

Proposal for amendments to ECE/TRANS/WP.29/GRBP/2020/20

The changes compared to document ECE/TRANS/WP.29/GRBP/2020/20 are marked in **bold** for added text and strike through for deleted text.

I. Proposal

Paragraph 2.13., amend to read:

- “2.13. “Cumulative driving time” means ~~the total time elapsed~~
where the vehicle **of category M₁ up to a maximum mass of 3,500 kg or N₁ is driven at speeds equal to or higher than 40 km/h and further deducted by 120 seconds for each event where the vehicle speed drops below 40 km/h**
or
where the vehicle of other categories than M₁ up to a maximum mass of 3,500 kg and N₁ is driven at speeds equal to or higher than 30 ~~25~~ km/h and further deducted by 120 seconds for each event where the vehicle speed drops below 30 ~~25~~ km/h.”

Paragraph 5.1.1.1., amend to read:

- “5.1.1.1. A Tyre Pressure Refill System (TPRS) shall be deemed to be equivalent to a Tyre Pressure Monitoring System (TPMS) when the test criteria of Annex 4 are met. In this case TPMS is not ~~requested~~ **required** to be installed.”

Paragraph 5.1.1.2., amend to read:

- “5.1.1.2. A Central Tyre Inflation System (CTIS) shall be deemed to be equivalent to a Tyre Pressure Monitoring System (TPMS) when the test criteria of Annex 4 are met. In this case TPMS is not ~~requested~~ **required** to be installed.”

Paragraph 5.1.2. (a) and 5.1.2. (b), amend to read:

- “5.1.2. The effectiveness of the tyre pressure monitoring system fitted on a vehicle shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10 by applying:

- (a) The {03} series of amendments for vehicles without a coupling system for charging the Rechargeable Electric Energy Storage System (traction batteries);
- (b) The {06 04-series} of amendments for vehicles with a coupling system for charging the Rechargeable Electric Energy Storage System (traction batteries)”

Paragraph 5.1.3., amend to read:

“5.1.3.
For vehicles of categories M₂, M₃, N₂, N₃, O₃ and O₄, the system shall operate from a speed of {30 25 km/h or below}, up to the vehicle's maximum design speed.”

Paragraph 5.1.6., amend to read:

“5.1.6. not detect a minimum pressure as defined in paragraphs 5.2.+ and 5.3. after executing
..... not detect if the pressure is above a minimum pressure as defined in paragraphs 5.2.+ and 5.3. after executing”

Paragraph 5.2.2., amend to read:

“5.2.2. For vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, fitted with tyres of the tyre class C2, the TPMS shall illuminate the warning signal described in paragraph 5.5. within {ten+0} minutes of cumulative driving time after the in service operating pressure in one of the vehicle's tyres has been reduced by {20+twenty} per cent or it is at a minimum pressure of {220} kPa, whichever is higher.”

Paragraph 5.2.3., amend to read:

“5.2.3. For vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄ , fitted with tyres of the tyre class C2 or C3, the TPMS shall illuminate the warning signal described in paragraph 5.5. within not more than {ten} minutes of cumulative driving time after the in service operating pressure in one of the vehicle's tyres has been reduced by {20+twenty} per cent.”

Paragraph 5.3.2., amend to read:

“5.3.2. For vehicle category of category M₁ up to a maximum mass of 3,500kg and N₁, fitted with tyres of the tyre class C2, the TPMS shall illuminate the warning signal described in 5.5. within not more than 60 minutes of cumulative driving time after the in service operating pressure in any of the vehicle's tyres has been reduced by {20+twenty} per cent or it is at a minimum pressure of {220} kPa, whichever is higher.”

Paragraph 5.3.3., amend to read:

“5.3.3. For vehicle categories M₂, M₃, N₂ and N₃, fitted with tyres of the tyre class C2 or C3, the TPMS shall illuminate the warning signal ~~and for categories O₃ and O₄, fitted with tyres of the tyre class C2 or C3, the TPMS shall transmit an appropriate warning signal described in 5.5.~~ within not more than 60 minutes of cumulative driving time after the in-service operating pressure in any of the

vehicle's rolling tyres in contact with the ground has been reduced by ~~[20twenty]~~ per cent.”

Insert a new paragraph 5.3.4., to read:

“**5.3.4.** For vehicle of categories O₃ and O₄, fitted with tyres of the tyre class C2 or C3, the TPMS shall transmit an appropriate warning signal described in 5.5 within not more than 60 minutes of cumulative driving time after the in-service operating pressure in any of the vehicle's rolling tyres in contact with the ground has been reduced by 20 per cent.”

Insertion of the new paragraph 5.3.4. requires to renumber the following paragraph:

“5.3.45. The low tyre pressure warning signal described in paragraph 5.5. shall be illuminated whenever the towed vehicle TPMS provides low tyre pressure warning information via the communication interface described in paragraph 5.6.”

Paragraph 5.5.2., amend to read:

“5.5.2. ~~{~~In the case of a vehicle of category N₂ or N₃ towing at least one vehicle of category O₃ or O₄, the optical warning signal referred to in 5.5.1. must indicate whether any warning relates to the **individual** towing or to the towed vehicle(s).~~}~~”

Paragraph 5.5.5., amend to read:

“5.5.5. ~~{~~For vehicles of category O₃ and O₄, the optical warning signal referred to in 5.5.1 must be displayed to the driver of the towing vehicle of category N₂ or N₃, as specified in paragraph 5.5.4.~~}~~”

Paragraph 5.6., amend to read:

~~{~~5.6. Communications interface between towing and towed vehicles

5.6.1. In the case of a vehicle of category N₂ or N₃ towing at least one vehicle of category O₃ or O₄, the communications interface between these vehicles can be ~~realised~~ **achieved** via wired or wireless equipment, provided that the TPMS equipment in the towing vehicle and in the towed vehicle(s) are compatible.

5.6.1.1. Wired equipment can be based on the braking electric control line which conforms to ISO 11992-1 and be a point-to-point type.

Different wired specifications may be used, provided that the TPMS equipment in the towing vehicle and in the towed vehicle(s) are compatible.

5.6.1.2. In the case of a wireless equipment, the communication link must be an open standard specification. Provision must be made to ensure that the wireless link is set up between the physically connected vehicles (as opposed to other vehicles in the vicinity), and that information shared over this link is secure against outside interference.

5.6.1.3. In the case of a point-to-point link between a towing vehicle ECU and a towed vehicle ECU, there shall be an open standard specification to allow a TPMS ECU, which does not constitute part of the point-to point link, to connect, communicate and operate via the towed vehicle ECU which constitutes part of the point-to-point link, i.e. standardised gatewaying.~~}~~”

Paragraph 12.2., amend to read:

“12.2. As from {6 July 2022}, for vehicle types of category M₁ and as from {6 July 2024} for vehicle types of other categories than M₁, Contracting Parties applying this Regulation shall not be obliged to accept type approvals to the preceding series of amendments, first issued after {06 July 2022}.”

Paragraph 12.3., amend to read:

“12.3. Until {6 July 2022}, for vehicle types of category M₁ and until {6 July 2024} for vehicle types of other categories than M₁, Contracting Parties applying this Regulation shall accept type approvals to the preceding series of amendments, first issued before {6 July 2022}.”

Paragraph 12.4., amend to read:

“12.4. As from {06 July 2022}, for vehicle types of category M₁ and as from {6 July 2024} for vehicle types of other categories than M₁, Contracting Parties applying this Regulation shall not be obliged to accept type approvals issued to the preceding series of amendments to this Regulation.”

Paragraph 12.7., amend to read:

“12.7. {Contracting Parties applying this Regulation shall not refuse to} **may** grant type approvals according to any preceding series of amendments to this Regulation or extensions thereof.”

Annex 1, Paragraph 9.1., amend to read:

“9.1.
~~Fourth~~ **Fourth** axle:
Fifth axle:
Sixth axle:
{etc}”

Annex 3, Paragraph 1.5.1., amend to read:

“1.5.1. Test weight.
The vehicle may be tested at any condition of load, the distribution of the mass among the axles being that stated by the vehicle manufacturer without exceeding any of the maximum permissible mass for each axle.
However, in the case where there is no possibility to set or reset the system, the vehicle shall be unladen. **For vehicles of category M₁ up to a maximum mass of 3,500 kg, M₂, M₃, N₁, N₂, and N₃** ~~There~~ **there** may be, in addition to the driver, a second person on the front seat (**if fitted**) who is responsible for noting the results of the tests. ~~The load condition shall not be modified during the test.~~
The load condition shall not be modified during the test.”

Annex 3, Paragraph 1.5.2., amend to read:

“1.5.2. Vehicle speed.
.....”

{The TPMS shall be calibrated and tested for vehicles of categories M₂, M₃, N₂, N₃, O₃ and O₄:

- (c) In a speed range from {3025} km/h and {90} km/h (or the vehicle's maximum design speed if it is less than {90} km/h) for the puncture test to verify the requirements of paragraph 5.2. to this Regulation; and
- (d) In a speed range from {3025} km/h and {90} km/h (or the vehicle's maximum design speed if it is less than {90} km/h) for the diffusion test to verify the requirements of paragraph 5.3 to this Regulation and for the malfunction test to verify the requirements of paragraph 5.4. to this Regulation.}

.....”

Annex 3, Paragraph 1.5.6., amend to read:

“1.5.6. Tyres.

The vehicle shall be tested with the tyres installed on the vehicle according to the vehicle manufacturer's recommendation. However, the spare tyre may be utilised for testing TPMS malfunction.

~~Tyres of tyre class C1 shall be warmed up according to the procedure in paragraph 2.6.2.1. of this Annex.—~~

~~{Tyres of tyre class C2 and C3 shall be warmed up according to the following procedure:~~

- ~~• Warm up the tyre during 2 hours according to UN Regulation No. 117.~~
- ~~• The ambient temperature should be higher than 0⁰ C.~~
- ~~• The chosen vehicle speed range should be between 25 and 90 km/h.~~
- ~~• The average speed should be around 45 km/h.~~
- ~~• The vehicle should be run with an axle load between 60% and 90%.}~~

Insert a new paragraph Annex 3, 1.5.7., to read:

“1.5.7. **Lift axle(s)**

If the vehicle is equipped with lift axle(s), the lift axle(s) shall be fully lowered such that the tyres shall have contact with the ground during testing.”

Annex 3, Paragraph 2., amend to read:

“2. Test procedure

The test shall be performed at a test speed within the range in accordance with paragraph ~~1.4.2.1.5.2.~~ to this annex, at least once

Annex 3, Paragraph 2.1., amend to read:

“2.1. Before inflating the vehicle's tyres, leave the vehicle stationary outside at ambient temperature with the engine off shaded from direct sunlight and not exposed to wind or other heating or chilling influences for at least one hour **for vehicles of category M₁ and N₁ and at least 4 hours for vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄.** Inflate the vehicle's tyres to the vehicle manufacturer's recommended cold inflation pressure (P_{rec}), in accordance with the vehicle manufacturer's recommendation for the speed and load conditions,

and tyre positions. All pressure measurements shall be carried out using the same test equipment.”

Annex 3, Paragraph 2.4., amend to read:

“2.4. Learning/ Tyre warming phase.

Annex 3, Paragraph 2.4.1., amend to read:

“2.4.1. **For vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, drive the vehicle for a minimum of 20 minutes within the speed range in paragraph 1.5.2. to this annex, and with an average speed of 80 km/h (±10 km/h). It is allowed to be outside the speed range for a maximum cumulative time of two minutes during this phase.**

For vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄, drive the vehicle for a minimum of 120 minutes within the speed range in paragraph 1.5.2. to this annex, and with an average speed of 57 km/h (±10 km/h). It is allowed to be outside the speed range for a maximum cumulative time of two minutes during this phase.

~~Drive the vehicle for a minimum of twenty minutes within the speed range in paragraph 1.4.2. to this annex, and with an average speed of eighty km/h (±10 km/h) for M₁ vehicles of mass up to 3,500 kg and N₁ vehicles, [and fifty-seven km/h (±10 km/h) for M₂, M₃, N₂, N₃, O₃ and O₄ vehicles]. It is allowed to be outside the speed range for a maximum cumulative time of two minutes during the learning phase.”~~

Annex 3, Paragraph 2.5.1., amend to read:

“2.5.1. Procedure for the puncture test to verify the requirements of paragraph 5.2. to this Regulation.

Following the requirements specified in 5.1.5, deflate one of the vehicle's tyres within five minutes of measuring the warm pressure as described in paragraph 2.4.3. above, until it is at P_{warm} -20 per cent, or it is at a minimum pressure

of 150 kPa for **vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁**, fitted with tyres of tyre class C1

or

of {220} kPa for **vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁**, fitted with tyres of tyre class C2,

whichever is higher, namely P_{test} . Following a stabilisation period of between two and five minutes the pressure P_{test} shall be rechecked and adjusted if necessary.”

Annex 3, Paragraph 2.5.2., amend to read:

“2.5.2. Procedure for the diffusion test to verify the requirements of paragraph 5.3. to this Regulation.

For vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, fitted with tyres of tyre class C1 deflate ~~Deflate~~ all tyres within five minutes of measuring the warm pressure as described in paragraph 2.4.3. above, until the deflated tyres are at P_{warm} - 20 per cent plus a further deflation of 7 kPa, namely P_{test} **or it is at a minimum pressure of 150 kPa.** Following a

stabilisation period of between two and five minutes the pressure P_{test} shall be rechecked and adjusted if necessary.

For vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, fitted with tyres of tyre class C2 deflate all tyres within five minutes of measuring the warm pressure as described in paragraph 2.4.3. above, until the deflated tyres are at $P_{\text{warm}} - 20$ per cent plus a further deflation of 7 kPa, namely P_{test} or it is at a minimum pressure of 220 kPa. Following a stabilisation period of between two and five minutes the pressure P_{test} shall be rechecked and adjusted if necessary.

For vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄ deflate all tyres within 15 minutes of measuring the warm pressure as described in paragraph 2.4.3. above, until the deflated tyres are at $P_{\text{warm}} - 20$ per cent plus a further deflation of 7 kPa, namely P_{test} . Following a stabilisation period of between 5 and 10 minutes the pressure P_{test} shall be rechecked and adjusted if necessary.

Annex 3, Paragraph 2.7.2., amend to read:

“2.7.2. For vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄

If the low tyre pressure tell-tale illuminated during the procedure in paragraph 2.6. above, deactivate the ignition locking system to the "Off" or "Lock" position. After a five minutes period, reactivate the vehicle's ignition locking system to the "On" ("Run") position. The tell-tale must illuminate within {ten minutes} and remain illuminated as long as the ignition locking system is in the "On" ("Run") position.”

Annex 3, Paragraph 3.6., amend to read:

“3.6. For vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄

If the TPMS malfunction indicator is illuminated or illuminates during the procedure in paragraphs 3.1. to 3.3. above, deactivate the ignition locking system to the "Off" or "Lock" position. After five minutes, reactivate the vehicle's ignition locking system to the "On" ("Run") position. The TPMS malfunction indicator shall again signal a malfunction within {ten minutes} and remain illuminated as long as the ignition locking system is in the "On" ("Run") position.”

Annex 4, Paragraph 1.3.2., amend to read:

“1.3.2.

In case of vehicles of category ~~O3~~ O₃ and ~~O4~~ O₄, electric and pneumatic supply shall be provided.”

Annex 4, Paragraph 2.3., amend to read:

“2.3.

Within 2 **minutes** ~~min~~

Within 8 **minutes** ~~min~~”

Annex 5., amend to read:

~~Annex 5~~

~~Compatibility between towing vehicles and trailers with respect to ISO 11992 data communication~~

~~...~~"

Contents, Annexes, 5, amend to read:

~~5—Compatibility between towing vehicles and trailers with respect to ISO 11992 data communication—21~~

II. Justification

1. The current amendments are submitted with the aim to introduce the TPMS requirements in Regulation (EU) 2019/2144 following the requirements in UN Regulation No. 141.

2. Certain points, merely dealing with performance values, were drafted within square brackets [] throughout **ECE/TRANS/WP.29/GRBP/2020/20**. These values needed validation by the validation test program planned in a relevant European Commission study. In July 2020 this test program was conducted and the results are presented in an informal document during the 72nd session of GRBP (**GRBP-72-20**).

Based on the results of the test program

- a) the square brackets in the following paragraphs have been removed:
 - *Paragraph 2.13.*
 - *Paragraph 5.1.3.*
 - *Paragraph 5.2.2.*
 - *Paragraph 5.2.3.*
 - *Paragraph 5.3.2.*
 - *Paragraph 5.3.3.*
 - *Paragraph 5.5.2.*
 - *Paragraph 5.5.5.*
 - *Annex 3, Paragraph 1.5.2.*
 - *Annex 3, Paragraph 2.5.1.*
 - *Annex 3, Paragraph 2.7.2.*
 - *Annex 3, Paragraph 3.6.*
- b) the vehicle speed of 25 km/h was increased to 30 km/h in the following paragraphs:
 - *Paragraph 2.13.*
 - *Paragraph 5.1.3.*
 - *Annex 3, Paragraph 1.5.2*
- c) the following paragraphs were split or introduced to adjust them to the need of the different vehicle categories:
 - *Paragraph 2.13. was split to distinguish the need to define two different vehicle speeds, depending on the vehicle category*
 - *Paragraph 5.3.3. was split and is now only covering vehicles of category M₂, M₃, N₂ and N₃*
 - *Paragraph 5.3.4. was introduced to cover vehicles of category O₃ and O₄*
 - *The original paragraph 5.3.4. was renumbered to 5.3.5.*

- *Annex 3, Paragraph 2.4.1.* was rewritten and split into two parts, one for vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, and one for vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄.
 - *Annex 3, Paragraph 2.5.2.* was rewritten and split into three parts:
 - 1) for vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, fitted with tyres of tyre class C1
 - 2) for vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, fitted with tyres of tyre class C2
 - 3) for vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄.
- d) the warming-up procedure was fine-tuned by
- removing this part from *Annex 3, Paragraph 1.5.6.* and adding the revised wordings to *Annex 3, Paragraph 2.4.* (Learning/ Tyre warming phase) and to *Annex 3, Paragraph 2.4.1.*
 - *Annex 3, Paragraph 2.4.1.* was split into two parts, one for vehicles of category M₁ up to a maximum mass of 3,500 kg and N₁, and one for vehicles of category M₂, M₃, N₂, N₃, O₃ and O₄. (see also 2. c))
- e) the question about how to handle vehicles with lift axle(s) was solved by adding the requirement noted in *Paragraph 1.5.7. to Annex 3.*
- f) the leaving of vehicle of category M₂, M₃, N₂, N₃, O₃ and O₄ in stationary conditions for at least 4 hours before inflating the vehicle's tyres was added to *Annex 3, Paragraph 2.1.*
3. Square brackets regarding references to UN Regulation No. 10 were deleted in *Paragraph 5.1.2. (a) and Paragraph 5.1.2. (b).* The correct reference to 06 series was given in *Paragraph 5.1.2. (b).*
4. For clarification and better understanding, words were deleted and/ or added on advice of the English speaking experts of TF TPMSTI to the following paragraphs:
- *Paragraph 5.1.1.1.*
 - *Paragraph 5.1.1.2.*
 - *Paragraph 5.5.2.*
 - *Annex 3, Paragraph 1.5.1.*
 - *Annex 3, Paragraph 2.5.1.*
5. For clarification and better understanding, the last sentence of *Annex3, Paragraph 1.5.1.* was decoupled from the previous chapter and stands now alone and for itself.
6. Spelling mistakes were corrected in
- *Annex 1, Paragraph 9.1.*
 - *Annex 4, Paragraph 1.3.2.*
 - *Annex 4, Paragraph 2.3.*
- and*
- *Annex 1, paragraph 9.1.: Square brackets were removed*
7. Transitional provisions
- a) The introduced dates for the Transitional provisions in *Paragraph 12.2., Paragraph 12.3., and Paragraph 12.4.* are in line with the application dates of TPMS requirements in Regulation (EU) 2019/2144. The square brackets have been deleted.
 - b) The change of the wording for the Transitional provisions in *Paragraph 12.7.* from “shall not refuse to grant” to “may grant” is in accordance with Article 12, paragraph 4, of the 1958 Agreement, Rev. 3 (document: *E/ECE/TRANS/505/Rev.3*) and was a compromise, the Task Force TPMSTI made, to avoid the deletion of the complete *Paragraph 12.7.* The compromise was supported by the experts of the participating

Contracting Parties European Commission, Finland, Germany, Japan and The Netherlands.

8. *Paragraph 5.6. and Annex 5 (Communication Interface)*
- a) The intent of *Paragraph 5.6.* and of *Annex 5* is to propose options for implementation of the truck-trailer interface which shall be used to communicate TPMS information from the trailer to the truck (or vice versa). Interface requirements should include but not be limited to existing interfaces, e.g. ISO 11992 braking electric control line (wired interface), in order to ensure compatibility at the truck-to-trailer communication interface.
 - b) To give GRBP the possibility to adopt **ECE/TRANS/WP.29/GRBP/2020/20**, the square brackets for *Paragraph 5.6.* were deleted. In addition *Annex 5* was also deleted.
 - c) In the meantime a small sub-working group of TF TPMSTI is taking up its work on the ‘Communication Interface’ issue to update *Paragraph 5.6.* and to draft *Annex 5.*. This sub-group should have started its work earlier, but due to the COVID-19 situation this was not possible. The aim of this small sub-group is to finalize its work in about 6 to 7 weeks.
9. **References were corrected in**
- *Paragraph 5.1.6.*
 - *Annex 3, Paragraph 2.*
-