

United Nations

ECE/TRANS/WP.29/2024/154

**Economic and Social Council**Distr.: General  
2 September 2024

Original: English

**Economic Commission for Europe**

Inland Transport Committee

**World Forum for Harmonization of  
Vehicle Regulations****194th session**

Geneva, 12–15 November 2024

Item 4.12.3 of the provisional agenda

**1958 Agreement:****Consideration of proposals for new UN Regulations  
submitted**

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**by the Working Parties subsidiary to the World Forum****Proposal for a new UN Regulation on uniform provisions for the approval of Acceleration Control for Pedal Error (ACPE)****Submitted by the Working Party on Automated/Autonomous and Connected Vehicles\***

The text reproduced below was adopted by the Working Party on Working Party on Automated/Autonomous and Connected Vehicles (GRVA) at its nineteenth session (ECE/TRANS/WP.29/GRVA/19, para. 58, based on ECE/TRANS/WP.29/GRVA/2024/24 (as amended by informal document GRVA-19-29). It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) for consideration at their November 2024 sessions.

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\* In accordance with the programme of work of the Inland Transport Committee for 2024 as outlined in proposed programme budget for 2024 (A/78/6 (Sect. 20), table 20.5), 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.

**Economic Commission for Europe****Inland Transport Committee****World Forum for Harmonization of  
Vehicle Regulations****196th session**

Geneva, 24–27 June 2025

Item 4.7.1 of the provisional agenda

**1958 Agreement:****Consideration of draft amendments to existing  
UN Regulations submitted by GRVA****Proposal for a new 01 series  
of amendments to UN****Economic and Social Council**Distr.: General  
4 April 2025

Original: English

**Regulation No. [175] (ACPE)****Submitted by the Working Party on Automated/Autonomous and Connected Vehicles \***

The text reproduced below was adopted by the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) at its twenty-first session (ECE/TRANS/WP.29/GRVA/21, para. 98). It is based on ECE/TRANS/WP.29/GRVA/2025/17 as amended by informal document GRVA-21-33. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) for consideration at their June 2025 sessions.

\* In accordance with the programme of work of the Inland Transport Committee for 2025 as outlined in proposed programme budget for 2025 (A/79/6 (Sect. 20), table 20.6), 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.

**UN Regulation No. [17X]****Uniform provisions concerning the approval of motor vehicles with regard to the Acceleration Control for Pedal Error (ACPE)****Contents**

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UNR Text	Explanation	GTR Equivalency
<p><b>0. Introduction</b></p>		<p><b><i>Statement of technical rationale and justification (i.e. Rational)</i></b></p> <p><u>General comments re transposing UN R175:</u></p> <ul style="list-style-type: none"> <li>- References that relate to the administration of type approval should be revised to be certification system neutral, or removed as appropriate.</li> <li>- <b>GTR 8 / UN R140</b> regarding electronic stability control, and proposed GTR on Automated Driving Systems (ADS), <b>ADS-15-04r3</b>, provide good reference documents for GTR formatting, examples of content and already curated text.</li> </ul>
<p>Collisions caused by unintended acceleration resulting from a driver applying the accelerator pedal instead of the brake pedal have been seen to increase in recent years. The issue is particularly prevalent in vehicles with automatic transmission, including electric and hybrid vehicles, and is a more notable occurrence for the elderly. This Regulation provides internationally harmonised technical provisions for Accelerator Control for Pedal Error systems (ACPE), which aim to mitigate the consequences of such incidents.</p>	<p>The first paragraph outlines the challenges that the UN Regulation on ACPE is intended to solve.</p>	<p>To elaborate on the safety issue and prevalence of pedal misapplication on automatic transmission vehicles and with elderly drivers.</p> <p>Include sources of supporting data / statistics that could be referenced.</p> <p>For example, the FR accident data as presented by Industry in ACPE-02-05, slide 10, as applicable.</p>
<p>ACPE limits the effect of an accelerator pedal application by the driver, and therefore it is important that systems only intervene in cases of genuine error. It is challenging to determine from accident data when misapplication of the accelerator pedal has occurred and therefore to define the characteristics of such incidents. Therefore, this initial phase of the Regulation has focused on those scenarios where it is most unambiguous that an error has occurred (i.e. when the vehicle is stationary and there is a clear obstruction present in the driving direction) and is closely aligned to the Japan New Car Assessment Program (JNCAP) protocol already established for assessing such systems.</p>	<p>In the initial phase of the UN Regulation, ACPE is required to activate only when a clear case of accelerator pedal misapplication by the driver is detected during standstill.</p> <p>The 00 series of this Regulation has been aligned with the test protocol established by Japan New Car Assessment Program (JNCAP), which has been evaluating ACPE since 2018.</p>	<p>To update</p> <p>If an “unambiguous” pedal misapplication is detected, then any form of acceleration does not seem appropriate, as this was not the intent of the driver in the first place. Consider discussing ACPE control philosophy, and why the ACPE regulation does not cancel acceleration altogether, nor require brakes to activate.</p>

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UNR Text	Explanation	GTR Equivalency
<p>The ACPE system must also be designed to accommodate any potential conflict with other systems, including Advanced Emergency Braking Systems (AEBS) - as regulated under UN Regulation No.152, whose purpose is to brake the vehicle when an imminent forward collision is detected. AEBS must provide a means for the driver to interrupt the system, for example by kick-down of the accelerator control. ACPE could misinterpret such a kick-down as a pedal confusion, resulting in a conflict between the two systems. This potential regulatory conflict is avoided in this initial phase of the Regulation by only considering the scenario of a stationary subject vehicle.</p>	<p>Because of the simplicity and the potential risk of false reaction of ACPE, the 00 series of this Regulation limits its scope to cases where the vehicle is stationary.</p>	<p>To update, including:</p> <ul style="list-style-type: none"> <li>- the addition of ACPE requirement from a creeping speed.</li> <li>- prioritizing crash avoidance systems between ACPE, AEBS (5.1.4.1.(a)) and automated driving systems (see 5.2.3.1.3.1).</li> </ul>
<p>Some vehicle designs intended for very specific uses may jeopardise the functioning robustness of ACPE, for instance when some necessary equipment or design prevents the fitment of sensors in the required location. An example of such configuration is a vehicle adapted at the rear for wheelchair access. Where justified, and to the extent necessary, the Type Approval Authority may exempt such vehicles from some or all of the requirements, e.g. exemption from compliance with requirements in the rearward direction.</p>	<p>It mentions to allowing exemptions from ACPE requirements for vehicles designed for specific purposes.</p>	<p>Revise to be certification system neutral.</p> <p>Scope and exemptions included in the GTR. Further exemptions addressed nationally, as needed.</p>
<p>Statistics have shown that majority of pedal error incidents occur in M<sub>1</sub> category vehicles, so in the initial phase of the Regulation the development of requirements has focussed on these vehicles. However, incidents are also seen to occur in other categories of vehicle, and the technology as regulated here may also be beneficial for those vehicles. For that reason, it is permitted to approve vehicles other than Category M<sub>1</sub> at a manufacturer's request.</p>	<p>In the 01 series of amendment, Category N1 vehicles were added in the scope. This was based on accidentology. There had been an extensive discussion within the group how to interpret the accidentology, even brought forward to GRVA. While CPs believed that the risk per registered vehicles (mainly the same for N1 und M1 in certain markets) is more relevant, the Industry participants argued that the risk per distance driven is more relevant which is lower for N1 as opposed to M1.</p> <p>This discussion is reflected in ACPE-04-19: "In general, the contracting parties justified the inclusion of the N1 category by basing the accident rate on the number of registered vehicles (rather than the mileage per vehicle category)"</p>	<p>Revise to be certification system neutral.</p>

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UNR Text	Explanation	GTR Equivalency
<p>As ACPE is a driver assistance system, it is appropriate to provide a means of deactivation for those drivers who do not wish to use the system, or for situations where the vehicle is operated in a manner or environment likely to cause improper intervention of ACPE. A novel concept has been introduced in this regulation whereby long-term deactivation is permitted without continuous warning, but the vehicle user must be periodically informed that the system is available and deactivated. This is to reaffirm the choice of the driver or to ensure that other users of the vehicle (for example when it is changes ownership or if it is used by multiple drivers) are made aware of the status of the ACPE.</p>	<p>It mentions to deactivate ACPE. Not only short-term deactivation, but also long-term deactivation is permitted.</p>	<p>To review.</p> <p>One of the long-term deactivation options suppresses a warning tell-tale for several days or powertrain starting sequences (5.2.2.(b)). This does not appear helpful if having multiple drivers, as otherwise expressed in this UNR text.</p>
<p>The accident data shows that pedal misapplication scenarios can vary widely from those which have been included for testing ACPE under this version of the Regulation. Therefore, a second phase <b>was</b> looking to expand the situations where ACPE can provide benefit. These considerations <b>led to</b> requirements and test procedures to address ‘moving-off’ and moving vehicle scenarios (including addressing vehicles which ‘creep’ when the brake control is released), pedestrian scenarios. <b>The situation on potential pedal misapplication in vehicles of Category N1 is ambiguous in some regions, therefore the contracting parties are recommended to carry out an evaluation of the necessity to apply this regulation in their region(s) for this vehicle category.</b></p>	<p>This paragraph was added in the 01 series of amendment.</p> <p>In the 01 series of amendments, It mentions that, in addition to adding pedestrians as targets, pedal misapplication during vehicle creeping (a condition in which the vehicle begins to move slowly when the brake is released) is also covered.</p> <p>The accident data as presented from the UK for instance shows that vehicles had travelled a significant distance before a collision (ACPE-02-10r1, slide 12) and the initial speed as presented by Germany suggests that only roughly a third of accidents with pedal misapplication start from standstill (ACPE-02-02 slide 3)</p>	<p>To update with the new requirement at creeping speed.</p>
<p>Equally, the regulation could be updated in a subsequent phase to accommodate secondary collisions and higher speed, both when technical feasibility is confirmed.</p>	<p>Secondary collisions and pedal misapplication at higher speeds are excluded from the scope of this Regulation due to technical feasibility. However, it is mentioned that these could be applied to this regulation in the future as technology advances, and the problem of the interaction between ACPE and AEBS (pedal misapplication is interpreted by AEBS as an overruling) is solved.</p>	<p>What is the state of ACPE technology today?</p> <ul style="list-style-type: none"> <li>- How many vehicles currently have some form of ACPE installed.</li> <li>- What are the abilities of the best ACPE systems on the market today? E.g. can certain systems intervene in the absence of an obstacle, and do some systems also apply the vehicle brakes?</li> </ul>

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UNR Text	Explanation	GTR Equivalency
<b>1. Scope</b>		
1.1. This UN Regulation applies to the type approval of vehicles of Category M <sub>1</sub> <sup>1</sup> and N <sub>1</sub> equipped with automatic transmission with regard to their Acceleration Control for Pedal Error systems (ACPE).	The application of this regulation to Vehicles of category N1 was added in the 01 series of amendment.  Automatic transmission vehicles have been identified as the main group from the UK data (ACPE-02-10r1, slide 11) and others.	Revise vehicle categories, per 1998 Agreement document S.R.1.  Propose widen scope as with GTR 8 – paragraph 2., and per the Rational paragraph 40.
1.2. At the request of the manufacturer, vehicles of other categories may be approved under this Regulation.	This paragraph was proposed by the UK in the ACPE IWG due to traffic accidents involving London city buses caused by pedal misapplication.	Specific to type approval, to be addressed at the national level as needed.
1.3. Vehicles where installation of means of forward and/or rear detection is incompatible with their <b>intended</b> use may be exempted from the relevant requirements (forward and/or rear direction) of this Regulation, subject to the decision of the Type Approval Authority.	This paragraph clarifies that vehicles for which it is difficult to install sensors detecting obstacles in the forward and/or rearward direction (e.g., small trucks which cannot be equipped with sonar sensors at the rear) may be exempted from the relevant requirements of this Regulation.	Specific to type approval, to be addressed at the national level as needed.
<b>1.4. Completed vehicles which have been built on a base vehicle which did not have the necessary structure to allow the installation of means of forward and/or rear detection may be exempted from the relevant requirements (forward and/or rear direction) of this Regulation, subject to the decision of the Type Approval Authority.</b>	This paragraph was added in the 01 series of amendment to clarify that completed vehicles on which sensors detecting obstacles in the forward and/or rearward direction cannot be installed may also be exempted from the relevant requirements of this Regulation.	Specific to type approval, to be addressed at the national level as needed.
<b>2. Definitions</b>		
For the purposes of this Regulation:		

<sup>1</sup> As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.6, para. 2 - <https://unece.org/transport/standards/transport/vehicle-regulations-wp29/resolutions>

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UNR Text	Explanation	GTR Equivalency
2.1. "Acceleration Control for Pedal Error (ACPE)" means a system to detect misapplication of the accelerator control by the driver and to control unintended acceleration.	In the definition of ACPE, detecting misapplication of the accelerator control and suppressing unintended acceleration are defined, but bringing the vehicle to a stop by braking control is not defined (not prohibiting the vehicle to a stop by braking control)	
2.2. "Vehicle Type with Regard to its ACPE" means a category of vehicles which do not differ in such essential aspects as:		Specific to type approval (only referenced in section 3), to be addressed at the national level as needed.
(a) Vehicle features which significantly influence the performances of ACPE;		
(b) The type and design of ACPE.		
2.3. "Common space" means an area on which two or more information functions (e.g. symbol) may be displayed but not simultaneously.	This definition is used in the other UN regulations (for example, UN R152 Advanced Emergency Braking System (AEBS) for M1 and N1 vehicles), and it has been quoted in this regulation.	Propose align with definition in UN R140 / GTR 8 <i>"Common space" means an area on which more than one tell-tale, indicator, identification symbol, or other message may be displayed but not simultaneously.</i>
2.4. "Dry road affording good adhesion" means a road with a sufficient nominal Peak Braking Coefficient (PBC) that would permit:	This definition is used in UN R131 Advanced Emergency Braking System (AEBS) for M2, M3, N2, and N3 vehicles, and it has been quoted in this regulation.	Suggest curated text and definitions from UN R140 / GTR 8.
(a) A mean fully developed deceleration of at least 9 m/s <sup>2</sup> ; or		
(b) The design maximum deceleration of the relevant vehicle;		
whichever is lower.		
2.5. "Sufficient nominal Peak Braking Coefficient (PBC)" means a road surface friction coefficient of:	This definition is used in UN R131 Advanced Emergency Braking System (AEBS) for M2, M3, N2, and N3 vehicles, and it has been quoted in this regulation.	To review. Suggest text and definitions from UN R140 / GTR 8.
(a) 0.9, when measured using the American Society for Testing and Materials (ASTM) of E1136-19 standard reference test tyre in accordance with ASTM Method E1337-19 at a speed of 40 mph;		To review as this standard reference tire is no longer available for testing or enforcement.

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UNR Text	Explanation	GTR Equivalency
(b) 1.017, when measured using either:		
(i) The American Society for Testing and Materials (ASTM) of F2493-20 standard reference test tyre in accordance with ASTM Method E1337-19 at a speed of 40 mph; or		
(ii) The k-test method specified in Appendix 2 to Annex 6 of UN Regulation No. 13-H.		
(c) The required value to permit the design maximum deceleration of the relevant vehicle, when measured using the k-test method in Appendix 2 to Annex 13 of UN Regulation No. 13.		
2.6. "Self-check" means an integrated function that checks for a system failure on a continuous basis at least while the system is active.	This definition is used in UN R152 and R131 Advanced Emergency Braking System (AEBS), and it has been quoted in this regulation.	
2.7. "Obstacle" means either a vehicle, or a wall-like structure <b>or a pedestrian.</b>	The objects that ACPE is required to detect include a vehicle, a wall, and a pedestrian. A pedestrian was added in the 01 series of amendment.	To review references to a "wall-like structure". Missing test procedures or performance requirements against a "wall-like structure".
2.8. "Automatic Transmission" means any transmission which does not require the use of a clutch control by the driver in order to shift gears (automatic transmissions include e.g. single gear transmissions, continuously-variable transmissions, transmissions with an automated clutch).	ACPE is intended for vehicles equipped with automatic transmissions, and this paragraph provides the definition of an automatic transmission.	
2.9. "Mass of a vehicle in running order" means the mass of an unladen vehicle with bodywork, including coolant, oils, at least 90 per cent of fuel, 100 per cent of other liquids, driver (75 kg) but except used waters, tools, spare wheel.	This definition is used in UN R152 Advanced Emergency Braking System (AEBS), and it has been quoted in this regulation.	Revise with definition of S.R.1 (also for unladen vehicle). See definition in GTR 8. Note that "Mass in running order" is used in the text of R175.
<b>2.10. "Extreme outer edge" on either side of the vehicle, means the plane parallel to the median longitudinal plane of the vehicle and touching its lateral outer edge, disregarding the projection:</b>	This definition was added in the 01 series of amendment.  The lateral position between the vehicle and a vehicle obstacle is specified in paragraph 5.1.5.(d)(ii). In this provision, a definition of the extreme outer edge of the vehicle is required.	To review. See document S.R.1.

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(a) Of tyres near their point of contact with the ground, and of connections for tyre-pressure gauges;		
(b) Of any anti-skid devices mounted on the wheels;		To review. Are such devices intended to be in scope? Perhaps address at the national level. Or alternate proposed text: “Of any temporary equipment not originally installed by the manufacturer on the completed vehicle, such as wheel-mounted anti-skid devices.”
(c) Of devices for indirect vision;		
(d) Of side direction-indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps, retro-reflectors and side-marker lamps.		
2.11. "Vehicle width" means the distance between the two vertical planes defined in paragraph 2.10	This definition was added in the 01 series of amendment. The lateral position between the vehicle and a pedestrian obstacle is specified in paragraph 5.1.5.(d)(iv). In this provision, a definition of the vehicle width is required.	To review. See document S.R.1.
2.12. "Moving off" means starting from stationary and moving forward or rearward after releasing the brakes	This definition was added in the 01 series of amendment. The 01 series of this regulation covers such situations in which pedal misapplication during not only vehicle stationary but also creeping (a condition in which the vehicle begins to move slowly when the brake is released), therefore the definition of "Moving off" became necessary.	To review. Term does not appear to be used in the regulation.
2.13. "Maximum Creeping Speed" means the maximum steady state speed which the vehicle achieves on a horizontal surface with the powertrain engaged and operating at idle, and no acceleration or brake demand	This definition was added in the 01 series of amendment. When the brake is released from stationary, creeping speed of the vehicle grows up to the steady speed, and the 01 series of this regulation covers up to the steady speed during creeping, therefore the definition of "Maximum Creeping Speed" became necessary.	To review. Is the reference to a vehicle "operating at <b>idle</b> " meant include electric vehicles, and if so, perhaps this needs to be clarified as electric vehicles do not "idle" as does an internal combustion engine.

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<p><b>2.13.1. “Creeping” means the state of motion with the powertrain engaged and operating at idle, and no acceleration or brake demand, up to the Maximum Creeping Speed</b></p>	<p>This definition was added in the 01 series of amendment in order to clarify creeping motion of the vehicle.</p>	<p>To review. Propose the definition of “creeping” include some brake demand. Therefore, the vehicle creeping speed can vary from the initial vehicle motion to the maximum creeping speed depending on any driver braking. For example, in a parking area, a driver may be slowing the vehicle below the “maximum creeping speed” with some light braking. This is suggested in the explanation to 5.1.5. (d)(viii). Also, as with 2.13, does the reference to a vehicle “operating at <b>idle</b>” include electric vehicles?</p>
<p><b>2.14. “Reducing the effective demand of the accelerator control to zero” means where the resulting power/torque demand from the accelerator control is reduced to the equivalent of the driver removing any input into the accelerator control, irrespective of the actual input being given (this is exclusive of power/torque demand not in connection with the relative position of the accelerator control, e.g. rollback prevention, anti-stall).</b></p>	<p>This definition was added in the 01 series of amendment. ACPE performance requirement while creeping is specified in paragraph 5.1.6.2., and the definition of “Reducing the effective demand of the accelerator control to zero” became necessary for the purpose of specifying the performance requirement while creeping.</p>	<p>To review. It is only used once, and therefore could be incorporated in 5.1.6.2.</p>

### 3. Application for approval

- 3.1. The application for approval of a vehicle type with regard to the ACPE shall be submitted by the vehicle manufacturer or by his authorized representative.
- 3.2. It shall be accompanied by the documents mentioned below in triplicate:
- 3.3. A description of the vehicle type with regard to the items mentioned in paragraph 2.2., together with a documentation package which gives access to the basic design of the ACPE and the means by which it is linked to other vehicle systems or by which it directly controls output variables. The numbers and/or symbols identifying the vehicle type shall be specified.
- 3.4. A vehicle representative of the vehicle type to be approved shall be submitted to the Technical Service conducting the approval tests.

### 4. Approval

- 4.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraph 5. below, approval of that vehicle type shall be granted.

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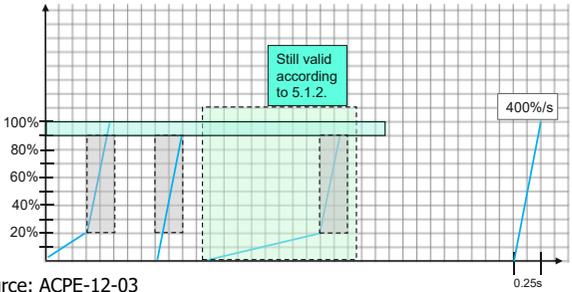
- 4.2. An approval number shall be assigned to each vehicle type approved; its first two digits (00 for the Regulation in its initial form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to the same vehicle type equipped with another type of ACPE, or to another vehicle type.
- 4.3. Notice of approval or of refusal or withdrawal of approval pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in Annex 1 and photographs and/or plans supplied by the applicant being in a format not exceeding A4 (210 x 297 mm), or folded to that format, and on an appropriate scale.
- 4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark conforming to the model described in Annex2, consisting of:
- 4.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval<sup>2</sup>;
- 4.4.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 4.4.1. above.
- 4.5. If the vehicle conforms to a vehicle type approved under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1. above need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.4.1. above.
- 4.6. The approval mark shall be clearly legible and be indelible.
- 4.7. The approval mark shall be placed close to or on the vehicle data plate.

UNR Text	Explanation	GTR Equivalency
<b>5. Specifications</b>		
5.1. Performance Requirements		

<sup>2</sup> distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in The Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6, Annex 3 - <https://unece.org/transport/standards/transport/vehicle-regulations-wp29/resolutions>

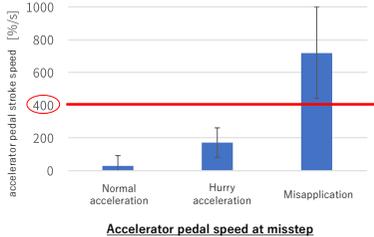
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The following performance requirements shall apply to a vehicle with no trailer coupled, with a mass between maximum mass and mass in running order, and whose powertrain management system is properly operational.	In this paragraph, ACPE performance requirements are specified. The condition of trailer coupling is excluded because the vehicle cannot detect an obstacle to the rear. The detail requirements are prescribed in its sub paragraphs.	To review. Any additional performance requirements such as "...between maximum mass and mass in running order ...” to be added to the test procedures or addressed at the national level. See paragraphs 5.1 & 7. of UN R140 / paragraphs 4. & 5. of GTR 8 for examples of curated text.
5.1.1. The ACPE shall be able to limit unintended acceleration of the vehicle when an accelerator control misapplication by the driver has been detected at least:	In both forward and rearward directions, ACPE is required to detect accelerator control misapplication and to limit unintended acceleration.  Accident data for both front and rear driving directions is available for instance in the FR accident data as presented by Industry in ACPE-02-05, slide 10.	
(a) When an obstacle exists in front of the vehicle when the driving direction is selected to be forward, and		
(b) When an obstacle exists behind the vehicle when the driving direction is selected to be rearwards.		
5.1.2. An accelerator control application <b>resulting in continuous acceleration and</b> having a velocity of at least 400 per cent per second over a travel distance of at least 70 per cent of the total travel distance of the accelerator control, and reaching a maximum position of the accelerator control of at least 90 per cent with that velocity shall be regarded as an accelerator control misapplication in the context of the paragraph 5.1.1.	In this paragraph, the profile of accelerator control application in which is regarded as misapplication is prescribed. Operational speed and maximum position of accelerator control are specified.  	To review. Concern is that the criteria will fail to detect most real-world pedal misapplication events that occur in a parking lot location.  Rational to include details supporting the requirements.

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UNR Text	Explanation	GTR Equivalency								
	<p>The profile of accelerator control application is based on that used in JNCAP test. JNCAP test is based on the research by National Agency for Automotive Safety and Victims' Aid (NASVA). See below figure.</p> <div data-bbox="927 472 1547 940" style="border: 1px solid black; padding: 5px;"> <p><b>(Reference) How to pedal</b> <span style="float: right;"></span></p> <p>Considering the pedal operation of elderly drivers, the lower limit of the standard deviation of the accelerator pedal operation speed (400[%/s]: maximum reached in 0.25 seconds) at the time of the misstep (participant experiment results) shall be used.</p>  <table border="1" data-bbox="1077 647 1451 884"> <caption>Accelerator pedal speed at misstep</caption> <thead> <tr> <th>Condition</th> <th>Accelerator pedal stroke speed [%/s]</th> </tr> </thead> <tbody> <tr> <td>Normal acceleration</td> <td>~50</td> </tr> <tr> <td>Hurry acceleration</td> <td>~150</td> </tr> <tr> <td>Misapplication</td> <td>~700</td> </tr> </tbody> </table> <p>Source: ACPE-01-06 <span style="float: right;">11</span></p> </div> <p>Supplemental information of the experimental test in “ACPE-01-06”.</p> <ul style="list-style-type: none"> <li>• The experimental test was conducted by using the driving simulator.</li> <li>• The vehicle model of the driving simulator was a passenger car.</li> <li>• Data was measured when the experimental participants accelerated normally and rapidly on the road.</li> <li>• The experimental test of the pedal misapplication scenario was conducted while the experimental participants were parking in the parking lot. (Pedal misapplication was simulated by switching the functions of the accelerator and brake pedals using the driving simulator’s software.)</li> </ul>	Condition	Accelerator pedal stroke speed [%/s]	Normal acceleration	~50	Hurry acceleration	~150	Misapplication	~700	
Condition	Accelerator pedal stroke speed [%/s]									
Normal acceleration	~50									
Hurry acceleration	~150									
Misapplication	~700									

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UNR Text	Explanation	GTR Equivalency
	<ul style="list-style-type: none"> <li>Accelerator pedal operations in the three experimental conditions — normal acceleration, rapid acceleration, and pedal misapplication — were compared.</li> <li>Data was collected from ten experimental participants.</li> </ul>	
5.1.3. Notwithstanding paragraph 5.1.2., in the case of systems that implement force-based triggering of the ACPE, an accelerator control force greater than the triggering threshold shall be considered as accelerator control misapplication. The manufacturer shall justify the triggering threshold to the satisfaction of the Type Approval Authority.	This paragraph prescribes that such kind of ACPE system which has force-based triggering threshold is not excluded and the corresponding triggering scheme shall be justified by the manufacturer. To date, force-based triggering is expected to be relevant for city busses of category M3.	To review. To include the performance requirement and test procedures or address nationally.
5.1.4. The ACPE shall control acceleration when the vehicle is accelerated <b>both</b> from standstill <b>and, as relevant, while creeping</b> .	<p>In the 01 series of this regulation, ACPE is required to cover both situations: unintended acceleration from standstill and unintended acceleration while creeping.</p> <p>The accident data as presented from the UK for instance shows that vehicles had travelled a significant distance before a collision (ACPE-02-10r1, slide 12) and the initial speed as presented by Germany suggests that only roughly a third of accidents with pedal misapplication start from standstill (ACPE-02-02 slide 3)</p>	What is the purpose of the words “as relevant”? Delete if not necessary.
<b>5.1.4.1 An ACPE intervention is not required when:</b>	<p>This requirement was added in the 01 series of amendments.</p> <p>To avoid conflict with AEBS, the provision that ACPE intervention is not required when there is an AEBS warning or intervention occurring was added ((a) of the left column).</p> <p>If the accelerator control is initially applied slowly within the range of below 30% of its stroke, and then suddenly applied at a rate exceeding 400% per second (which satisfies the profile specified in paragraph 5.1.2.), the vehicle speed may become higher just as the accelerator input rate exceeds 400% per second. Therefore, an upper speed limit for ACPE intervention was specified (see item (b) in the left column).</p>	To review See items (a) and (b) below.

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UNR Text	Explanation	GTR Equivalency
(a) there is an AEBS warning or intervention occurring; or		To review. AEBS warnings (R152, 5.1.4) also include equipment failure and AEBS deactivation, suggest narrow the scope to specifically reference "... an AEBS forward collision warning or intervention..."
(b) the vehicle speed is greater than 10 km/h.		To review. Why the upper speed limit of 10 km/h? If to avoid conflict with AEBS, this seems covered in (a). Perhaps (b) is redundant / unnecessary. Note, in R152, AEBS must intervene from 20 km/h to a pedestrian or cyclist, and 10 km/h to a vehicle.
5.1.4.2 If ACPE is not ready to perform an intervention 6 s after the initiation of the vehicle powertrain, information of this status shall be indicated to the driver. This information shall exist until the system has been successfully initialised.	This requirement was added in the 01 series of amendments.  In some cases, it could take time until ACPE is ready to perform an intervention. In that case, it is necessary for the driver to recognize the status of the system.  The 6-second duration was determined in consideration of use cases where ACPE may need to operate just as the vehicle starts off. For reference, AEBS uses a 15-second duration.	How is the status indicated to the driver? Are all options available, i.e., any haptic, acoustic, or optical signal? Or is it through the yellow failure warning signal (5.4.3.), by way of 5.3.1. for the Failure detection / self-check requirement.
5.1.5. The ACPE shall limit vehicle acceleration in order to prevent or mitigate a collision with an obstacle located not more than 1.5 m in front of or behind the vehicle, in the vehicle path, at the time the triggering conditions (as outlined in paragraph 5.1.2.) are achieved, provided:	ACPE is required to intervene if an obstacle is located not more than 1.5 m in front of or behind the vehicle at the time the accelerator control is applied according to the profile specified in paragraph 5.1.2.  The distance of 1.5 meters was determined in consideration of the point at which ACPE basically detects an obstacle using sonar sensors, the worst case for sensors.  The detail conditions under which ACPE has to fulfil the performance requirements are specified in items (a) through (d). In situations that differ from (a) to (d), ACPE does not need	To review. The sub-paragraphs appear to be necessary for type approval. Test procedures are included in Paragraph 6. Under self-certification, vehicles are expected to perform to the minimum performance requirements within the boundaries of the test procedures, as well as function safely in scenarios outside of those boundaries. If a safety issue is identified, a safety recall process is in place to have identified safety issues corrected.

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UNR Text	Explanation	GTR Equivalency
	to fulfil the performance requirements, however it shall not deactivate or switch strategy.  (a) specifies conditions related to the road surface and external environment.	See paragraphs 5.1 & 7. of UN R140 / paragraphs 4. & 5. of GTR 8 for examples of curated text.
(a) Vehicle external influences allow for the required acceleration inhibition, i.e.:		
(i) The road is flat, horizontal and dry affording good adhesion;		
(ii) The weather conditions do not affect the performance of the vehicle (e.g. no storm, not below 0°C);		
(b) The vehicle state itself allows for the required acceleration inhibition, e.g.:	(b) specifies conditions related to the vehicle side, such as tires, brakes, weight, and powertrain.  Note that (b) offers a list of examples, there could be more situations where the vehicle state does not allow for the required acceleration inhibition, while (a), (c) and (d) contain an exhaustive list.	
(i) The tyres are in an appropriate state and properly inflated;		
(ii) The brakes if intended to be used are properly operational (brake temperature, pads condition etc.);		
(iii) There is no severe uneven load distribution;		
(iv) No trailer is coupled to the motor vehicle and the mass of the motor vehicle is between maximum mass and mass in running order conditions;		

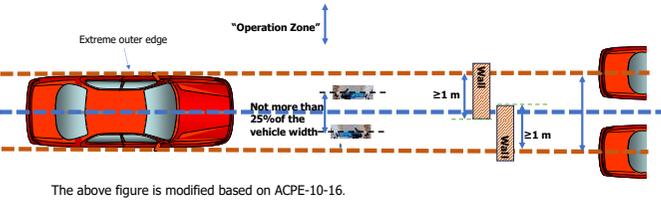
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UNR Text	Explanation	GTR Equivalency
(v) The vehicle's powertrain management system is properly operational		
<b>(vi) If the vehicle is equipped with rear hatches, trunk lids or tailgates, they are closed and latched in the normal conditions of vehicle operation.</b>		
(c) There are no external influences affecting the physical sensing capabilities, i.e.:	(c) specifies conditions related to the external conditions, such as ambient illumination, a vehicle obstacle, weather conditions and overhead obstructions.	
(i) The ambient illumination conditions are at least 1000 Lux and there is no extreme blinding of the sensors (e.g. direct blinding sunlight, highly radar-reflective environment);		
(ii) The target vehicle is not extreme with regard to the Radar Cross Section (RCS) or the shape/silhouette (e.g. below fifth percentile of RCS of all M <sub>1</sub> vehicles)		
(iii) There are no significant weather conditions affecting the sensing capabilities of the vehicle (e.g. heavy rain, dense fog, snow, dirt);		
(iv) There are no overhead obstructions close to the vehicle;		
(d) The situation is unambiguous, i.e.:	(i) to (iv) of item (d) specifies the location between the vehicle and obstacles. (See next slide)  (v) of item (d) specifies the direction of travel.	
(i) The obstacle is stationary, unobstructed, clearly separated from other objects in the driving direction;	(i) to (iv) of item (d) specifies the location between the vehicle and obstacles. (See the below figure)	

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<p>(ii) In the case of a vehicle obstacle, the centre line of the obstacle is located between two vertical longitudinal planes defining the extreme outer edge of the vehicle.</p>	<p><b>"Operation Zone"</b></p>  <p>The above figure is modified based on ACPE-10-16.</p>	
<p>(iii) In the case of a wall obstacle, the overlap between wall and vehicle is at least 1.0 m.</p>		
<p>(iv) In the case of a pedestrian obstacle, the distance between the centre line of the pedestrian obstacle and the centre line of the vehicle is not more than 25 per cent of the vehicle width.</p>		
<p>(v) The direction of travel is straight with no curve, and the vehicle is not turning at an intersection and following its lane.</p>	(v) of item (d) specifies the direction of travel.	
<p>(vi) The obstacle is a vehicle of category M<sub>1</sub>, or a wall like structure with a width of at least 2.0 m and a height of at least 1.0 m or a silhouette of a pedestrian that relates to a human being.</p>	(vi) of item (d) specifies the category of a vehicle and the dimension or silhouette of the obstacles. A child is included in a pedestrian.	
<p>(vii) The obstacle is located at least 1.0m from the vehicle at the time the triggering conditions (as outlined in paragraph 5.1.2.) are achieved;</p>	(vii) of item (d) specifies the distance between the vehicle and the obstacle when application of the accelerator pedal for acceleration is completed (as outlined in paragraph 5.1.2.) . "1.0 m is considered the minimum detectable range for the system to identify obstacles for worst case sensors (camera, RADAR, sonar).	

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<b>(viii) The vehicle is travelling at or below its maximum creeping speed in the forward direction and at or below 4km/h in rearward direction<sup>3</sup>.</b>	(viii) Of item (d) specifies the range of creeping speed that the system shall intervene. Regarding the frontal direction, current majority of the system can detect the obstacle by not only sonar sensors but also camera, on the other hand, regarding the rearward direction, the system can detect the obstacle only by sonar sensors for which it is difficult to detect a pedestrian. Therefore, the range of creeping speed in rearward direction is lower than that in frontal direction.	
<i>Insert a new footnote in paragraph 5.1.5. (d) (viii), to read:</i>		
<sup>3</sup> <b>This condition shall be reviewed by September 2032</b>		
5.1.5.1 When conditions deviate from those listed above, the system shall not deactivate or unreasonably switch the control strategy. This shall be demonstrated by the manufacturer in accordance with Annex 3 of this Regulation and, if deemed justified, may be followed by testing by the Technical Service in conditions deviating from those listed above or those in paragraph 6. The rationale for and the results of this verification testing shall be appended to the test report.	This paragraph is based on UN R152 and R131 (AEBS). The aim is to prevent the system from being designed to operate only under the specific conditions listed in paragraph 5.1.5..	To review. Appears necessary only for type approval.
5.1.6. <b>ACPE performance</b>		
5.1.6.1 <b>Acceleration from standstill,</b>		
In the case that a collision is not prevented, the collision speed shall be no greater than 8 km/h higher than the vehicle speed at the point where the triggering conditions specified in paragraph 5.1.2. are met.	8 km/h was proposed by Industry based on the investigation from JAPAN OEM M1 vehicle, as shown in ACPE-04-10, slide 4.  The statement “the collision speed shall not be greater than 70% of that speed the vehicle would have had in the same position and under the same circumstances but without any ACPE intervention” means that the ACPE shall reduce the vehicle speed by more than 30% compared to the case without	Rational to include the effectiveness / benefit of this performance requirement in mitigating casualties and property damage.

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	ACPE intervention. A speed reduction rate of "more than 30%" is the threshold at which points are awarded to the test vehicle in JNCAP ACPE tests.	
In addition, the collision speed shall not be greater than 70% of that speed the vehicle would have had in the same position and under the same circumstances but without any ACPE intervention.		
5.1.6.1.1 Low power to weight vehicles,		Perhaps misleading title. Should the title and requirement below refer to “ <i>Vehicles with low acceleration performance</i> ”.
In the case of vehicles that do not exceed 8 km/h without ACPE in the test scenarios but for which a speed reduction of 30 per cent cannot be achieved due to a low engine power to test mass ratio, the speed reduction shall be of at least 15 per cent.	Industry raised a concern that some vehicles cannot satisfy a speed reduction of 30% because of weak acceleration performance, as shown in ACPE-08-03, slide 4.  Consequently, this paragraph was added.	To review.  Rational to include the details of ACPE-08-03.  Is the reference to “...due to a low engine power to test mass ratio...” accurate, i.e. aren’t there other factors that can affect acceleration? Or is it due to vehicles with low acceleration performance?  Per slide 6 of ACPE-08-03, would this apply mostly or completely to gas powered vehicles, i.e., should this specifically exclude electric vehicles or electric vehicle with direct drive motors as these can control to a lower creeping speed and lower acceleration to creeping speed?  Review reference to “engine” power, if including electric vehicles.

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UNR Text	Explanation	GTR Equivalency
5.1.6.2. Acceleration while creeping,		
<p><b>In the case a collision is not prevented, the ACPE shall reduce the effective demand of the accelerator control to zero at or before the point of collision.</b></p>	<p>Industry raised a concern that it was not appropriate to specify a quantitative criteria while creeping, because major of vehicles doesn't accelerate significantly at 1.0 m from the point at which the accelerator pedal application is completed without ACPE, as shown in ACPE-11-11, slide 9.</p> <p>Consequently, a quantitative criterion has not been adopted, and "the ACPE shall reduce the effective demand of the accelerator control to zero at or before the point of collision" was adopted.</p>	<p>Why not reduce acceleration demand to zero once ACPE is triggered? Otherwise, a lower performance requirement than from a standstill, and potentially a more severe outcome.</p> <p>Proposed revision: In the case a collision is not prevented, the ACPE shall reduce the [effective demand] of the accelerator control to zero <u>at the point where the triggering conditions specified in paragraph 5.1.2. are met.</u> <del>or before the point of collision.</del></p> <p>"Effective demand": For independent oversight, need to revise this reference as test facilities / governments may not have the capability to see the effective demand of the accelerator.</p>
<p>5.1.7. During any intervention, the vehicle acceleration shall continue to be limited by the ACPE. The intervention <b>may</b> be ended when the obstacle is no longer detected, or the driver has interrupted the function. The Manufacturer shall declare the ACPE continuation conditions to the technical service.</p>	<p>This requirement intends to prevent the ACPE intervention from ending even though the obstacle is still being detected.</p> <p>On the other hand, this paragraph also prescribed the conditions in which ACPE may be ended the intervention.</p>	<p>First sentence, suggest "During any <b>ACPE</b> intervention..." to be clear.</p> <p>To confirm intent: If the driver has interrupted the function, is the requirement that ACPE intervention <i>ends</i>, or <b>may</b> end? Revise sentence as needed.</p> <p>Reference to the "technical service" is for type approval.</p>
<p>5.1.8. The effectiveness of ACPE 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 the 06 or later series of amendments to UN Regulation No. 10.</p>	<p>This requirement was referenced from the other UN regulations (for example, UN R152).</p>	<p>To be addressed in national regulations, as was done for UN 140 (included) and GTR 8 (not included).</p>

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5.1.9. Conformity with the safety aspects of electronic control systems shall be shown by meeting the requirements of Annex 3.	This requirement was referenced from the other UN regulations (for example, UN R152) as the audit of the safety aspects of electronic control systems.	Specific to type approval, to be addressed at the national level as needed.
5.1.10. The ACPE shall inform the driver of its intervention in accordance with paragraph 5.4.2.	ACPE intervention shall be informed to the driver, because it is one of the system which intervenes in case of emergency situation.	
5.1.11. Interruption of ACPE by driver		To review. Helpful for the rational to provide justification and specific instances where an ACPE interruption is needed. Particularly as it seems counterintuitive given the regulation is about accelerator pedal misapplication when there is an obstacle in the way.
5.1.11.1. The ACPE shall provide a means for the driver to interrupt its intervention. This interruption shall be started by any intentional action which indicates that the driver has recognised the situation.	In some situations when ACPE intervenes even though the driver intends to accelerate, the intervention of ACPE shall be interrupted by any intentional action of the driver (for example, continuing to operate the accelerator pedal for more than a certain time).	Consider including accepted method(s) for driver interruption and objective performance requirements.
5.1.11.2. In the case of interruption by maintaining the accelerator control application, there shall be no rapid increase of acceleration.	This requirement prescribes the prevention of rapid acceleration of the vehicle when the intervention of ACPE is interrupted by the driver, because the driver could operate the accelerator pedal with full stroke in order to interrupt unnecessary intervention for the driver.	Include objective criteria to limit this “rapid increase of acceleration”, and how long the accelerator must be maintained depressed (depressed fully?). That said, such a means for interruption does not appear to be appropriate given the regulation is about pedal misapplication. If keeping, the rational to include the reasoning.
5.1.11.3. The fulfilment of these requirements shall be documented and demonstrated by the manufacturer to the Approval Authority during the inspection of the safety concept as part of the assessment to Annex 3.	The methodology of interruption of the intervention is depended on the design philosophy by the vehicle manufacturer, it shall be documented in the assessment of Annex 3.	Specific to type approval, to be addressed at the national level as needed.

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5.1.12. The performance requirements shall be verified using the test procedure as described in section 6.6.1. and 6.6.2.		
5.2. Deactivation		<p>To review.</p> <p>=&gt; Clarify tell-tales. These deactivations are not the result of a system failure.</p> <p>=&gt; Consider including procedures for functionality checks, similar to UN R140 / GTR 8 for “ESC Off” control check.</p>
5.2.1. Short term deactivation		
When a vehicle is equipped with a means to manually deactivate the ACPE, the ACPE shall be automatically reinstated at the initiation of any new engine start (or run cycle, as relevant).	The vehicle may have a means to manually deactivate the ACPE, however, the ACPE shall be automatically reinstated at the initiation of any new engine start (or run cycle, as relevant), because ACPE is a safety device, it is the same concept as the other safety device such as AEBS, ESC.	Consider requirements for the control and its identification for short term deactivation.
This requirement does not apply when a new engine start (or run cycle, as relevant) is performed automatically, e.g., the operation of a stop/start system.		
A deactivation warning shall be given at least at the time of deactivation.		<p>To review.</p> <p>Clarify that the tell-tale warning is maintained “...for as long as the condition exists”. Similar text for “ESC Off” tell-tale in GTR 8-5.6.2.(h) / UN R140-7.6.2.2.</p> <p>Is the intent to allow any optical, haptic or acoustic? Need for further tell-tale specifications? As used for long term deactivation 5.2.2.(a), can it share the yellow failure warning tell-tale in 5.4.3.?</p>

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5.2.2. Long term deactivation		
Notwithstanding paragraph 5.2.1., a vehicle may be equipped with a long term deactivation means to manually deactivate the ACPE, in that case, the system is not required to be reinstated at the initiation of each engine start (or run cycle, as relevant). However, the system shall provide information to the driver by either (a), (b) or (c):	Industry proposed the possibility of a long term deactivation, as shown in ACPE-04-06, slide 4. The proposal was agreed on the condition that the driver is informed.	
(a) A constant optical warning signal shall inform the driver that the ACPE has been deactivated. The yellow warning signal specified in paragraph 5.4.3. may be used for this purpose;	The requirement (a) is most understandable for the driver that the ACPE is deactivated, as it continuously indicates that the ACPE is deactivated.	To review.  Clarify that the warning signal is maintained for as long as the condition persists. A “constant” signal can mean it extinguishes after xx seconds. Same comment wherever the word “constant” is used.  Consider including specifications, otherwise it can be anything optical (if the yellow signal in 5.4.3. is not used).  Consider referencing “tell-tale” throughout, as opposed to “signal”, consistent with text of UN R121 for controls, tell-tales and indicators.
(b) The driver shall be periodically informed that the ACPE has been deactivated. In this case this information shall be given for a minimum of 10 seconds or until driver confirmation.	However, the driver could find continuous information annoying. Then the requirement (b) or (c) also became options.  The requirement (b) is the method in which the driver is informed periodically.	
This information shall be given at least either every 7 days or every 10 engine starts (or run cycles, as relevant), not counting when a new engine start (or run cycle, as relevant) is performed automatically, e.g. the operation of a stop/start system. This information shall be distinct from the failure warning signal specified in paragraph 5.4.3.;		To review.  What is the rational for potentially suppressing information from other drivers of the same vehicle that may not be aware?  Re “...every 7 days or every 10 engine starts...”, propose adding “... <i>whichever occurs first</i> ...”. Reason: If the driver is on an extended vacation,

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		<p>may not get a supplemental warning after an extended period of time, and completely forget about ACPE having been deactivated.</p> <p>Consider including specifications for the warning signal, otherwise it can be anything optical, haptic or acoustic (but distinct from the optical signal in 5.4.3., although distinct is not defined).</p>
or		
<p>(c) If deactivation is only for one direction of operation (forward or rearwards), as an alternative to (a) or (b), a constant optical warning shall be given when the corresponding driving direction is selected for first time following each initiation of the powertrain. The warning shall remain at least until the driving direction is changed.</p>	<p>The requirement (c) is the method in which the driver is continuously informed only while the corresponding driving direction (for example, rearward direction) is selected.</p>	<p>To review.</p> <p>Consider including (<i>if in fact the intent</i>) that the warning may be the same as the failure warning signal from paragraph 5.4.3., similar to 5.2.2.(a) above.</p> <p>Consider specifications be included, otherwise it can also be anything optical. E.g., could be the same warning as in (b), if (b) is optical.</p>
<p>The long-term deactivation process shall be designed in such a way that deactivation shall not be possible with less than two deliberate actions.</p>	<p>To prevent entering the long-term deactivation process unintentionally, at least 2 deliberate actions are necessary.</p>	<p>Consider requirements for the deliberate actions for long-term deactivation.</p>
5.2.3. Automatic deactivation		
<p>5.2.3.1. When the vehicle is equipped with a means to automatically deactivate the ACPE, for instance in situations such as carrying a bicycle rack or towing a trailer, the following conditions shall apply as appropriate:</p>	<p>Automatic deactivation was proposed by Industry based on a concept from R152 and R131.</p>	<p>To review.</p> <p>How is this different from 5.3.3.? Similar to 5.3.3, it seems that automatic deactivation occurs when the system is unable to meet the requirements of the Regulation.</p>

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5.2.3.1.1. The vehicle manufacturer shall provide a list of situations and corresponding criteria where the ACPE is automatically deactivated to the technical service at the time of type-approval and it shall be annexed to the test report.	Because the detail situations and corresponding criteria of automatic deactivation are depending on the design concept of the vehicle manufacturer, they shall be listed and provided to the technical service and annexed to the test report.	To review. If keeping, revise text similar to GTR 8-ESC para. 5.7, requiring providing information "... to the regulatory entity designated by the Contracting Party, upon request, ..."
5.2.3.1.2. The ACPE shall be automatically reactivated as soon as the conditions that led to the automatic deactivation are not present anymore.	This paragraph is the requirement of automatic reactivation of the ACPE from automatic deactivation.	
5.2.3.1.3. A deactivation warning shall be given at least at the time of deactivation unless a failure warning is given as per paragraph 5.3.3.	A failure warning is prioritized over a deactivation warning.	To review.  This seems to contradict 5.3.3. for failure warning, which prioritizes a deactivation warning over a failure warning. Clarify warning priorities and discuss in the Rational.  Also, consider including specifications for the <u>deactivation warning</u> tell-tale, otherwise it can be anything optical, haptic or acoustic. E.g., it could share the warning in 5.2.2.(b), or the optical failure warning signal in 5.4.3. as with similar to 5.2.2.(a)?  Further guidance to ensure consistent oversight and enforcement.  If a distinct automatic deactivation warning is provided, consider requiring the tell-tale remains activated even if there is a failure warning given per 5.3.3.

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UNR Text	Explanation	GTR Equivalency
5.2.3.1.3.1. While an Automated Driving System is in control of the vehicle (e.g. ALKS), the ACPE may be suspended or its control strategies adapted without indication to the driver, as long as the risks associated with a pedal misapplication remain mitigated to the same degree as provided by ACPE. The suspension of the ACPE or the adapted control strategies shall be documented and demonstrated by the manufacturer to the Approval Authority during the inspection of the safety concept as part of the assessment to Annex 3.	This paragraph prescribe that if a vehicle has an Automated Driving System and while it is in control of the vehicle, ACPE may be suppressed as long as the system has the same function which capable to mitigate the risk of a pedal misapplication.	To review. Scenarios that would reduce the safety performance of ACPE are addressed separately under self-certification, whereby vehicles must achieve the minimum performance requirements within the boundaries of the test procedures, as well as function safely in scenarios that deviate from the test procedures. If a safety issue is identified, a safety recall process is in place to have the safety issue corrected.
5.3. Failure detection / self-check		To review. Consider including tell-tale functionality checks in the procedure, similar to UN R140-ESC (9.10) malfunction detection, and GTR 8 & FMVSS 126 (7.10).
5.3.1. A failure warning shall be given to the driver when there is a failure in the ACPE that prevents the requirements of this Regulation being met. The warning shall be as specified in paragraph 5.4.3.	This requirement is the same as the other safety systems such as AEBS (UN R152 and R131).	
5.3.1.1. It is not required to provide the driver with a failure warning signal to indicate that the ACPE is temporarily not available, for example due to inclement weather conditions.	This provision was proposed by the UK (ACPE-04-05), and agreed in the ACPE IWG.	“temporarily”, subjective and not enforceable. Consider objective requirements. How does this compare to sensor blindness in 5.3.3. which could also be temporary?
5.3.2. There shall not be an appreciable time interval between each ACPE self-check, and subsequently there shall not be a delay in illuminating the warning signal, in the case of an electrically detectable failure. However, if the vehicle speed is greater than 10 km/h at the time a failure is detected, the warning signal may be suppressed until the next time the vehicle speed is below 10 km/h.	Basically, this requirement is the same as the other systems such as AEBS (UN R152 and R131). However, ACPE is not required to intervene when the vehicle speed is greater than 10 km/h; therefore, the warning signal may be suppressed until the next time the vehicle speed falls below 10 km/h.	“appreciable” is subjective and not enforceable. Per the definition, “2.6 self-check” means an integrated function that checks for a system failure on a continuous basis at least while the system is active. Consider rewording to be more objective. Rational should include why the warning signal suppression is acceptable if this occurs above 10 km/h, given the failure of a safety system.

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UNR Text	Explanation	GTR Equivalency
5.3.3. A failure warning shall also be given to the driver in the case of a detected non-electrical failure condition (e.g. sensor blindness or sensor misalignment) unless a deactivation warning is given as per paragraph 5.2.3.1.3.	This requirement is the same as the other safety system such as AEBS (UN R152).	Review with 5.2.3.1.3.
5.4. Warning signals		Consider adding functionality checks in the test procedure.
5.4.1. General		
5.4.1.1. The optical warning signals shall be visible even by daylight; the satisfactory condition of the signals must be easily verifiable by the driver from the driver's seat.	This requirement is the same as the other safety systems such as AEBS (UN R152 and R131).	To review for more specificity. E.g. GTR 8 paragraphs 5.4 & 5.6.2.
5.4.1.2. Each ACPE optical warning signal shall be activated either when the engine start (or run, as relevant) switch is turned to the "on" (run) position or when the engine start (or run, as relevant) switch is in a position between the "on" (run) and "start" position that is designated by the manufacturer as a check position (initial system (power-on)). This requirement does not apply to warning signals shown in a common space.	This requirement is the same as the other safety systems such as AEBS (UN R152 and R131).	Throughout, and where appropriate, references to "engine" should be revised to "powertrain" in order to include electric motors.
5.4.2. Intervention warning signal		
An intervention warning shall be given by an optical signal. In addition, a haptic or acoustic signal shall be provided to the driver, unless such a signal is already being provided by another vehicle system comprising an object detection capability (e.g. parking distance warning).	Basically, the requirement of providing two-mode warning is the same as that for other safety systems such as AEBS (UN R152 and R131). In the case of ACPE, an optical signal is mandatory, whereas for AEBS, the manufacturer can choose at least one mode from acoustic, haptic, or optical.	To review. Consider adding specifications for the required haptic or acoustic signal.
The optical warning signal may be the flashing of the failure warning signal.		

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UNR Text	Explanation	GTR Equivalency
A description of the warning indication presented to the driver shall be provided by the vehicle manufacturer at the time of type-approval and recorded in the test report.		To revise. If keeping, revise text similar to GTR 8-ESC para. 5.7, requiring providing information "... to the regulatory entity designated by the Contracting Party, upon request, ..."
5.4.3. Failure warning signal		
The failure warning shall be given by a constant yellow optical signal.	Providing a constant yellow optical signal as the failure warning signal is the same as the other safety systems such as AEBS (UN R152 and R131).	To review. A "constant" signal can mean it extinguishes after xx seconds. Propose revising to read that the signal be given "... for as long as the condition exists."
5.5. Provisions for the Periodic Technical Inspection		To review. This section is for type approval.
5.5.1. At a Periodic Technical Inspection, it shall be possible to confirm the correct operational status of the ACPE by a visible observation of the failure warning signal status. Following a "power-ON" and any bulb check, the failure warning signal shall remain illuminated if any failure was present at the end of the previous engine start (or run, as relevant) cycle, unless this failure is detected to be no longer present.	This requirement is the same as the other safety systems such as AEBS (UN R152 and R131).	To review. Consider bulb check and all warning signal checks to be included in the test procedures to verify required operation.
In the case of the failure warning signal being in a common space, the common space must be observed to be functional prior to the failure warning signal status check.		
5.5.2. At the time of type approval, the means to protect against simple unauthorised modification of the operation of the failure warning signal chosen by the manufacturer shall be confidentially outlined.	This requirement is the same as the other safety systems such as AEBS (UN R152 and R131).	
Alternatively, this protection requirement is fulfilled when a secondary means of checking the correct operational status of the ACPE is available.		

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UNR Text	Explanation	GTR Equivalency
<b>6. Test procedure</b>		
6.1. Test surface and environment conditions	These provisions are aligned to the other safety systems such as AEBS (UN R152 and R131).	
6.1.1. The test shall be performed on a flat, dry, concrete or asphalt road affording good adhesion.		To review. Suggest curated text and definitions from UN R140 / GTR 8.
6.1.2. The test surface has a consistent slope between level and 1 per cent.		
6.1.3. The ambient temperature shall be between 0°C and 45°C.		
6.1.4. The horizontal visibility range shall allow the target to be observed throughout the test.		To review. Consider objective requirements.
6.1.5. The tests shall be performed when there is no wind liable to affect the results.		To review. Suggest from UN R140 / GTR 8: The maximum wind speed is no greater than 10 m/s
6.1.6. Natural ambient illumination must be homogeneous in the test area and in excess of 1000 lux. It should be ensured that testing is not performed whilst driving towards, or away from the sun at a low angle.	Natural ambient illumination in excess of 1000 lux is aligned to the case of car to car scenario in the AEBS regulations (UN R152 and R131).	To review. Propose replace 2 <sup>nd</sup> sentence with objective criteria from FMVSS 127, S6.1.3.(2) <i>Testing is not performed while driving toward or away from the sun such that the horizontal angle between the sun and a vertical plane containing the centerline of the subject vehicle is less than 25 degrees and the solar elevation angle is less than 15 degrees.</i>

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UNR Text	Explanation	GTR Equivalency
6.1.7. At the request of the manufacturer and with the agreement of the Technical Service tests may be conducted under deviating test conditions (suboptimal conditions, e.g. on a not dry surface; below the specified minimum ambient temperature), whilst the performance requirements are still to be met.	This provision is aligned to the other safety systems such as AEBS (UN R152 and R131).	To review. This is specific to the administration of type approval.
6.2. Instrumentation		
6.2.1. The speed of the vehicle shall be measured with an accuracy of +/- 0.1 km/h.	These provisions are based on the specifications of the measurement devices used in the JNCAP ACPE test.	
6.2.2. The position of the vehicle shall be measured with an accuracy of +/- 0.03 m.		
6.2.3. The accelerator control force (if applicable) shall be measured with an accuracy of +/- 1 N.		To review.
6.2.4. The accelerator control position shall be measured with an accuracy of +/- 1%. Alternatively, at the choice of the manufacturer. this measurement may be taken from the vehicle's own position sensor.	This provision was proposed by the UK (ACPE-07-03), and agreed in ACPE IWG.	To review. The reference to measurement at the "choice of the manufacturer" is specific to type approval, should be addressed at the national level as needed.
6.2.5. Measurements shall be recorded at a frequency of at least 100 Hz.	This provision is based on the specification of the measurement devices used in the JNCAP ACPE test.	

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UNR Text	Explanation	GTR Equivalency
6.3. Test Vehicle		
6.3.1. Pre-Test Conditioning		
If requested by the vehicle manufacturer:	This provision is aligned to the other safety systems such as AEBS (UN R152 and R131).	To review. Require specific procedure for pre-conditioning and system initialization to ensure consistent vehicle preparation for testing and fair oversight. => For example, include details regarding tyre inflation pressure, as provided in R140-8.3.3. & 9.1. / GTR8-6.3.3. & 7.1.
(a) The vehicle can be driven a maximum of 100 km on a mixture of urban and rural roads with other traffic and roadside furniture to initialise the sensor system.		To review. For purpose of initialisation, why the need for an option to travel such a great distance? Noting per 5.1.4.2., the system should be functional 6 seconds after initiation of powertrain. Propose the system must be initialized within a shorter time / distance maximum distance, to ensure consistent oversight. E.g., from FMVSS 127 - S6.3.14. "...vehicle driven at 10 km/h or higher for at least one minute prior to testing, and subsequently the starting system is not cycled off prior to testing."
(b) The vehicle can undergo a sequence of brake activations in order to ensure the service brake system is bedded in prior to the test.		To review. ACPE regulation does not require use of vehicle brakes (but does not prohibit it either). Is bedding necessary? If so, perhaps suggest procedure in UN R140-9.4 & GTR 8-7.4 for ESC.
Details of the pre-test condition strategy requested by the vehicle manufacturer shall be identified and recorded in the vehicle type approval documentation.		To review. Text is specific to type approval, to be addressed at the national level as needed.

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UNR Text	Explanation	GTR Equivalency
6.3.2. Prior to any testing, it shall be ensured that the ACPE is switched on and ready to function.		
<b>During the conduct of the test the technical service need to ensure that the boundary conditions of the ACPE - as defined by the manufacturer - with regard to the detection of the test target are taken into account (e.g. avoid blocking of a sonar system used, ensure that a vision system used can properly identify the pedestrian test target used as a human by making it fully visible to the camera system before testing, etc.)</b>	This provision was added in the 01 series of amendment. This provision was proposed by industry to ensure the detection of the test target especially the pedestrian target before accelerator pedal application in the test.	To review. Text is specific to type approval, to be addressed at the national level as needed.
6.3.3. Test mass		
The vehicle shall be tested:	Condition (a) is aligned to AEBS (UN R152). For ACPE, it is considered that the minimum mass is the most severe condition. On the other hand, the technically permissible maximum laden mass may be tested if the technical service requires.	Rational to include why the minimum mass is “considered” the most severe condition.
(a) At the minimum mass (mass in running order with an additional mass of maximum 125 kg);		
(b) If this is deemed justified, the technical service may test at any other mass up to the technically permissible maximum laden mass as defined by the manufacturer. No alteration shall be made once the test procedure has begun.		To review. Text is specific to type approval, to be addressed at the national level as needed.

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UNR Text	Explanation	GTR Equivalency
6.4. Test Targets		(Necessity of a wall target will be discussed in GTR.)
<p>6.4.1. The target used for the vehicle detection tests shall be a regular high-volume series production passenger car of Category M<sub>1</sub> or alternatively a "soft target" representative of a passenger vehicle in terms of its identification characteristics applicable to the sensor system of the ACPE under test according to either ISO 19206-1:2018 or ISO 19206-3:2021 at the choice of the manufacturer.</p>	<p>This provision is aligned to the other safety systems such as AEBS (UN R152 and R131).</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>ISO 19206-1</p> </div> <div style="text-align: center;">  <p>ISO 19206-3</p> </div> </div>	<p>To review. UN R152 and FMVSS 127 currently reference only ISO 19206-3:2021.</p>
<p><b>6.4.2. The targets used for the pedestrian detection tests shall be a child articulated "soft target" in its resting position with the articulation being switched off and be representative of the human attributes applicable to the sensor system of the ACPE under test according to ISO 19206-2:2018.</b></p>	<p>This provision was added in the 01 series of amendment.</p> <p>A child articulated "soft target" according to ISO 19206-2:2018 is used in the test of AEBS (UN R152 and R131).</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p>ISO 19206-2 (child articulated pedestrian target)</p>	

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UNR Text	Explanation	GTR Equivalency
<b>6.5. Offset of vehicle and target</b>		
<b>6.5.1. The reference point for the location of the vehicle shall be the most rearward point on the centreline of the vehicle when going rearwards, and the most forward point of the vehicle when going forwards.</b>	This provision was added in the 01 series of amendment.	
<b>6.5.2. The lateral offset between the centreline of the vehicle target and the centreline of the vehicle shall be between 0.0 m and the distance to extreme outer edge of the vehicle.</b>	This provision was added in the 01 series of amendment, and it is aligned to paragraph 5.1.5. (d) (ii).	
<b>6.5.3. The lateral offset between the centre line of the pedestrian obstacle and the centre line of the vehicle is not more than 25 per cent of the vehicle width.</b>	This provision was added in the 01 series of amendment, and it is aligned to paragraph 5.1.5. (d) (iv).	
<b>6.5.4. The orientation of the pedestrian target is to be determined by the technical service.</b>	This provision was added in the 01 series of amendment.	Include requirements for orientation in the GTR, to ensure consistent and fair oversight.
<b>6.5.5. The orientation of the vehicle target shall be 0° or 180° respectively as defined in ISO 19206-3:2021, chosen by the technical service.</b>	This provision was added in the 01 series of amendment.	Include requirements for orientation in the GTR, to ensure consistent and fair oversight.
<b>6.6. Test procedures</b>		Rational to elaborate on the procedures.
The test procedures shall be performed both in a forward and rearward direction and at least with the ACPE interventions triggered at 1.0 m (+0.1 m tolerance) and 1.5 m (-0.1 m tolerance) distance from the target position (as detailed in Table 1).	This provision was modified in the 01 series of amendment (green texts).  1.0 m (+0.1 m tolerance) distance is based on JNCAP ACPE test, and 1.5 m (-0.1 m tolerance) distance is aligned to paragraph 5.1.5. “an obstacle located not more than 1.5 m in front of or behind the vehicle”.  Applying two testing conditions at distances of 1.0 m and 1.5 m with the specified tolerance was discussed and agreed upon in the ACPE IWG for the 00 series of this regulation.	

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UNR Text	Explanation	GTR Equivalency

Table 1

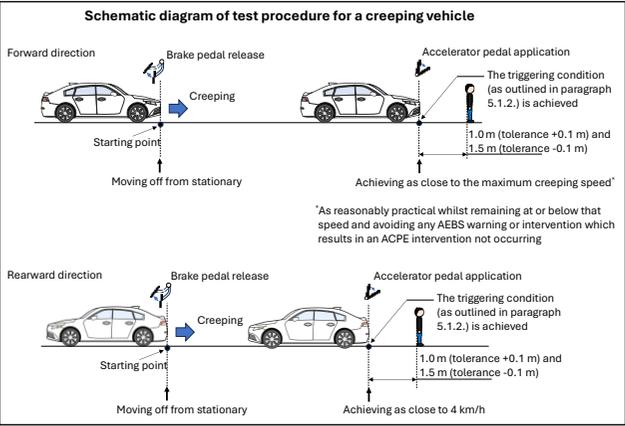
**Test conditions**

<i>Driving direction</i>	<i>Distance to target at the point triggering conditions achieved / Distance to speed measuring point</i>		<i>Tolerance on the longitudinal distance</i>
	<i>(m)</i>	<i>(m)</i>	<i>(m)</i>
Forward	1.0		+ 0.1
Forward	1.5		-0.1
Rearward	1.0		+ 0.1
Rearward	1.5		-0.1

UNR Text	Explanation	GTR Equivalency
<b>6.6.1. Test procedure for a stationary vehicle</b>		
<b>6.6.1.1. Each test condition according to Table 1 shall be tested with and without the presence of the target. For tests without a target the ACPE shall be deactivated if necessary, and may be combined where feasible.</b>		<p>=&gt;The words at the end of the sentence do seem redundant "... and may be combined where feasible.". What is the reason to include, and how would an independent test facility know if the ACPE should be deactivated or not.</p> <p>=&gt;Rational should explain that some systems can operate even without an object in the vehicle's path.</p>

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<p><b>6.6.1.2.</b> The procedure for each test <b>with a stationary (non-creeping) vehicle</b> shall be as follows:</p>	<p>The procedure (a) to (d) for each test with a stationary (non-creeping) vehicle is based on JNCAP ACPE test.</p>	
<p>(a) Position the vehicle at a distance to the <b>relevant</b> target or speed measurement point as defined in Table 1.</p>		
<p>(b) Hold the vehicle stationary and select the corresponding driving direction.</p>		
<p>(c) Accelerate the vehicle, whilst maintaining the steering control in the neutral position, by operating the accelerator control in order to achieve the relevant triggering conditions (as outlined in paragraph 5.1.2.) before the vehicle reaches a speed of 0.5 km/h.</p>		<p>ACPE triggering conditions: If needed, include reference to 5.1.3. for a force-based triggering criterion.</p>
<p>(d) Record the speed at the collision point (if applicable) or the speed at the respective speed measurement point.</p>		
<p><b>6.6.2. Test procedure for a creeping vehicle</b></p>	<p>Test procedure for a creeping vehicle was added in the 01 series of amendment.</p>	
<p><b>6.6.2.1. Each test condition according to Table 1 shall be tested once with a starting point and a profile of the accelerator control application selected at the discretion of the Technical Service. The starting point and the accelerator control application profile shall be selected such that the triggering condition (as outlined in paragraph 5.1.2.) is achieved as close to:</b></p>	<p>For your understanding, see the schematic diagram of Test procedure for a creeping vehicle.</p> 	<p>Revise to include objective testing details, to ensure consistent and fair oversight.</p> <p>E.g., add tolerance to the forward or rearward vehicle speeds to better define when the accelerator control application should occur.</p>
<ul style="list-style-type: none"> <li>the maximum creeping speed in the forward direction;</li> </ul>		
<ul style="list-style-type: none"> <li>4 km/h in the rearward direction,</li> </ul>		<p>Rational to discuss the reasons for selecting the vehicle speeds for the ACPE tests.</p>

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as reasonably practical whilst remaining at or below that speed and avoiding any AEBS warning or intervention which results in an ACPE intervention not occurring.		To review for objective requirements.
6.6.2.2. The procedure for each test with a creeping vehicle shall be as follows:	For your understanding, see the schematic diagram of Test procedure for a creeping vehicle.	To review with 6.6.2.1.
(a) Position the vehicle at the selected starting point as determined by paragraph 6.6.2.1.		
(b) Hold the vehicle stationary and select the corresponding driving direction.		
(c) Release the braking system so that the vehicle starts creeping.		
(d) Operate the accelerator control in order to achieve the relevant triggering conditions (as outlined in paragraph 5.1.2.) at the point the vehicle has reached the distance to target according to Table 1.		Suggest preceding the sentence with “After having achieved a steady creeping speed in the forward direction or 4 km/h in the rearward direction, operate the accelerator control in order to...”
(e) In the case a collision is not prevented the manufacturer shall demonstrate to the satisfaction of the technical service that the intervention complies with the requirements of paragraph 5.1.6.2.		Text is specific to type approval, to be revised. 5.1.6.2 reference to “Effective demand” to be revised to allow for independent oversight.
6.7. If this is deemed justified, the Technical Service may additionally test in any test condition within the conditions specified in paragraph 5.1.5. or test alternative accelerator control application profiles.	This paragraph confirms that vehicles can be tested in any other aspect according to the performance requirements, such as with other targets/speeds/walls/real objects/..., in other than ideal weather conditions and the like, making section 5 performance requirements more relevant than test specifications.	Text is specific to type approval. Any further requirements need to be included in the GTR, or address at the national level.

## 7. Modification of vehicle type and extension of approval

- 7.1. Every modification of the vehicle type as defined in paragraph 2.2. above shall be notified to the Type Approval Authority which approved the vehicle type. The Type Approval Authority may then either:
- 7.1.1. Consider that the modifications made do not have an adverse effect on the conditions of the granting of the approval and grant an extension of approval;

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- 7.1.2. Consider that the modifications made affect the conditions of the granting of the approval and require further tests or additional checks before granting an extension of approval.
- 7.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.3. above to the Contracting Parties to the Agreement which apply this Regulation.
- 7.3. The Type Approval Authority shall inform the other Contracting Parties of the extension by means of the communication form which appears in Annex 1 to this Regulation. It shall assign a serial number to each extension to be known as the extension number.

## **8. Conformity of production**

- 8.1. Procedures concerning conformity of production shall comply with those set out in the 1958 Agreement, Schedule 1 (E/ECE/TRANS/505/Rev.3) and meet the following requirements:
- 8.2. A vehicle approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements of paragraph 5. above;
- 8.3. The Type Approval Authority which has granted approval may at any time verify the conformity of control methods applicable to each production unit. The normal frequency of such inspections shall be once every two years.

## **9. Penalties for non-conformity of production**

- 9.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 8, above are not complied with.
- 9.2. If a Contracting Party withdraws an approval it had previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by sending them a communication form conforming to the model in Annex 1 to this Regulation.

## **10. Production definitively discontinued**

If the holder of the approval completely ceases to manufacture a type of vehicle approved in accordance with this Regulation, he shall so inform the Type Approval Authority which granted the approval, which in turn shall forthwith inform the other Contracting Parties to the Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

## 11. Names and addresses of the Technical Services responsible for conducting approval tests and of Type Approval Authorities

The Contracting Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat<sup>3</sup> the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval are to be sent.

## 12. Transitional provisions

### 12.1. Transitional provisions applicable to the 01 series of amendments

12.1.1. As from the official date of entry into force of the 01 series of amendments, no Contracting Party applying this Regulation shall refuse to grant or refuse to accept type approvals under this Regulation as amended by the 01 series of amendments.

12.1.2. As from 1 September 2029, Contracting Parties applying this Regulation shall not be obliged to accept type approvals to the original version of this Regulation, first issued after 1 September 2029.

12.1.3. Until 1 September 2031, Contracting Parties applying this Regulation shall accept type approvals to the original version of this Regulation, first issued before 1 September 2029.

12.1.4. As from 1 September 2031, Contracting Parties applying this Regulation shall not be obliged to accept type approvals issued to the original version of this Regulation.

12.1.5. Notwithstanding paragraph 12.1.4., Contracting Parties applying this Regulation shall continue to accept type approvals issued according to the original version of this Regulation, for vehicles which are not affected by the changes introduced by the 01 Series of amendments.

12.1.6. Notwithstanding the transitional provisions above, Contracting Parties who start to apply this Regulation after the date of entry into force of the most recent series of amendments are not obliged to accept type approvals which were granted in accordance with any of the preceding series of amendments to this Regulation.

12.1.7. Contracting Parties applying this Regulation may grant type approvals according to any preceding series of amendments to this Regulation.

12.1.8. Contracting Parties applying this Regulation shall continue to grant extensions of existing approvals to any preceding series of amendments to this Regulation

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<sup>3</sup> The UNECE secretariats provides the online platform ("343 Application") for exchange of such information with the secretariat: <https://www.unece.org/trans/main/wp29/datasharing.html>

# Annex 1

## Communication

(Maximum format: A4 (210 x 297 mm))



issued by : (Name of administration)  
 .....  
 .....  
 .....

- <sup>1</sup>Concerning: <sup>2</sup>
- Approval granted
  - Approval extended
  - Approval refused
  - Approval withdrawn
  - Production definitively discontinued

of a type of vehicle with regard to its Acceleration Control for Pedal Error pursuant to UN Regulation No. [17X]

- Approval No.: .....
1. Trademark: .....
  2. Type and trade name(s): .....
  3. Name and address of manufacturer: .....
  4. If applicable, name and address of manufacturer's representative: .....
  5. Brief description of vehicle type: .....
  6. Vehicle is equipped with ACPE which has been exempted from the relevant requirements (forward and/or rear direction) of this Regulation: yes/no
  - 6.1. If yes, details:
  7. Date of submission of vehicle for approval: .....
  8. Technical Service performing the approval tests: .....
  9. Date of report issued by that Service: .....
  10. Number of report issued by that Service: .....
  11. Approval granted/refused/extended/withdrawn:<sup>2</sup>
  12. Place: .....
  13. Date: .....
  14. Signature: .....
  15. Annexed to this communication are the following documents, bearing the approval number indicated above: .....
  16. Any remarks: .....

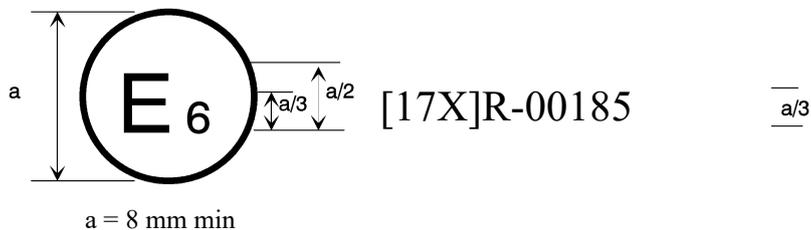
<sup>1</sup> Distinguishing number of the country which has granted/extended/refused/withdrawn an approval (see approval provisions in the Regulation).

<sup>2</sup> Strike out what does not apply.

## Annex 2

### Arrangements of approval marks

(see paragraphs 4.4. to 4.4.2. of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in Belgium (E 6) with regard to the Acceleration Control for Pedal Error (ACPE) pursuant to UN Regulation No. [17X]. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of UN Regulation No. [17X] in its original form.

## Annex 3

### Special requirements to be applied to the safety aspects of electronic control systems

#### 1. General

This annex defines the special requirements for documentation, fault strategy and verification with respect to the safety aspects of Complex Electronic Vehicle Control Systems (paragraph 2.4. below) as far as this Regulation is concerned.

This annex shall also apply to safety related functions identified in this Regulation which are controlled by electronic system(s) (paragraph 2.3.) as far as this Regulation is concerned.

This annex does not specify the performance criteria for "The System" but covers the methodology applied to the design process and the information which must be disclosed to the Technical Service, for type approval purposes.

This information shall show that "The System" respects, under non-fault and fault conditions, all the appropriate performance requirements specified elsewhere in this Regulation and that it is designed to operate in such a way that it does not induce safety critical risks.

#### 2. Definitions

For the purposes of this annex,

- 2.1. *The System*" means an electronic control system or complex electronic control system that provides or forms part of the control transmission of a function to which this Regulation applies. This also includes any other system covered in the scope of this Regulation, as well as transmission links to or from other systems that are outside the scope of this Regulation, that acts on a function to which this Regulation applies."
- 2.2. *Safety Concept*" is a description of the measures designed into the system, for example within the electronic units, so as to address system integrity and thereby ensure safe operation under fault and non-fault conditions, including in the event of an electrical failure. The possibility of a fall-back to partial operation or even to a back-up system for vital vehicle functions may be a part of the safety concept.
- 2.3. *Electronic Control System*" means a combination of units, designed to co-operate in the production of the stated vehicle control function by electronic data processing. Such systems, often controlled by software, are built from discrete functional components such as sensors, electronic control units and actuators and connected by transmission links. They may include mechanical, electro-pneumatic or electro-hydraulic elements.
- 2.4. *Complex Electronic Vehicle Control Systems*" are those electronic control systems in which a function controlled by an electronic system or the driver may be over-ridden by a higher level electronic control system/function. A function which is over-ridden becomes part of the complex system, as well as any overriding system/function within the scope of this Regulation. The transmission links to and from overriding systems/function outside of the scope of this Regulation shall also be included.

- 2.5. "*Higher-Level Electronic Control*" systems/functions are those which employ additional processing and/or sensing provisions to modify vehicle behaviour by commanding variations in the function(s) of the vehicle control system. This allows complex systems to automatically change their objectives with a priority which depends on the sensed circumstances.
- 2.6. "*Units*" are the smallest divisions of system components which will be considered in this annex, since these combinations of components will be treated as single entities for purposes of identification, analysis or replacement.
- 2.7. "*Transmission links*" are the means used for inter-connecting distributed units for the purpose of conveying signals, operating data or an energy supply. This equipment is generally electrical but may, in some part, be mechanical, pneumatic or hydraulic.
- 2.8. "*Range of control*" refers to an output variable and defines the range over which the system is likely to exercise control.
- 2.9. "*Boundary of functional operation*" defines the boundaries of the external physical limits within which the system is able to maintain control.
- 2.10. "*Safety Related Function*" means a function of "The System" that is capable of changing the dynamic behaviour of the vehicle. "The System" may be capable of performing more than one safety related function.

### **3. Documentation**

#### 3.1. Requirements

The manufacturer shall provide a documentation package which gives access to the basic design of "The System" and the means by which it is linked to other vehicle systems or by which it directly controls output variables. The function(s) of "The System" and the safety concept, as laid down by the manufacturer, shall be explained. Documentation shall be brief, yet provide evidence that the design and development has had the benefit of expertise from all the system fields which are involved. For periodic technical inspections, the documentation shall describe how the current operational status of "The System" can be checked.

The Technical Service shall assess the documentation package to show that "The System":

- (a) Is designed to operate, under non-fault and fault conditions, in such a way that it does not induce safety critical risks;
- (b) Respects, under non-fault and fault conditions, all the appropriate performance requirements specified elsewhere in this Regulation; and,
- (c) Was developed according to the development process/method declared by the manufacturer.

#### 3.1.1. Documentation shall be made available in two parts:

- (a) The formal documentation package for the approval, containing the material listed in paragraph 3. (with the exception of that of paragraph 3.4.4.) which shall be supplied to the Technical Service at the time of submission of the type approval application. This documentation package shall be used by the Technical Service as the basic reference for the verification process set out in paragraph 4. of this annex. The Technical Service shall ensure that this documentation package remains available for a period determined in agreement with the Approval Authority. This period shall be at least 10 years counted from the time when production of the vehicle is definitely discontinued.

- (b) Additional material and analysis data of paragraph 3.4.4. which shall be retained by the manufacturer, but made open for inspection at the time of type approval. The manufacturer shall ensure that this material and analysis data remains available for a period of 10 years counted from the time when production of the vehicle is definitely discontinued."

3.2. Description of the functions of "The System"

A description shall be provided which gives a simple explanation of all the control functions of "The System" and the methods employed to achieve the objectives, including a statement of the mechanism(s) by which control is exercised.

Any described function that can be over-ridden shall be identified and a further description of the changed rationale of the function's operation provided.

- 3.2.1. A list of all input and sensed variables shall be provided and the working range of these defined.
- 3.2.2. A list of all output variables which are controlled by "The System" shall be provided and an indication given, in each case, of whether the control is direct or via another vehicle system. The range of control (paragraph 2.8.) exercised on each such variable shall be defined.
- 3.2.3. Limits defining the boundaries of functional operation (paragraph 2.9.) shall be stated where appropriate to system performance.

3.3. System layout and schematics

3.3.1. Inventory of components.

A list shall be provided, collating all the units of "The System" and mentioning the other vehicle systems which are needed to achieve the control function in question.

An outline schematic showing these units in combination, shall be provided with both the equipment distribution and the interconnections made clear.

3.3.2. Functions of the units

The function of each unit of "The System" shall be outlined and the signals linking it with other units or with other vehicle systems shall be shown. This may be provided by a labelled block diagram or other schematic, or by a description aided by such a diagram.

3.3.3. Interconnections

Interconnections within "The System" shall be shown by a circuit diagram for the electric transmission links, by a piping diagram for pneumatic or hydraulic transmission equipment and by a simplified diagrammatic layout for mechanical linkages. The transmission links both to and from other systems shall also be shown

3.3.4. Signal flow, operating data and priorities

There shall be a clear correspondence between these transmission links and the signals and/or operating data carried between units. Priorities of signals and/or operating data on multiplexed data paths shall be stated wherever priority may be an issue affecting performance or safety as far as this Regulation is concerned.

3.3.5. Identification of units

Each unit shall be clearly and unambiguously identifiable (e.g. by marking for hardware and marking or software output for software content) to provide corresponding hardware and documentation association.

Where functions are combined within a single unit or indeed within a single computer, but shown in multiple blocks in the block diagram for clarity and

ease of explanation, only a single hardware identification marking shall be used. The manufacturer shall, by the use of this identification, affirm that the equipment supplied conforms to the corresponding document.

- 3.3.5.1. The identification defines the hardware and software version and, where the latter changes such as to alter the function of the unit as far as this Regulation is concerned, this identification shall also be changed.
- 3.4. Safety concept of the manufacturer
- 3.4.1. The Manufacturer shall provide a statement which affirms that the strategy chosen to achieve "The System" objectives will not, under non-fault conditions, prejudice the safe operation of the vehicle.
- 3.4.2. In respect of software employed in "The System", the outline architecture shall be explained and the design methods and tools used shall be identified. The manufacturer shall show evidence of the means by which they determined the realisation of the system logic, during the design and development process.
- 3.4.3. The Manufacturer shall provide the Technical Service with an explanation of the design provisions built into "The System" so as to generate safe operation under fault conditions. Possible design provisions for failure in "The System" are for example:
- (a) Fall-back to operation using a partial system.
  - (b) Change-over to a separate back-up system.
  - (c) Removal of the high level function.

In case of a failure, the driver shall be warned for example by warning signal or message display. When the system is not deactivated by the driver, e.g. by turning the ignition (run) switch to "off", or by switching off that particular function if a special switch is provided for that purpose, the warning shall be present as long as the fault condition persists.

- 3.4.3.1. If the chosen provision selects a partial performance mode of operation under certain fault conditions, then these conditions shall be stated and the resulting limits of effectiveness defined.
- 3.4.3.2. If the chosen provision selects a second (back-up) means to realise the vehicle control system objective, the principles of the change-over mechanism, the logic and level of redundancy and any built in back-up checking features shall be explained and the resulting limits of back-up effectiveness defined.
- 3.4.3.3. If the chosen provision selects the removal of the Higher Level Function, all the corresponding output control signals associated with this function shall be inhibited, and in such a manner as to limit the transition disturbance.
- 3.4.4. The documentation shall be supported, by an analysis which shows, in overall terms, how the system will behave on the occurrence of any individual hazard or fault which will have a bearing on vehicle control performance or safety.

The chosen analytical approach(es) shall be established and maintained by the Manufacturer and shall be made open for inspection by the Technical Service at the time of the type approval.

The Technical Service shall perform an assessment of the application of the analytical approach(es). The audit shall include:

- (a) Inspection of the safety approach at the concept (vehicle) level with confirmation that it includes consideration of interactions with other vehicle systems. This approach shall be based on a Hazard / Risk analysis appropriate to system safety.
- (b) Inspection of the safety approach at the system level. This approach shall be based on a Failure Mode and Effect Analysis (FMEA), a Fault Tree Analysis (FTA) or any similar process appropriate to system safety.

- (c) Inspection of the validation plans and results. This validation shall use, for example, Hardware in the Loop (HIL) testing, vehicle on-road operational testing, or any means appropriate for validation.

The assessment shall consist of checks of hazards and faults chosen by the Technical Service to establish that the manufacturer's explanation of the safety concept is understandable, logical and that the validation plans are suitable and have been completed.

The Technical Service may perform or may require to perform tests as specified in paragraph 4. to verify the safety concept.

- 3.4.4.1. This documentation shall itemize the parameters being monitored and shall set out, for each fault condition of the type defined in paragraph 3.4.4. of this annex, the warning signal to be given to the driver and/or to service/technical inspection personnel.
- 3.4.4.2. This documentation shall describe the measures in place to ensure the "The System" does not prejudice the safe operation of the vehicle when the performance of "The System" is affected by environmental conditions e.g. climatic, temperature, dust ingress, water ingress, ice packing.

## 4. Verification and test

- 4.1. The functional operation of "The System", as laid out in the documents required in paragraph 3., shall be tested as follows:

- 4.1.1. Verification of the function of "The System"

The Technical Service shall verify "The System" under non-fault conditions by testing a number of selected functions from those declared by the manufacturer in paragraph 3.2. above.

For complex electronic systems, these tests shall include scenarios whereby a declared function is overridden.

- 4.1.2. Verification of the safety concept of paragraph 3.4.

The reaction of "The System" shall be checked under the influence of a failure in any individual unit by applying corresponding output signals to electrical units or mechanical elements in order to simulate the effects of internal faults within the unit. The Technical Service shall conduct this check for at least one individual unit, but shall not check the reaction of "The System" to multiple simultaneous failures of individual units.

The Technical Service shall verify that these tests include aspects that may have an impact on vehicle controllability and user information (HMI aspects)."

- 4.1.2.1. The verification results shall correspond with the documented summary of the failure analysis, to a level of overall effect such that the safety concept and execution are confirmed as being adequate.

## 5. Reporting by Technical Service

Reporting of the assessment by the Technical Service shall be performed in such a manner that allows traceability, e.g. versions of documents inspected are coded and listed in the records of the Technical Service.

An example of a possible layout for the assessment form from the Technical Service to the Type Approval Authority is given in Appendix 1 to this Annex.

## Annex 3 - Appendix 1

### Model assessment form for electronic systems

Test report No: .....

1. Identification
  - 1.1. Vehicle make: .....
  - 1.2. Type: .....
  - 1.3. Means of identification of type if marked on the vehicle: .....
  - 1.4. Location of that marking:.....
  - 1.5. Manufacturer's name and address:.....
  - 1.6. If applicable, name and address of manufacturer's representative:.....
  - 1.7. Manufacturer's formal documentation package:
    - Documentation reference No: .....
    - Date of original issue: .....
    - Date of latest update: .....
2. Test vehicle(s)/system(s) description
  - 2.1. General description: .....
  - 2.2. Description of all the control functions of "The System", and methods of operation: ..
  - 2.3. Description of the components and diagrams of the interconnections within "The System":.....
3. Manufacturer's safety concept
  - 3.1. Description of signal flow and operating data and their priorities: .....
  - 3.2. Manufacturer's declaration:
 

*The manufacturer(s) ..... affirm(s) that the strategy chosen to achieve "The System", objectives will not, under non-fault conditions, prejudice the safe operation of the vehicle.*
  - 3.3. Software outline architecture and the design methods and tools used: .....
  - 3.4. Explanation of design provisions built into "The System" under fault conditions: .....
  - 3.5. Documented analyses of the behaviour of "The System" under individual hazard or fault conditions: .....
  - 3.6. Description of the measures in place for environmental conditions: .....
  - 3.7. Provisions for the periodic technical inspection of "The System": .....
  - 3.8. Results of "The System" verification test, as per para. 4.1.1. of Annex 3 to UN Regulation No. [17X]: .....
  - 3.9. Results of safety concept verification test, as per para. 4.1.2. of Annex 3 to UN Regulation No. [17X]: .....
  - 3.10. Date of test: .....

3.11. This test has been carried out and the results reported in accordance with ..... to UN Regulation No. [17X] as last amended by the ..... series of amendments.

Signed: ..... Date: .....

3.13. Comments: .....

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