

Consolidated proposal for amendments to ECE/TRANS/WP29/GRVA/2019/19

Note: The text below was prepared by the secretariat on request of GRVA. It contains ECE/TRANS/WP29/GRVA/2019/19, GRVA-04-09 (OICA) and GRVA-04-46 (France).

Consolidated proposal

UN Regulation No. 79, insert a new sentence in paragraph 5.6.2.1.1., to read:

"5.6.2.1.1. The activated system shall at any time, within the boundary conditions, ensure that the vehicle does not cross a lane marking for lateral accelerations below the maximum lateral acceleration specified by the manufacturer a_{smax} .

It is recognised that the maximum lateral acceleration specified by the vehicle manufacturer a_{smax} may not be achievable under all conditions (e.g. inclement weather, different tyres fitted to the vehicle, laterally sloped roads). The system shall not deactivate or unreasonably switch the control strategy in these other conditions.

The system may exceed the specified value a_{smax} by not more than 0.3 m/s^2 , while not exceeding the maximum value specified in the table in paragraph 5.6.2.1.3. of this Regulation.

Notwithstanding the sentence above, for time periods of not more than 2 s the lateral acceleration of the system may exceed the specified value a_{smax} by not more than 40%, while not exceeding the maximum value specified in the table in paragraph 5.6.2.1.3. of this Regulation by more than 0.3 m/s^2 ."

Annex 8, paragraph 2.1. amend to read:

"2.1. Lane markings

The lane markings on the road used for the tests shall be in line with one of those described in Annex 3 of UN Regulation No. 130. The markings shall be in good condition and of a material conforming to the standard for visible lane markings. The lane-marking layout used for the tests shall be recorded in the test report.

The width of the lane shall be minimum 3.5 m, for the purpose of the tests of this annex. **At the manufacturer's discretion and with the agreement of the Technical Service, a lane with a width of less than 3.5 m may be used, if the correct function of the system on roads with wider lanes can be demonstrated.**

The test shall be performed under visibility conditions that allow safe driving at the required test speed.

The vehicle manufacturer shall demonstrate, through the use of documentation, compliance with all other lane markings identified in Annex 3 of UN Regulation No. 130. Any of such documentation shall be appended to the test report. "

Annex 8, paragraph 2.4., amend to read:

"2.4. Lateral acceleration

~~The position representing the centre of gravity, at which the lateral acceleration shall be measured, shall be determined in agreement between the vehicle manufacturer and the Technical Service. The position at which the lateral acceleration is measured and the centre of gravity of the vehicle shall be identified in the test report.~~

~~The lateral acceleration shall be measured without taking into account the additional effects due to the movements of the vehicle body (e.g. roll of sprung mass).~~

The lateral acceleration and the lateral jerk at vehicle's center of gravity shall be determined. The raw lateral acceleration data shall be measured closest as possible to the position of the vehicle's center of gravity. The position at which the lateral acceleration is measured and the centre of gravity of the vehicle shall be identified in the test report. The sampling rate shall be at least 100 Hz.

To determine the lateral acceleration, the raw data shall be filtered by applying a fourth order Butterworth filter with a cut-off frequency of 0.5 Hz.

To determine the lateral jerk, the 500ms moving average of the time derivation of the filtered lateral acceleration shall be considered.

The lateral acceleration data at the vehicle center of gravity shall be determined by removing additional effects due to the movements of the vehicle body (e.g. roll of sprung mass) and by correcting for sensor placement via the use of coordinate transformation. As reference, the **intermediate axis vehicle-coordinate** system as described in ISO 8855:2011 shall be used."

Annex 8, insert a new paragraph 2.5., to read:

"2.5. Overriding force

The measurement of the overriding force during the test can be performed by two methods: either through the internal driver torque signal or by an external measurement device fitted, which doesn't induce any deactivation of the system.

Prior to performing the overriding force test, by the internal driver torque signal, it shall be verified by an external measurement device that there are no relevant differences between the both measured values. Differences shall be less than or equal to 3N. This requirement is deemed to be fulfilled if the correlation between the values of the internal driver torque signal and the external measurement device was determined and is applied in the overriding force test. "

Annex 8, paragraph 3.2.1.1. and 3.2.1.2., amend to read:

"3.2.1.1. The vehicle speed shall remain in the range from V_{min} up to V_{max} .

The test shall be carried out for each speed range specified in paragraph 5.6.2.1.3. of this Regulation separately or within contiguous speed ranges where the $a_{y_{\text{max}}}$ is identical.

The vehicle shall be driven without any force applied by the driver on the steering control (e.g. by removing the hands from the steering control) with a constant speed **or with a predefined initial speed when using an embedded vehicle speed control system (e.g. for vehicles automatically decelerating in curves)** on a curved track with lane markings at each side.

The necessary lateral acceleration to follow the curve shall be between 80 and 90 per cent of the maximum lateral acceleration specified by the vehicle manufacturer $a_{y_{\text{max}}}$. **The measured lateral acceleration during the test execution can be outside of the above-mentioned limits.**

The lateral acceleration and the lateral jerk shall be recorded during the test.

3.2.1.2. The test requirements are fulfilled if:

No outside edge of the tyre tread of the vehicle's front wheel does cross the outside edge of ~~The vehicle does not cross~~ any lane marking.

The moving average over half a second of the lateral jerk does not exceed 5 m/s³."

Annex 8, paragraphs 3.2.2.1. and 3.2.2.2., amend to read:

- "3.2.2.1.** The vehicle speed shall remain in the range from V_{smin} up to V_{smax}
 [...] The vehicle shall be driven without any force applied by the driver on the steering control (e.g. by removing the hands from the steering control) with a constant speed on a curved track with lane markings at each side.
If an embedded vehicle speed control system will automatically decelerate the vehicle in the curve, it shall be inhibited.
 [...]
- 3.2.2.2. The test requirements are fulfilled if:
 The recorded acceleration is within the limits specified in paragraph **5.6.2.1.1.** ~~5.6.2.1.3.~~ of this Regulation.
 The moving average over half a second of the lateral jerk does not exceed 5 m/s^3 ."

Annex 8, paragraph 3.2.3.1. amend to read:

- "3.2.3.1. The vehicle speed shall remain in the range from V_{smin} up to V_{smax} .
 The vehicle shall be driven without any force applied by the driver on the steering control (e.g. by removing the hands from the steering control) with a constant speed on a curved track with lane markings at each side.
 The necessary lateral acceleration to follow the curve shall be between 80 and 90 per cent of ~~the minimum value specified in the table of paragraph 5.6.2.1.3. of this Regulation.~~ **the maximum lateral acceleration specified by the vehicle manufacturer a_{ysmax} .**
 The driver shall then apply a force on the steering control to override the system intervention and leave the lane.
 The force applied by the driver on the steering control during the overriding manoeuvre shall be recorded. "

Annex 8, insert new paragraphs 3.2.5. to 3.2.5.2., to read:

- "3.2.5. Lane Crossing Warning Test for $M_1 N_1$ and for $M_2 M_3 N_2$ and N_3 , if not equipped with a Lane Departure Warning System (LDWS) fulfilling the technical requirements of UN Regulation No. 130.**
- 3.2.5.1. **The vehicle shall be driven with activated ACSF with a vehicle test speed between V_{smin} and V_{smax} .**
 The vehicle shall be driven without any force applied by the driver on the steering control (e.g. by removing the hands from the steering control) on a curved track with lane markings at each side.
 The technical service defines a test speed and a radius which would provoke a lane crossing. The test speed and radius shall be defined such that the necessary lateral acceleration to follow the curve is in between $a_{ysmax} + 0.1 m/s^2$ and $a_{ysmax} + 0.4 m/s^2$.
- 3.2.5.2. **The test requirements are fulfilled if:**
 The optical warning signal and additionally the acoustic or haptic warning signal was given at the latest when the outside edge of the tyre tread of the vehicle's front wheel has crossed the outside edge of the lane marking.
 The system continues to provide assistance as required in paragraph 5.6.2.2.3."