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Item 5 of the provisional agenda

UN Regulations Nos. 24 (Visible pollutants, measurement of power of C.I. engines (Diesel smoke)), 85 (Measurement of the net power), 115 (LPG and CNG retrofit systems), 133 (Recyclability of motor vehicles) and 143 (Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS))

Proposal for a new Supplement to UN Regulation No. 85 (Measurement of the net power)

Submitted by the expert from the International Organization of Motor Vehicle Manufacturers*

The text reproduced below was prepared by the expert from the International Organization of Motor Vehicle Manufacturers (OICA). This document proposes to amend the footnote 9 in table 1 of Annex 5 to introduce an alternative for the measurement of power. The modifications to the current text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21 and Add.1, Cluster 3), 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. Proposal

Annex 5, Table 1, Footnote 9, amend to read:

"⁹ Charge air cooled engines shall be tested with charge air cooling, whether liquid or air cooled, but if the engine manufacturer prefers, a test bench system may replace the air cooled cooler. In either case, the measurement of power at each speed shall be made with the same pressure drop and temperature drop of the engine air across the charge air cooler on the test bench system as those specified by the manufacturer for the system on the complete vehicle.

Alternatively, at the request of the manufacturer with the agreement of the type approval authority, the measurement of power (at each speed) may be made with the charge air cooler outlet temperature set as follows:

$$T_{\text{outlet, bench, N}} = T_{\text{outlet, vehicle, N}} - (T_{\text{amb}} - 298)$$

Where,

$T_{\text{outlet, bench, N}}$ is set temperature at engine speed N during the bench test (K)

$T_{\text{outlet, vehicle, N}}$ is measured temperature at engine speed N during a test of the complete vehicle test (K)

T_{amb} is ambient temperature during the complete vehicle test (K)"

II. Justification

1. The current test method for measuring charge-air-cooled engines net power is not suitable for high power engines of those. While waiting for the constant test condition (ref. Annex 5, 3.4.), the charge air cooler outlet temperature rises and the net power cannot be measured correctly.
 2. To solve this problem, we propose an alternative test method to "set the charge air cooler outlet temperature during bench test to temperature which was observed by vehicle test and corrected to the reference temperature specified in paragraph 5.2.1. of this Annex". This alternative method is well recognized in SAE J1349.
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