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World Forum for Harmonization of Vehicle Regulations

Working Party on Pollution and Energy

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Item 6(c) of the provisional agenda

Regulation No. 83(Emissions of M₁ and N₁ categories of vehicles)**Proposal for draft amendments to Supplement 1 to the
06 series of amendments to Regulation No. 83****Submitted by the expert from the Netherlands ***

The text reproduced below was prepared by the expert from the Netherlands in order to amend the requirements concerning the specifications for the proportional speed fan which can be used during testing of the vehicle on the chassis dynamometer, as requested during the June 2010 session of Working Party on Pollution and Energy (GRPE) (see report ECE/TRANS/WP.29/GRPE/60, para. 36). This document takes into account Supplement 1 to the 06 series of amendments to Regulation No. 83 (ECE/TRANS/WP.29/2010/130) adopted by the World Forum for Harmonization of Vehicle Regulations (WP.29) at its November 2010 session as amended by informal document WP.29-152-11 (see report ECE/TRANS/WP.29/1087, para. 57). Modifications to the current provisions of the Regulation are marked in bold characters for new or as strikethrough for deleted text.

* In accordance with the programme of work of the Inland Transport Committee for 2006–2010 (ECE/TRANS/166/Add.1, 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.

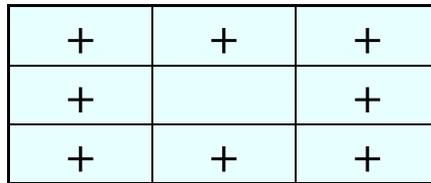
I. Proposal

Annex 4, paragraph 6.1.3., amend to read:

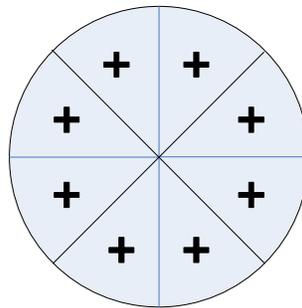
"6.1.3. A current of air of variable speed shall be blown over the vehicle. The blower speed shall be within the operating range of 10 km/h to ~~at least 50 km/h, or within the operating range of 10 km/h to~~ at least the maximum speed of the test cycle being used. The linear velocity of the air at the blower outlet shall be within ± 5 km/h of the corresponding roller speed within the range of 10 km/h to 50 km/h. At the range over 50 km/h, the linear velocity of the air shall be within ± 10 km/h of the corresponding roller speed. At roller speeds of less than 10 km/h, air velocity may be zero.

The above mentioned air velocity shall be determined as an averaged value of a number of measuring points which

- (a) For blowers with rectangular outlets are located at the centre of each rectangle dividing the whole of the blower outlet into 9 areas (dividing both horizontal and vertical sides of the blower outlet into 3 equal parts). **The centre area shall not be measured (as shown in the diagram below).**



- (b) For circular blower outlets, the outlet shall be divided into 8 equal arcs by vertical, horizontal and 45° lines. The measurement points lie on the radial centre line of each arc (22.5°) at a radius of two thirds of the total (as shown in the diagram below).



These measurements shall be made with no vehicle or other obstruction in front of the fan.

The device used to measure the linear velocity of the air shall be located at between 0 and 20 cm from the air outlet.

The final selection of the blower shall have the following characteristics:

- (a) Area: at least 0.2 m²;

- (b) Height of the lower edge above ground: approximately 20 cm;
 (c) Distance from the front of the vehicle: approximately 30 cm.

~~As an alternative, at the request of the manufacturer the blower speed shall be fixed at an air speed of at least 6 m/s (21.6 km/h).~~

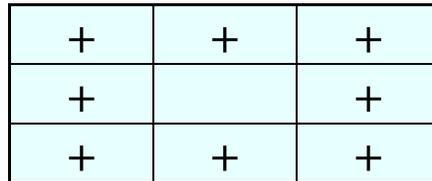
The height and lateral position of the cooling fan may be modified, if appropriate."

Annex 4a, paragraph 3.4.2., amend to read:

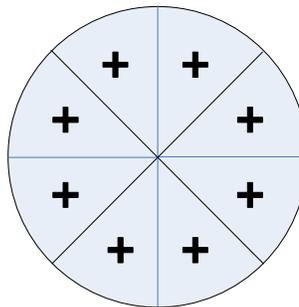
"3.4.2. A current of air of variable speed shall be blown over the vehicle. The blower speed shall be, within the operating range of 10 km/h to ~~at least 50 km/h, or within the operating range of 10 km/h to~~ at least the maximum speed of the test cycle being used. The linear velocity of the air at the blower outlet shall be within ± 5 km/h of the corresponding roller speed within the range of 10 km/h to 50 km/h. At the range over 50 km/h, the linear velocity of the air shall be within ± 10 km/h of the corresponding roller speed. At roller speeds of less than 10 km/h, air velocity may be zero.

The above mentioned air velocity shall be determined as an averaged value of a number of measuring points which:

- (a) For blowers with rectangular outlets are located at the centre of each rectangle dividing the whole of the blower outlet into 9 areas (dividing both horizontal and vertical sides of the blower outlet into 3 equal parts). **The centre area shall not be measured (as shown in the diagram below).**



- (b) For circular blower outlets, the outlet shall be divided into 8 equal arcs by vertical, horizontal and 45° lines. The measurement points lie on the radial centre line of each arc (22.5°) at a radius of two thirds of the total (as shown in the diagram below).



These measurements shall be made with no vehicle or other obstruction in front of the fan.

The device used to measure the linear velocity of the air shall be located at between 0 and 20 cm from the air outlet.

The final selection of the blower shall have the following characteristics:

- (a) Area: at least 0.2 m²;
- (b) Height of the lower edge above ground: approximately 0.2 m;
- (c) Distance from the front of the vehicle: approximately 0.3 m.

~~As an alternative, at the request of the manufacturer the blower speed shall be fixed at an air speed of at least 6 m/s (21.6 km/h).~~

The height and lateral position of the cooling fan may be modified, if appropriate."

II. Justification

1. Amendments to the requirements in Annexes 4 and 4a regarding cooling fans were proposed at the June 2010 session of GRPE in ECE/TRANS/WP.29/GRPE/2010/11 prepared by the expert from International Organization of Motor Vehicle Manufacturers (OICA). Some concerns about the air cooling velocity were noted during the session. As requested by the GRPE Chairman, the expert from the Netherlands has prepared this document for consideration at the sixtieth-first session of GRPE in January 2011, after having discussed with the experts from the European Commission (EC), Poland, Germany, the United Kingdom and OICA.

2. This proposal takes into account Supplement 1 to the 06 series of amendments to Regulation No. 83 proposed in ECE/TRANS/WP.29/2010/130 and adopted by WP.29 at its November 2010 session as amended by informal document WP.29-152-11.

3. In the justification prepared by the expert from OICA in the earlier document ECE/TRANS/WP.29/GRPE/2008/6, it is mentioned on this topic: "Vehicles require increasingly complex thermal management of the engine, the charge (intake) air and aftertreatment devices. It is therefore essential that the air flow over the vehicle and onto the radiators, intercoolers and/or exhaust gas recirculation system (EGR) coolers during emission/fuel economy type approval testing on the chassis dynamometer is representative of that which the vehicle would experience when being driven on a road".

4. Therefore, the current options in Regulation No. 83 of different kinds of fans such as constant speed fans and variable speed fans up to 50 km/h or up to the maximum speed of the test cycle being used, is not desirability for modern vehicles where thermal management is important and can influence the emission results.

5. Fan speed should follow the roller speed to at least the maximum speed of the test cycle being used in order to improve uniformity.