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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), 143 (Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS)) and 177 (System Power)

Proposal for a new supplement to the 01 series of amendments of UN Regulation No. 177 (System Power)

Submitted by the Task Force on Automated Vehicles Regulations Screening (AVRS) *

The text reproduced below was prepared by the Task Force on Automated Vehicles Regulations Screening (AVRS). This document aims to allow type approval of vehicles with Automated Driving Systems. It is submitted to the Working Party on Pollution and Energy consideration at its 94th session. 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 2026 as outlined in proposed programme budget for 2026 (A/80/6 (Sect. 20), table 20.7), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Paragraph 1.1., amend to read:

- "1.1. This Regulation applies to vehicles that meet all of the following criteria (a), (b) and (c):
- (a) Are hybrid electric vehicles, or are pure electric vehicles that have more than one propulsion energy converter;
- and
- (b) Are classified in category N₁¹, or are classified in category M₁¹ and have a technically permissible maximum laden mass not exceeding 3,500 kg;
- and
- (c) If a hybrid electric vehicle, at least one electric machine contributes to propulsion of the vehicle under the maximum power condition."

Footnote 1, insert new footnote to read:

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.8, <https://unece.org/transport/vehicle-regulations/wp29/resolutions>"

Paragraph 2., amend to read:

"2. Abbreviations

General abbreviations

ADS¹ Automated Driving System

AWD All-Wheel Drive

FSD Full Scale Deflection

..."

Paragraph 3.4.1., amend to read:

- "3.4.1. "~~Driver~~**User-selectable mode**" means a distinct ~~driver~~**user**-selectable condition which could affect emissions, or fuel and/or energy consumption, or maximum system power output."

Insert a new paragraph 3.4.2., to read:

- "3.4.2. "**ADS user**" means a human user of an Automated Driving System, as defined in UN Regulation No. [ADS]."

Paragraph 3.5.4., amend to read:

- "3.5.4. "**Power-rating mode**" means the ~~driver~~**user**-selectable mode (if any) for which vehicle system power rating is desired."

Paragraph 3.5.5., amend to read:

- "3.5.5. "**Speed of maximum power**" means the fixed speed setting of the dynamometer at which a maximum ~~accelerator pedal command~~**acceleration demand**, given for a period of at least ten seconds while the vehicle is in power-rating mode, delivers the greatest peak power to the dynamometer."

Paragraph 3.5.6., amend to read:

"3.5.6. "Maximum power condition" means the condition in which the vehicle is operating on a dynamometer, the vehicle is in power-rating mode, the dynamometer is operating in fixed speed mode set to the speed of maximum power, and the maximum ~~accelerator pedal command~~**acceleration demand** command is given for a period of at least ten seconds."

Table 2, last row, amend to read:

"...

Accelerator pedal command Acceleration demand	percent	As read from onboard accelerator pedal command acceleration demand signal
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"

Paragraph 8.1.2., amend to read:

"8.1.2. Required measurements

...

Measurements common to both TP1 and TP2 include ~~accelerator pedal command~~**acceleration demand**, atmospheric pressure, room temperature, and the operational metrics listed in paragraph 8.8.1.

For the purpose of internal validation (see paragraph 8.11.), the power delivered by the vehicle to the dynamometer during the maximum power condition shall be recorded (for example, by recording dynamometer wheel speed and torque, or dynamometer power if available, at a minimum of 10 Hz).

Vehicles of categories X and Y¹ shall be tested using the ADS testing mode as set out in paragraph 2.4.2.7. of Annex B6 to UN Regulation No. 154, but extended to enable the correct execution of the TP1 and TP2 tests and the determination of the speed of maximum power set out in Annex 5 of this regulation, where necessary.

If the vehicle is equipped with an ADS testing mode, it shall be engaged for all tests of TP1 or TP2 and determination of speed of maximum power, where these tests are conducted using ADS."

Paragraph 8.8.1., amend to read:

"8.8.1. General

The test shall be carried out in accordance with paragraphs 8.8.3. to 8.8.8., and 8.9. to 8.11. (see Figure 23). The test shall be stopped immediately if **one or more** warning ~~indicator(s)~~**indication(s)** with regard to the powertrain ~~turns on~~**are activated**.

Note: Warnings are coolant temperature and engine ~~check lamp~~**malfunction indication**~~æ~~, for example.

The following operational metrics, if present, shall be monitored and recorded throughout the test: (a) engine coolant temperature, (b) battery temperature (as indicated by temperature of battery cells, modules, or pack, as available), (c) transmission or gearbox oil temperature, (d) battery SOC, (e) electric machine temperature (as indicated by temperature of stator, rotor, or cooling fluid, as available). The manufacturer shall specify the normal operating range for each operational metric."

Paragraph 8.8.3., amend to read:

"8.8.3. Vehicle conditioning

The measurement devices shall start collecting data.

The object of conditioning is to operate the vehicle until the normal operating temperature ranges specified by the manufacturer (paragraph 8.1.1.4.) for the temperature-related operational metrics (paragraph 8.8.1.) have been reached and have stabilised.

Prior to the test, perform initial conditioning by placing the vehicle in the power-rating mode, if applicable (see paragraph 8.8.5.), and run at the speed of 60 km/h at the vehicle road load for at least 20 minutes, or as recommended by the vehicle manufacturer. The vehicle manufacturer or the Type-Approval Authority may specify a different time period, speed, ~~driver~~**user**-selectable mode, dynamometer mode, or cycle, as necessary to achieve stable operating metrics.

At the end of initial vehicle conditioning, the operational metrics (see paragraph 8.8.1.) shall be recorded.

During the test, monitor the operating metrics and perform additional conditioning as necessary to maintain the operating metrics within the normal operating temperature ranges."

Paragraph 8.8.5., amend to read:

"8.8.5. Vehicle operation

For vehicles that have ~~driver~~**user**-selectable modes, the vehicle system power rating that is determined by this procedure may depend on which mode is active during the test. Select the mode for which a vehicle system power rating is desired.

The selected mode shall be recorded as the power-rating mode.

Place the dynamometer in fixed speed mode.

Set the dynamometer fixed speed to the speed of maximum power and allow the speed to stabilize."

Paragraph 8.8.6., amend to read:

"8.8.6. Power test

The maximum ~~accelerator pedal command~~**acceleration demand** shall be given by either the pedal position or by vehicle communication network for a duration of at least 10 s.

The maximum ~~accelerator command~~**acceleration demand** shall be given as rapidly as possible. If necessary in order to elicit maximum power delivery, it is permissible to vary the ~~accelerator pedal command~~**acceleration demand** as recommended by the manufacturer prior to the maximum accelerator pedal command (for example, ask the manufacturer if it is necessary to achieve a kickdown state).

If the gearbox has ~~driver~~**user**-selectable gears, the gear shall be selected as recommended by the manufacturer ~~for a typical driver~~ to achieve maximum power. Gear shifting by means of special modes or actions that are not available to a typical driver **or ADS user** are not permitted."

Paragraph 8.9.1., amend to read:

"8.9.1. General

For each of the 2nd, 3rd, 4th and 5th repetitions according to paragraph 8.8.7., time series data obtained from undertaking the test sequence set out in paragraph 8.8. shall be analysed to calculate vehicle system power.

For each repetition, two power calculations shall be performed:

- (a) Peak vehicle system power: as defined in paragraph 3.5.9.; and
- (b) Sustained vehicle system power: as defined in paragraph 3.5.10.

For computation purposes, the 10-second measurement time window begins when the ~~accelerator pedal command~~**acceleration demand** has reached maximum as indicated by the ~~accelerator pedal command~~**acceleration demand** measurement, and the gear ratio (if changed) has begun a period in which it is constant for at least 10 seconds.

If the vehicle design does not provide for a stable gear ratio to be achieved for a full 10 seconds under the maximum power condition, the time window may begin according to the manufacturer’s recommendation, with the approval of the Type-Approval Authority.

Finally, compute the peak and sustained vehicle system power ratings for the vehicle, as the mean of the respective individual results of the four analysed repetitions.

The variation of each of the four analysed repetitions shall be computed as a percentage of their mean, and recorded.

The maximum variation of an individual value should not be greater than ± 5% of the mean. If the variation is too large, check the dynamometer settings and vehicle configuration, consult with the manufacturer for possible causes, and perform the repetitions again. If variation cannot be reduced, the system power rating is subject to approval by the Type-Approval Authority."

Appendix 1, Information document table, item 7.3., amend to read:

"

7.3.	Driver User -selectable mode switch: Yes/No ²⁾
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Appendix 2, Test report table, item 3.4., amend to read:

"

3.4.	Selected gear for maximum power (if driver user -selectable gear available)
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Appendix 2, Test report table, item 3.6., amend to read:

"

3.6.	Accelerator pedal command Acceleration demand ... %
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"

II. Justification

1. The document introduces changes required to incorporate vehicles with Automated Driving Systems into the existing Regulation.
 2. Reference to the Consolidated Resolution on the Construction of Vehicles (R.E.3.) is updated to include ADS equipped vehicles in the scope. Vehicle categories X and Y are introduced in Revision 8 of R.E.3, prepared by the Task Force on Automated Vehicle Categorisation (TF-AVC) under GRSG and GRVA, and are not capable to be driven manually above 6 km/h.
 3. Testing vehicles equipped with an ADS might require special procedures, therefore provisions have been added to allow for the testing of ADS vehicles on the dynamometer using the ADS test mode described in UN Regulation No. 154.
 4. Vehicles of categories X and Y might not have gear change or accelerator controls, therefore the provisions were generalized to include vehicles without such controls.
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