
Draft GRPE reference document to clarify two concerns currently in UN-R 154

1. Coasting

United Nations Regulation 154 contains some requirements concerning “Coasting” systems.

The relevant pieces of text are:

In Section 3 of the Regulation (Definitions):

“3.2.36. *“Coasting” means a functionality of either an automatic transmission or a clutch which decouples the engine from the drivetrain automatically when no propulsion or a slow reduction of speed is needed and during which the engine may be idling or switched off.”*

In Annex B6 of the Regulation (Type 1 test procedures and test conditions):

“2.4.2.1.1. *For Level 1A only*

If the vehicle is equipped with a coasting functionality, this functionality shall be deactivated either by a switch or by the vehicle’s dynamometer operation mode during chassis dynamometer testing, except for tests where the coasting functionality is explicitly required by the test procedure.”

Paragraph 2.4.2.1.1. is also in Series of Amendments 01 (Level 2).

Concern:

It has been identified that the text as written may have unintended consequences as follows:

A coasting system on a conventional ICE vehicle disconnects the engine when the vehicle is in motion in order to reduce fuel consumption and therefore CO₂ emissions, some hybrid vehicles however disconnect the (combustion) engine when using electrical propulsion and recuperate energy via this electrical drive system when the vehicle is in motion but no propulsion is required. It was never the intention of the text in UN-R 154 to force the deactivation of this mode of recuperation by hybrid vehicles and therefore some clarification is required.

The requirement to deactivate coasting systems does not take account of whether the vehicle operator can deactivate such a system. Without this differentiation, for vehicles which do not offer a deactivation to the user, the text requires bringing the vehicle into a status which cannot be reproduced in normal use, i.e. driving without coasting although coasting would operate in normal use.

Solution:

The term “coasting” should be understood as follows (functional approach):

“Coasting” means a functionality where neither a propulsion energy is applied to the wheels nor recuperation energy is taken from the wheels nor mechanical braking is applied.

And additionally the following understanding should be applied to the technical requirement:

original version of the Regulation:

“2.4.2.1.1. For Level 1A only

*If the vehicle is equipped with a coasting functionality **which can be activated or deactivated by the vehicle operator**, this functionality shall be deactivated either by a switch or by the vehicle’s dynamometer operation mode during chassis dynamometer testing, except for tests where the coasting functionality is explicitly required by the test procedure.”*

Series of Amendments 01:

“2.4.2.1.1. *If the vehicle is equipped with a coasting functionality **which can be activated or deactivated by the vehicle operator**, this functionality shall be deactivated either by a switch or by the vehicle’s dynamometer operation mode during chassis dynamometer testing, except for tests where the coasting functionality is explicitly required by the test procedure.”*

2. Twin roller dynamometers in 4WD operation

Specifically, UN-R 154 contains the following text:

In Annex B5 of the Regulation (Test equipment and calibrations):

“2.3.1. For testing in 4WD operation, the chassis dynamometer shall have a single roller configuration. The 4WD control system shall be designed such that the following requirements are fulfilled when tested with a vehicle driven over the WLTC.”

Concern:

Although the normal configuration for Type 1 testing is to combine single roller dynamometers for 4WD operation, It has been identified that twin roller dynamometers are in current use in the EU for testing in climatic chambers which have been traditionally used for Type 6 testing but are also used for the ATCT which is newly introduced to this Regulation.

As this configuration is currently accepted by EU legislation, including for testing associated with measurement of CO₂, it seems reasonable to permit it in UNR 154 providing certain conditions are met.

Solution:

- a) The vehicle restraint system

It can be assumed that the restraint system required for twin roller dynamometers in 2WD operation provides equally sufficient restraint and protection against measurement variation and inaccuracy as it would for 4WD operation. Therefore no need for further clarification is foreseen here.

- b) The reflection of the vehicle wheelbase in the configuration of the dynamometer

Although even minor differences between the vehicle wheelbase and the separation distance between the roller sets should be avoided where possible, this becomes critical if the difference is inconsistent between the setting of the dynamometer loads and the testing of the vehicle.

Therefore, the usage of twin roller dynamometers with 4WD configuration should be accepted if the following conditions are met:

1. The separation distance between the front and rear sets of twin rollers of the dynamometer (X in diagram below) is set as closely as possible to match the manufacturer’s declared wheelbase of the vehicle to be tested, and
2. It shall be ensured that the setting of the separation distance between the roller sets used for dyno load setting is reproduced for vehicle testing.

