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Item 4.9.1 of the provisional agenda

**1958 Agreement – Consideration of draft amendments
to existing Regulations submitted by GRPE**

Proposal for Supplement 5 to the 05 series of amendments to Regulation No. 49 (Emissions of C.I. and P.I. (LPG and CNG) engines)

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-second session to introduce amendments to Annexes 9B and 9C of Regulation No. 49. It is based on ECE/TRANS/WP.29/GRPE/2011/16, as amended by paragraph 22 of the report (ECE/TRANS/WP.29/GRPE/62, paras. 21-22). It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) 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.

Annex 9B

Paragraph 3.30., amend to read:

"3.30. "Readiness" means a status indicating whether a monitor or a group of monitors have run since the last erasing by an external request or command (for example through an OBD scan-tool)."

Paragraph 4.2.2.1., amend to read:

"4.2.2.1. Exception to component monitoring

Monitoring of electrical circuit failures, and to the extent feasible, functionality, and rationality failures of the engine system shall not be required if all the following conditions are met:

...

- (c) the failure does not affect a component or system enabling the proper performance of the OBD system, and
- (d) the failure does not substantially delay or affect the ability of the emission control system to operate as originally designed (for example a breakdown of the reagent heating system under cold conditions cannot be considered as an exception).

Determination of the emissions impact shall be performed on a stabilized engine system in an engine dynamometer test cell, according to the demonstration procedures of this annex.

When such a demonstration would not be conclusive regarding criterion (d), the manufacturer shall submit to the approval authority appropriate design elements such as good engineering practice, technical considerations, simulations, test results, etc."

Paragraph 4.2.3., amend to read:

"4.2.3. Monitoring frequency

...

At the request of the manufacturer, the approval authority may approve monitors that do not run continuously. In that case the manufacturer shall clearly inform the Approval Authority and describe the conditions under which the monitor runs and justify the proposal by appropriate design elements (such as good engineering practice).

A monitor shall be regarded as running continuously, if it samples at a rate not less than twice per second and concludes the presence or the absence of the failure relevant to that monitor within 15 seconds. If a computer input or output component is sampled less frequently than twice per second for engine control purpose, a monitor shall also be regarded as running continuously, if the system concludes the presence or the absence of the failure relevant to that monitor each time sampling occurs."

Paragraph 4.3., amend to read:

"4.3. Requirements for recording OBD information

...

In case a malfunction with the previously active status occurs again, that malfunction may at the choice of manufacturer be directly given the "Pending

DTC" and "confirmed and active DTC" status without having been given the "potential DTC" status. If that malfunction is given the potential status, it shall also keep the previously active status during the time it is not yet confirmed and active.

..."

Paragraph 4.6.1., amend to read:

"4.6.1 MI specification

The malfunction indicator shall be a visual signal that is perceptible under all lighting conditions. The malfunction indicator shall comprise a yellow or amber (as defined in Regulation No. 37) warning signal identified by the 0640 symbol in accordance with ISO standard 7000:2004."

Paragraph 4.6.3., amend to read:

"4.6.3 MI activation at "engine on"

When the key is placed in the on position and the engine is started (engine on), the MI shall be commanded off unless the provisions of paragraph 4.6.3.1. have been met."

Paragraph 4.6.3.1.4., amend to read:

"4.6.3.1.4. MI de-activation scheme

...

The "short-MI" shall be deactivated if the malfunction is not detected during the 3 subsequent sequential operating sequences following the operating sequence when the monitor has concluded the absence of the considered malfunction and the MI is not activated due to another Class A or B malfunction.

Figures 1, 4 and 4bis in Appendix 2 to this annex illustrate respectively the short and continuous MI deactivation in different use-cases."

Paragraph 4.6.4., amend to read (inserting also a new footnote*):

"4.6.4. MI activation at key-on/engine-off

The MI activation at key-on/engine-off shall consist of two sequences separated by a 5 seconds MI off:

- (a) the first sequence is designed to provide an indication of the MI functionality and the readiness of the monitored components;
- (b) the second sequence is designed to provide an indication of the presence of a malfunction.

The second sequence is repeated until engine is started* (engine-on) or the key is set to the key-off position.

At the request of the manufacturer, this activation may only occur once during an operating sequence (for example in case of start-stop systems)."

* An engine may be considered started during the cranking phase.

Paragraph 4.6.4.2., amend to read:

"4.6.4.2. Presence / absence of a malfunction

Following the sequence described in paragraph 4.6.4.1, the MI shall indicate the presence of a malfunction by a series of flashes or a continuous illumination, depending on the applicable activation mode, as described in the following paragraphs, or absence of a malfunction by a series of single flashes. When applicable, each flash consists of a 1s MI-on followed by a 1s MI-off, and the series of flashes will be followed by a period of four seconds with the MI off."

Paragraph 4.7.1.5., amend to read:

"4.7.1.5. Readiness

With the exceptions specified in paragraphs 4.7.1.5.1., 4.7.1.5.2. and 4.7.1.5.3., a readiness shall only be set to "complete" when a monitor or a group of monitors addressed by this status have run and concluded the presence (that means stored a confirmed and active DTC) or the absence of the failure relevant to that monitor since the last erasing by an external request or command (for example through an OBD scan-tool). Readiness shall be set to "not complete" by erasing the fault code memory (see paragraph 4.7.4.) by an external request or command (for example through an OBD scan-tool)."

Insert new paragraphs 4.7.1.5.1. to 4.7.1.5.3., to read:

"4.7.1.5.1. The manufacturer may request, subject to approval by the Approval Authority, that the ready status for a monitor be set to indicate "complete" without the monitor having run and concluded the presence or the absence of the failure relevant to that monitor if monitoring is disabled for a multiple number of operating sequences (minimum 9 operating sequences or 72 operation hours) due to the continued presence of extreme operating conditions (e.g. cold ambient temperatures, high altitudes). Any such request must specify the conditions for monitoring system disablement and the number of operating sequences that would pass without monitor completion before ready status would be indicated as "complete". The extreme ambient or altitude conditions considered in the manufacturer's request shall never be less severe than the conditions specified by this annex for temporary disablement of the OBD system.

4.7.1.5.2. Monitors subject to readiness

Readiness shall be supported for each of the monitors or groups of monitors that are identified in this annex and that are required when and by referring to this annex, with the exception of items 11 and 12 of Appendix 3.

4.7.1.5.3. Readiness for continuous monitors

Readiness of each of the monitors or groups of monitors that are identified in items 1, 7 and 10 of Appendix 3 to this annex, required when and by referring to this annex, and that are considered by this annex as running continuously, shall always indicate "complete"."

Paragraph 4.7.3., amend to read:

"4.7.3. Access to OBD information

...

Access to OBD information shall be provided using, at least one of the following series of standards mentioned in Appendix 6:

- (a) ISO 27145 with ISO 15765-4 (CAN-based)
- (b) ISO 27145 with ISO 13400 (TCP/IP-based)
- (c) SAE J1939-73

Manufacturers shall use appropriate ISO or SAE-defined fault codes (for example, P0xxx, P2xxx, etc.) whenever possible. If such identification is not possible, the manufacturer may use diagnostic trouble codes according to the relevant clauses in ISO 27145 or SAE J1939. The fault codes must be fully accessible by standardized diagnostic equipment complying with the provisions of this annex.

The manufacturer shall provide the ISO or SAE standardization body through the appropriate ISO or SAE process with emission-related diagnostic data not specified by ISO 27145 or SAE J1939 but related to this annex."

Paragraph 5.2.2., amend to read:

"5.2.2. Ambient temperature and altitude conditions

Manufacturers may request approval to disable OBD system monitors

- (a) at ambient temperatures below 266 K (-7 degrees Celsius) in the case where the coolant temperature has not reached a minimum temperature of at least 333 K (60 degrees Celsius), or
- (b) at ambient temperatures below 266 K (-7 degrees Celsius) in the case of frozen reagent, or
- (c) at ambient temperatures above 308 K (35 degrees Celsius), or
- (d) at elevations above 2,500 meters above sea level.

A manufacturer may further request approval that an OBD system monitor be temporarily disabled at other ambient temperatures and altitude conditions upon determining that the manufacturer has demonstrated with data and/or an engineering evaluation that misdiagnosis would occur at those ambient conditions because of its effect on the component itself (e.g. component freezing, effect on the compatibility with sensor tolerances).

Notes: ..."

Paragraph 5.2.3., the table, the text of row (b), amend to read:

"(b) The low fuel pressure in the tank considered for such a disablement shall not exceed 20 per cent of the usable range of fuel tank pressure."

Paragraph 6.3.2.1., amend to read:

"6.3.2.1. Procedure for qualifying a deteriorated component used to demonstrate the detection of classes A and B1 malfunctions"

Insert new paragraphs 6.3.2.1.1. to 6.3.2.1.3., to read:

"6.3.2.1.1. Emission threshold monitoring

In the case the malfunction selected by the Approval Authority results in tailpipe emissions that may exceed an OBD threshold limit, the manufacturer shall demonstrate by an emission test according to paragraph 7. that the

deteriorated component or device does not result in the relevant emission exceeding its OTL by more than 20 per cent.

6.3.2.1.2. Performance monitoring

At the request of the manufacturer and with the agreement of the approval authority, in the case of performance monitoring, the OTL may be exceeded by more than 20 per cent. Such request shall be justified on a case by case basis.

6.3.2.1.3. Component monitoring

In the case of component monitoring, a deteriorated component is qualified without reference to the OTL."

Appendix 2

List of figures, amend to read:

"...

Figure 3: DTC status in case of the re-occurrence of a class B1 malfunction

Figure 4A: Class A malfunction -activation of the MI and MI counters

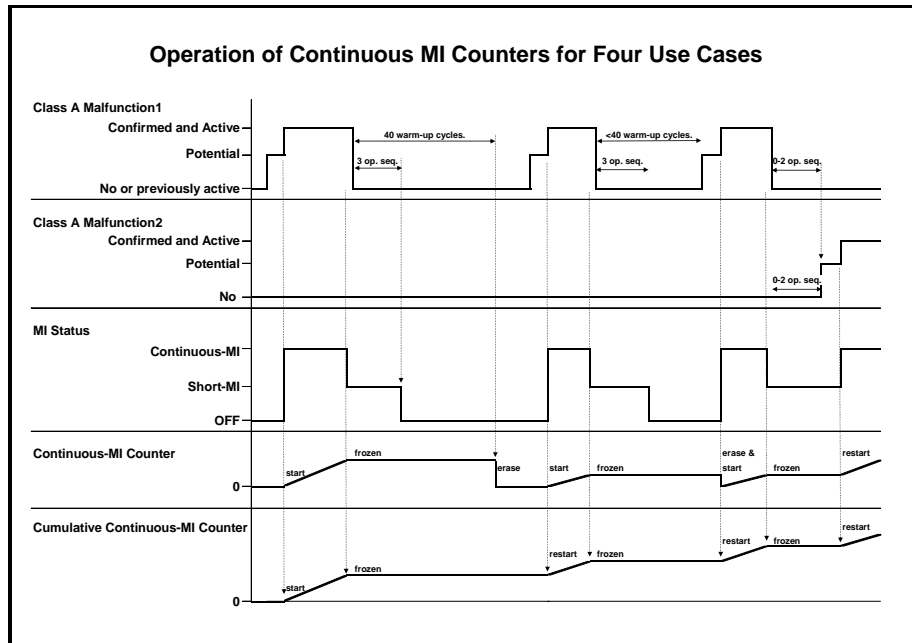
Figure 4B: Illustration of the continuous MI deactivation principle

Figure 5: Class B1 malfunction - activation of the B1 counter in 5 use cases."

Renumber Figure 4 as Figure 4A, and amend to read:

"Figure 4A

Class A malfunction - activation of the MI and MI counters

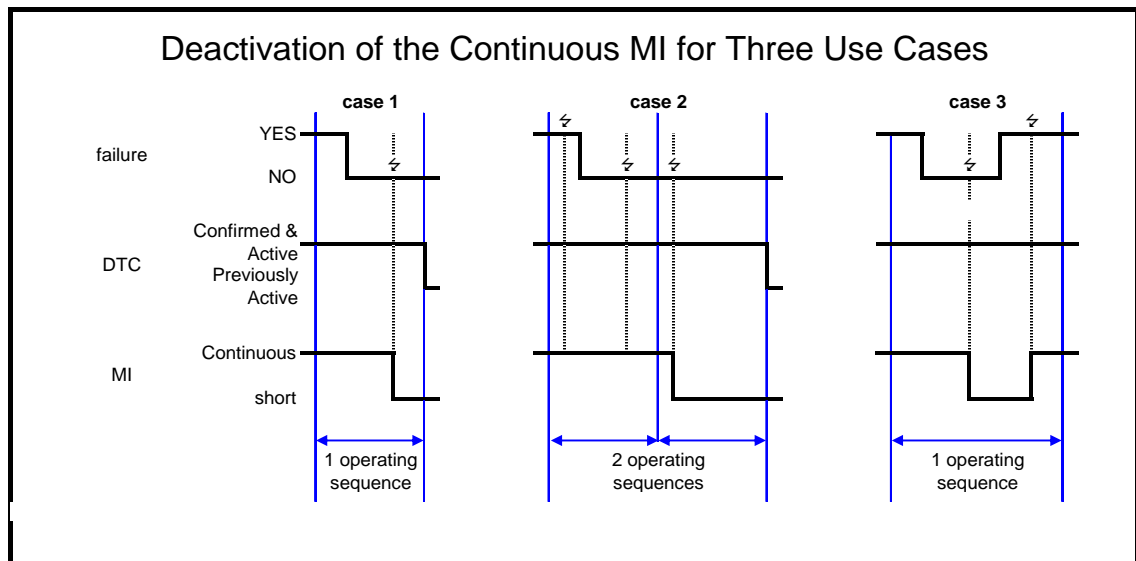


Note: Details related to the deactivation of the continuous MI are illustrated in Figure 4B below in the specific case where a potential state is present."

Insert a new Figure 4B, to read:

"Figure 4B

Illustration of the continuous MI deactivation principle



Notes:

⚡ means the point where monitoring of the concerned malfunction occurs.

M means the operating sequence when the monitor concludes for the first time that a confirmed and active failure is no longer present.

case 1 means the case where the monitor does not conclude the presence of failure during the operating sequence M.

case 2 means the case where the monitor has previously concluded, during the operating sequence M, the presence of the malfunction.

case 3 means the case where the monitor concludes during the operating sequence M the presence of the malfunction after having first concluded to its absence."

Appendix 5, Table 3, the text of the second row, amend to read:

"Fuel level (e.g. percentage of the nominal capacity of the fuel tank) or tank fuel pressure (e.g. percentage of the usable range of fuel tank pressure), as appropriate"

Appendix 6, amend to read:

"Annex 9B

Appendix 6

Reference standard documents

This appendix contains the references to the industry standards that are to be used in accordance to the provisions of this annex to provide the serial communications interface to the vehicle/engine. There are two allowed solutions identified:

- (a) ISO 27145 with either ISO 15765-4 (CAN based) with either ISO 15765-4 (CAN based) or with ISO 13400 (TCP/IP based),
- (b) SAE J1939-73.

In addition there are other ISO or SAE standards that are applicable in accordance with the provisions of this annex.

Reference by this annex to ISO 27145 means reference to:

- (a) ISO 27145-1 Road vehicles — Implementation of WWH-OBD communication requirements — Part 1 — General Information and use case definitions
- (b) ISO 27145-2 Road vehicles — Implementation of WWH-OBD communication requirements — Part 2 — Common emissions-related data dictionary;
- (c) ISO 27145-3 Road vehicles — Implementation of WWH-OBD communication requirements — Part 3 — Common message dictionary;
- (d) ISO 27145-4 Road vehicles — Implementation of WWH-OBD communication requirements — Part 4 — Connection between vehicle and test equipment.

Reference by this annex to J1939-73 means reference to:

J1939-73 "APPLICATION LAYER - DIAGNOSTICS", dated on year 2011.

Reference by this annex to ISO 13400 means reference to:

- (a) FDIS 13400-1: 2011 Road vehicles — Diagnostic communication over Internet Protocol (DoIP) — Part 1: General information and use case definition;
- (b) FDIS 13400-3: 2011 Road vehicles — Diagnostic communication over Internet Protocol (DoIP) — Part 2 — Network and transport layer requirements and services;
- (c) FDIS 13400-3: 2011 Road vehicles — Diagnostic communication over Internet Protocol (DoIP) — Part 3: IEEE 802.3 based wired vehicle interface;
- (d) not yet finalised [13400-4: 2011 Road vehicles — Diagnostic communication over Internet Protocol (DoIP) — Part 4: Ethernet-based high-speed data link connector]."

Annex 9C

Paragraph 3.7., amend to read

"3.7. *"Driving cycle"*

A driving cycle means a sequence consisting of an engine start, an operating period (of the vehicle), an engine shut-off, and the time until the next engine start."

Paragraph 5.2., amend to read:

"5.2. Requirements for incrementing the numerator

...

- (c) For monitors which are used for failure identification and that run only after a potential DTC has been stored, the numerator and denominator may be the same as those of the monitor detecting the original malfunction.

..."

Paragraph 7.1., amend to read

"7.1. Information about in-use performance data

...

- (f) confirmed and active DTCs for Class A malfunctions
- (g) confirmed and active DTCs for Class B (B1 and B2) malfunctions.

..."
