-defined fault codes shall be used consistently (i.e., the same fault code may not be used to represent two different failure modes) across a manufacturer's entire product line".*

5. It is proposed to require from the manufacturer to use first the standardized codes, and, when such a code is not available refer to the concerned standardization body, in view of possibly creating a new code. This measure aims at avoiding non-harmonized durable interpretation and at restricting to a limited period of time an extensive usage of manufacturer specific codes.

6. Referring to ISO 15765-4 as a third implementation option would lead to the assumption that solely by implementing ISO 15765-4 WWH-OBD access to OBD information requirements can be fulfilled. However, the requirements in this gtr cannot be fulfilled by implementing ISO 15765-4 only. To be able to fulfil the requirements established by this gtr it is obligatory to implement ISO 27145 (parts 1-4). Options for implementing ISO 27145 are either ISO 27145 on CAN, for this use case ISO 15765-4 would apply in addition, or ISO 27145 on DoIP (TCP/IP), for this use case ISO 13400 would apply in addition.

7. Due to the fact that the 2006's PAS specifications are no longer available, it is proposed to refer to the corresponding ISO standards.

B. Elements concerning readiness, Module B, paragraph 3.24. and paragraph 4.7.1.5.

8. It is not sufficient enough that the monitor has run for setting the readiness to "complete". It should arrive to a conclusion. Not allowing the readiness be set to complete by e.g. radio turn on is also necessary.

9. Paragraph 4.7.4. stipulates that it is not allowed to clear the fault code memory of a specific monitor or a specific group of monitors by means of a scan tool or maintenance tool. Only "all DTCs" may be (simultaneously) erased. It is common practice to apply this requirement.

10. In that respect, the last sentence of paragraph 4.5.1.5. needs to be amended for ensuring consistency in the requirements. By deleting the words "of a monitor or group of monitors" the problem would be solved.

11. New paragraphs are added to improve the world harmonized character of the gtr by adapting the Californian requirements for 2013 that states (CARB 1971.1).

C. Temporary OBD disablement, paragraph 5.2.2.

12. Amendment to paragraph 5.2.2. aims at solving the case of an engine cold start with frozen reagent that is shut down after a short time with a still frozen reagent (i.e. before the 70 min when severe inducement would occur) and then started again. It also includes a review of disablement conditions.

13. In that case the "ambient engine start temperature" for the second start is relatively high, because the engine compartment has been warmed-up during the first engine run. In this situation, paragraph 5.2.2. does not allow disabling monitors even that the AdBlue is frozen leading to misdiagnosis.

14. Engine start refers to the engine-warm-up that is defined through definition 3.29., that states: *"3.29. "Warm-up cycle" means sufficient engine operation such that the coolant temperature has risen by at least 22 K (22 °C / 40 °F) from engine starting and reaches a minimum temperature of 333 K (60 °C / 140 °F).*"

D. MI deactivation scheme, paragraph 4.6.3.1.4. and Annex 2

15. The second paragraph of paragraph 4.6.3.1.4. may be understood as if the short MI should be switched off after three complete operating sequences with no failure detected, even if the failure was present and not detected in most of that sequence. This understanding is in contradiction with common interpretation as illustrated in figures 1 and 4 of Annex 2.

16. The amendment aims at avoiding this misinterpretation.

17. Reference to the figures in Annex 2 is recommended for understanding the meaning of this paragraph.

18. The continuous MI is deactivated as soon as the monitor has concluded the absence of the malfunction. On the contrary, the status of the malfunction changes from confirmed and active to previously active at the end of the operating sequence.

19. Details of this mechanism are illustrated in a new figure 4bis, but figure 4 needs to be modified accordingly.

20. This new figure aims at illustrating the continuous MI deactivation scheme in 3 typical cases and at reinforcing the consistency between the figures and paragraph 4.6.3.1.4.

E. Key-on – Engine-off display, paragraph 4.6.4.

21. In order not to unnecessarily disturb the driver, repeated starting by start-stop systems shall not automatically generate the activation of the display.

22. When a malfunction has been detected by the system, the principle of the display requested in paragraph 4.6.4.2. is based on an illumination code where the illumination is either continuous, or periodic.

23. In case of a periodic illumination, each illumination sequence consists of a series of flashes separated by a MI-off period. To avoid any confusion, the duration of this periodic MI-off period was determined to be the same as the duration of the MI-off period between the readiness display and the malfunction display that is 5 second. This principle is correctly illustrated in figure B2.

24. The current text needs to be corrected because it indicates that the duration shall be 5 + 1 second due to the fact that the first second is counted twice!

F. Procedure for failure qualification, paragraph 6.3.2.1.

25. In the case of performance monitoring, no correlation to actual emissions is required (paragraph 4.2.1.1.). Accordingly, the 20 per cent maximum value may not always be applicable to performance monitoring, depending on the type of monitoring. For example, monitoring lack of reagent dosing (which is typically a performance monitoring) may lead to increased emissions (higher than 20 per cent).

26. Component monitoring may result in emissions that are not correlated to the OTL. Accordingly, the 20 per cent maximum value may not be applicable to component monitoring.

G. Continuous monitor, paragraph 4.2.3.

27. In principle the certification authority should maintain the right not to accept a manufacturer's proposal that could not be justified.

28. The current wording of paragraph 4.2.3. may lead to an abusive interpretation where a monitor could sample at a frequency greater than 2 Hz, have a relatively high evaluation time (e.g. 2 minutes) and still be considered as running continuously.

29. On the other side the current text wisely addresses the fact that the technology development does permit, in many cases, a monitor that could sample and evaluate that sample at a frequency greater than 2 Hz.

30. Paragraph 4.2.3. proposes to limit the evaluation time of a continuous monitor to a feasible value such as 15 seconds.

H. Component monitoring, paragraph 4.2.2.1.

31. Avoid the loop-hole saying that such devices like the urea heating system do not need to be monitored.

I. Editorial errors, paragraphs 4.3. and 4.6.1.

J. Additional requirements concerning the monitors, Appendices 6, 8, 1 and 2

32. Introduce into Appendices 6 and 8 to Annex 3 changes that may permit regional authorities to consider some types of plausible double failures (enhanced optional monitors) and clarify some points on the monitors specified in Appendices 1 and 2 to Annex 3.