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|   | E/ECE/TRANS/505/Rev.3/Add.1XY |
|  |  | 14 February 2025 |

**Agreement**

 **Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations[[1]](#footnote-2)\***

(Revision 3, including the amendments which entered into force on 14 September 2017)

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 **Addendum 1XY – Regulation No. 1XX**

Date of entry into force as an annex to the 1958 Agreement: XX Month 202Y

 **Uniform provisions concerning the approval of a vehicle with regard to a Driver Drowsiness and Attention Warning (DDAW) System**

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**UNITED NATIONS**

Regulation No. 1XX

 Uniform provisions concerning the approval of a vehicle with regard to a Driver Drowsiness and Attention Warning (DDAW) System

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1. Introduction
	1. Fatigue has been long considered one of the most significant road safety problems across the world. Fatigue negatively affects a driver’s physical, cognitive, psychomotor and sensory processing capabilities, which can cause the driver to have difficulty maintaining a constant speed and/or lane position, slower reaction times, lapses in attention, altered decision making, and to fall asleep (including both micro-sleeps and falling into deeper sleep).
	2. The severity of fatigue related crashes is particularly high, as drivers that are drowsy or asleep are much less likely to react effectively to reduce the severity of an impending impact (e.g. braking, steering to avoid serious impact etc.). Additionally, high speeds are a contributing factor in these crashes, as fatigue typically occurs in long distance drives at constant speed.
	3. A Driver Drowsiness and Attention Warning (DDAW) System can be used to monitor the driver’s physical state through [direct and/or indirect means (e.g. by analysis and recognition of driving or steering patterns, or using driver monitoring cameras)]. The system will be able to provide a warning if the driver is identified as drowsy.
	4. Constantly changing driving and steering patterns when driving within urban areas [significantly increase the difficulty in reliably detection of drowsy driving. In addition, as it is known that longer distance driving at constant speed (e.g. typical highway driving) presents an increased risk of drowsiness through task monotony, it is most important to account for these conditions in specifying a DDAW system for a vehicle.] Therefore, motor vehicles with a maximum design speed of 70km/h or below should be exempt from having to be equipped with a DDAW system.
	5. [There are some sub-groups of vehicles where the benefit of a DDAW system may be more limited because they are primarily used in other conditions than highway conditions (e.g. category G vehicles, construction vehicles, etc.). [In some cases (e.g. vehicles of category G, construction vehicles mainly used in off-road areas and gravel tracks, military vehicles) the operating environment and/or manner in which the vehicles are used may lead to a high number of false positives for detection of drowsiness.] [Regardless from the benefit, there may also be some vehicle types for which the installation of a DDAW system would be technically difficult or not feasible (e.g. special purpose vehicles).]]
	6. [Paragraph 1.2 states that this Regulation is without prejudice to requirements of national or regional laws related to privacy, data protection and personal data processing. This means that any Contracting Party applying this regulation may prescribe any additional such requirements through its laws. Technical Services and Approval Authorities will not assess compliance with any such regional or national laws as part of an application for type approval of a vehicle type with regard to its DDAW system. This is a matter for the relevant regional and/or national authorities, as well as vehicle manufacturers.

For example, a DDAW system may use data from cameras and/or other sensors which monitor the vehicle occupants. Contracting Parties may choose to specify requirements in regional or national law to prevent this data from being used to confirm the unique identification of any natural person.

This could be achieved through more general privacy laws, and/or specific technical requirements, including for example to keep any data within a closed-loop system for no longer than is needed for the system to perform its safety function, and to prevent unauthorised access. Contracting Parties should also consider the possibility that biometric personal data, and/or the storage of historical data of a particular driver, could be used to improve the performance of the DDAW system. Such systems could for example seek permission from a driver and this request may be accompanied by explanatory information of the system changes that will be implemented and the reasons for those changes.]

* 1. [Reserved].

1. Scope

1.1. This Regulation applies to vehicles of category M and N[[2]](#footnote-3), with a maximum design speed above 70 km/h.

1.2. This Regulation is without prejudice to requirements of national or regional laws related to privacy, data protection and personal data processing.

2. Definitions

 For the purposes of this Regulation:

2.1. “*Approval of a vehicle type”* means the full procedure whereby a Contracting Party to the Agreement certifies that a vehicle type meets the technical requirements of this Regulation.

2.2. *“Biometric personal data”* means data resulting from specific technical processing relating to the physical, physiological or behavioural characteristics of a natural person, which allow or confirm the unique identification of that natural person, such as facial images or fingerprint data.

[2.3. *“Direct means”* is a method for observing the driver directly to assess drowsiness.]

[2.4. *“Driver Drowsiness and Attention Warning (DDAW) system”* means a system that assesses the driver’s alertness and warns the driver via the vehicle’s Human-Machine Interface when they are assessed to be a drowsy driver.]

2.5. *“Drowsiness threshold”* is a quantification of the level of driver drowsiness, at or before which the DDAW shall provide a drowsiness warning to the driver.

[2.6. *“Drowsy driver”* means a driver whose alertness level is such that a warning shall be provided by the vehicle’s DDAW system in accordance with this Regulation. A drowsy driver may be detected by a DDAW system using direct means and/or indirect means.]

2.7. *“Human-Machine Interface (HMI)”* means the user interface of the vehicle that allows the human to engage and interact with the software components of the vehicle, [including for observation of their status].

[2.8. *“Inactive powertrain”* means a vehicle powertrain that is in the deactivated (or “off”) state, by which it is not ready to supply energy at the drive wheels for the purpose of vehicle propulsion.

 A powertrain shall not be considered inactive during an engine stop which is performed automatically, for example by the operation of a stop/start system.]

[2.9. *“Indirect means”* is a method for observing the vehicle behavior and/or vehicle parameters to assess drowsiness.]

[2.10. *“Initiation of the powertrain”* means the state of the vehicle powertrain[[3]](#footnote-4), following a driver-initiated action, by which it is ready to supply energy at the drive wheels for the purpose of vehicle propulsion.

 A new engine start (or run cycle) which is performed automatically, for example by the operation of a stop/start system, is not considered an initiation of the powertrain.]

2.11. *“Karolinska Sleepiness Scale (KSS)”* means the [subjective self-report] scale that is used to measure the level of drowsiness being experienced by the driver over a[n approximate] 5-minute time interval (as shown in the table below).

|  |  |
| --- | --- |
| **Rating** | **Verbal Description** |
| 1 | Extremely alert |
| 2 | Very alert |
| 3 | Alert |
| 4 | Rather alert |
| 5 | Neither alert nor sleepy |
| 6 | Some signs of sleepiness |
| 7 | Sleepy, no effort to keep awake |
| 8 | Sleepy, some effort to keep awake |
| 9 | Very sleepy, great effort to keep awake, fighting sleep |

[2.12. *“Primary metrics”* are the main parameters used by the DDAW system for detection of drowsiness.

 Details of the primary metrics shall be included in the documentation submitted in accordance with Annex 3.]

[2.13. *“Secondary metrics”* are additional and optional parameters that may increase robustness of the DDAW system.

 Details of the secondary metrics shall be included in the documentation submitted in accordance with Annex 3.]

[2.14. *“Trigger behaviour”* means the specific output of variable/s which the DDAW system monitors to determine primary metrics and any secondary metrics, for which a drowsiness warning is provided to the driver, intended to indicate they are a drowsy driver. The variable/s monitored relate to either:

(a) vehicle behavior (the way the vehicle is being driven);

(b) driver action (movements or gestures of the driver);

(c) driver appearance (how the driver looks, or the change in this);

(d) driver physiological state; or

(e) any combination of the above.

Details of the trigger behaviour shall be included in the documentation submitted in accordance with Annex 3.]

[2.15. *“Vehicle type with regard to its DDAW system”* means a category of vehicles which do not differ in such essential respects such as:

(a) the manufacturer’s trade name or mark;

(b) the type and design of the DDAW system, including but not limited to:

(i) the method(s) used in detection of a drowsy driver;

(ii) the specifications for the sensor(s) used in the detection system;

(iii) the warning system methods, strategy and characteristics;

(c) the other vehicle systems which provide data input to the DDAW system for the purpose of it performing its safety function; and

(d) the vehicle features which significantly influence the performance of the DDAW system.

Information relating to items (b), (c) and (d) shall be included in the documentation submitted in accordance with Annex 3.]

OR

[2.15. *“Vehicle type with regard to its DDAW system”* means a category of vehicles which do not differ in such essential respects such as:

(a) the manufacturer’s trade name or mark;

(b) the type and design of the DDAW system, including but not limited to:

(i) the method(s) used in detection of a drowsy driver;

(ii) the specifications for the sensor(s) used in the detection system;

(iii) the warning system methods, strategy and characteristics; and

 (c) the other vehicle systems and the vehicle features which significantly influence the functioning or performance of the DDAW system.

Information relating to items (b) and (c) shall be included in the documentation submitted in accordance with Annex 3.]

3. Application for Approval

3.1. The application for approval of a vehicle type with regard to its DDAW system shall be submitted by the vehicle manufacturer or by its authorized representative.

3.2. The application for approval of a vehicle type with regard to its DDAW system shall be accompanied [in triplicate] by the following:

(a) the numbers and/or symbols identifying the vehicle type;

(b) a description of the vehicle type, including in particular with regard to the items mentioned in paragraph 2.15.;

(c) a documentation package detailing how the DDAW system functions, in accordance with Annex 3; and

(d) a documentation package validating the effectiveness of the DDAW system, in accordance with Annex 4.

3.3. A vehicle which is representative of the vehicle type to be approved shall be submitted to the Technical Service responsible for assessing the technical documentation submitted by the manufacturer and conducting the verification tests.

4. Approval

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

4.1.1. The conformity of the vehicle type to the technical requirements in paragraph 5. below, shall be demonstrated by the manufacturer through the submission of documentation packages in accordance with Annex 3 and Annex 4.

4.1.2. The Technical Service shall verify the vehicle type submitted for approval pursuant to this Regulation meets the technical requirements of paragraph 5. below, through an assessment of the documentation packages (including the relevant test report(s)) submitted as part of the application for approval, according to the process set out in Annex 5.

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 DDAW system, or to another vehicle type.

4.4. Notice of approval, extension, refusal or withdrawal of approval pursuant to this Regulation shall be communicated to the Contracting Parties to the Agreement applying this Regulation by means of a form conforming to the model in Annex 1 and photographs and/or diagrams and drawings supplied by the applicant for approval, in a format not exceeding A4 (210 x 297 mm), or folded to that format, and on an appropriate scale.

4.5. 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 Annex 2, consisting of a circle surrounding the letter "E" followed by:

(a) the distinguishing number of the country which has granted approval;[[4]](#footnote-5)and

(b) the number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in this paragraph.

4.5.1. 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 4.5. need not be repeated; in this case the Regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.5.

4.6. The approval mark shall be clearly legible and shall be indelible.

4.7. The approval mark shall be placed close to or on the vehicle data plate.

5. Technical requirements

[5.1. Applicability

5.1.1. Any vehicle fitted with an DDAW system meeting the definition in paragraph 2.4 above, shall meet the requirements set out in paragraphs 5.2 to 5.7 below.]

5.2. General technical requirements

5.2.1. A DDAW system shall monitor a driver’s level of drowsiness and alert the driver through the vehicle HMI.

5.2.2. The DDAW system shall be designed to avoid or minimise the system error rate under real driving conditions.

5.2.3. The DDAW system and any other system which warns the driver when he or she is distracted, shall be designed to avoid overlap and not prompt the driver separately, concurrently, or in a confusing manner, where one action triggers both systems.

5.3. DDAW system control

[5.3.1. It shall not be possible for the driver to manually deactivate the DDAW system.

5.3.1.1. It may however be possible for the driver to manually deactivate the DDAW system HMI warnings.

5.3.1.2. Following manual deactivation of the DDAW system HMI warnings, it shall be possible for the driver to re-activate the system HMI warnings by taking no more than the same number of actions as were required to deactivate it.

[5.3.2. The DDAW system may be automatically deactivated in the situations pre-defined by the manufacturer, specifically in situations:

1. When another system takes over the entire dynamic driving task on a sustained basis and is supported with an appropriate driver monitoring system;
2. When a driver-operated vehicle system, assisting a human driver in controlling the longitudinal and lateral motion on a sustained basis, is active and contains an appropriate driver monitoring system.

5.3.2.1. The DDAW system shall be automatically reactivated as soon as the conditions that led to its automatic deactivation are no longer present.

5.3.2.2. In the context of paragraph 5.3.2. (a), the dynamic driving task shall include all real time operational functions and tactical functions required to operate the vehicle, excluding strategic functions such as trip scheduling, and selection of destinations and waypoints, and including the following subtasks:

1. Lateral vehicle motion control via steering (operational);
2. Longitudinal vehicle motion control via acceleration and deceleration (operational);
3. Monitoring the driving environment via object and event detection, recognition, classification, and response preparation (operational and tactical);
4. Object and event response execution (operational and tactical);
5. Manoeuvre planning (tactical);
6. Enhancing conspicuity via lighting, sounding the horn, signaling or gesturing (tactical).]

[5.3.3. The DDAW system shall not be automatically deactivated under conditions laid down in paragraph 5.7., but the DDAW system’s drowsiness warnings may be automatically deactivated. The drowsiness warning emission should be automatically reactivated as soon as the conditions that led to its deactivation are no longer present.]

[5.3.4. The emission of distraction warnings by the DDAW system may be automatically deactivated under conditions in which other driving assistance system are warning about an imminent danger or a critical situation, but it is not a condition for automatic deactivation of the DDAW system.

5.3.4.1. The distraction warning emission should be automatically reactivated as soon as the conditions that led to its deactivation are no longer present.]

[5.3.5. The DDAW system, including HMI warnings, shall be automatically reinstated to normal operation mode upon each initiation of the powertrain. The vehicle manufacturer can optionally set such automatic reinstatement to be dependent upon one of the following conditions having been met, whichever occurs first;

5.3.5.1. the driver’s door having been opened;

5.3.5.2. the vehicle having an inactive powertrain for a maximum period of 15 minutes.]

5.3.6. The DDAW system shall be automatically activated above the vehicle speed of 70 km/h.

5.3.7. Once activated, the DDAW system shall operate normally within the vehicle speed range of 65 km/h to 130 km/h or the vehicle’s maximum speed, whichever is lower.

5.3.7.1. The DDAW system shall not be automatically deactivated at a vehicle speed of above 130 km/h, although the system’s behaviour can be adapted to the degraded situation.

[5.3.7.2. Once activated, the DDAW system shall not be automatically deactivated at a vehicle speed of below 65 km/h such that a system learning phase allowed by paragraph 5.3.8. that is incomplete is reset or paused. Interruptions to this learning phase are however acceptable where the period of this reduced speed is excessive in the context of the system design and monitoring limitations, as documented by the manufacturer in accordance with Annex 3.]

5.3.8. There shall be less than a 5-minute delay [for a system learning phase] between the vehicle meeting the activation criteria set out in paragraph 5.3.6., and the DDAW system beginning to actively monitor driver drowsiness, [under normal operating conditions inclusive of the requirements of paragraph 5.3.8.1.]

5.3.8.1. The learning phase activation time shall start once all conditions for the activation of the DDAW system referred to in paragraphs 5.3. and 5.4. are met.

5.3.9. If a warning is provided during the learning phase of the DDAW system (allowing for calibration of the system parameters to best fit the driver’s behaviour and driving pattern), the learning phase is considered over.]

5.4. Environmental conditions

5.4.1. The DDAW system shall operate effectively during the day and night.

5.4.2. The DDAW system shall operate in absence of weather conditions limiting the system’s operation.

5.4.2.1. [The manufacturer shall take into consideration the range, severity and frequency of weather conditions that a vehicle type is likely to experience, in generating the design of the DDAW system. Those weather conditions that will result in degraded performance of the DDAW system shall be documented and explained as per para 2.1.2 of Annex 4.]

5.4.3. At a minimum, the DDAW system shall work effectively on a multi-lane divided road, with or without a central divide, when lane markings are visible on both sides of the lane.

5.5. Monitoring driver drowsiness

5.5.1. The DDAW system shall detect driver drowsiness by direct means and/or indirect means.

[5.5.1.1. In the case of indirect means, vehicle behaviour used as indicators of drowsy driving may include but are not limited to the following:

1. A reduction in the number of micro-corrections within driver steering, paired with an increase in the number of large and fast corrections;
2. An increase in the variability of a vehicle’s lateral lane position.]

[5.5.1.2. For the vehicle behaviour listed in paragraph 5.5.1.1. that may be monitored in a system using indirect means, parameters used for inclusion in primary metrics and/or secondary metrics may include but are not limited to the following:

1. Steering wheel reversal rate;
2. Yaw rate;
3. Standard deviation of lane position (where lane position refers to position of the vehicle relative to the lateral lane markings).]

5.5.2. The DDAW system shall provide a warning to the driver at a level of drowsiness which is equivalent to or above 8 on the reference sleepiness scale defined in paragraph 2.11. of this Regulation (the Karolinska Sleepiness Scale, hereinafter referred to as the ‘KSS’).

5.5.2.1. The DDAW system may provide a warning to the driver at a level of drowsiness which is equivalent to level 7 on the KSS.

5.5.2.2. In addition, the manufacturer may implement an information strategy on the HMI prior to the warning.

[5.5.2.3. The manufacturer shall carry out validation testing in accordance with
Annex 4 – Appendix 1, ~~to ensure that DDAW systems are able to monitor driver drowsiness in a manner which is accurate, robust, and scientifically valid~~.]

5.6. HMI requirements

5.6.1. Warning nature

[5.6.1.1. A visual warning shall be used by the DDAW system to inform the driver and an acoustic and/or a haptic warning shall be used by the DDAW system to alert the driver as soon as possible after occurrence of the trigger behaviour and may cascade and intensify until acknowledgement thereof by the driver.]

5.6.2. Visual warning

5.6.2.1. The visual warning shall be located so as to be readily visible and recognisable in daylight and at night-time by the driver and distinguishable from other alerts.

5.6.2.2. The visual warning shall be a steady or flashing indication (e.g. tell-tale, pop-up message).

5.6.2.3. Any new symbols developed for the purpose of a DDAW visual warning
are recommended to be constructed using similar elements to and
keeping coherence with ISO 2575:2010+A7:2017 K.21 and/or ISO 2575:2010+A7:2017 K.24.

5.6.2.4. The contrast of the symbol with the background in sun light, twilight and night conditions are recommended to be in accordance with ISO 15008:2017.

5.6.2.5. The following visual alert and background colour combinations should not be used: red/green; yellow/blue; yellow/red; red/violet.

5.6.3. Acoustic warning

5.6.3.1. The acoustic warning shall be easily recognised by the driver.

5.6.3.2. A majority of the acoustic warning shall fall within the frequency spectrum of 200-8000 Hz and amplitude range of 50-90 dB. [The vehicle manufacturer may adjust the amplitude depending on the surrounding noise level.]

5.6.3.3. If speech alerts are utilised, the vocabulary used shall be consistent with any text used as part of the visual alert.

5.6.3.4. The audible portion of the alert shall last for at least the duration that allows the driver to understand it.

[5.6.4. Haptic warning

5.6.4.1. The haptic warning shall be noticeable by the driver and be provided directly or indirectly through any interface expected to attract the attention of the driver back to the driving task.]

5.7. DDAW system failure warning

[5.7.1. Permanent failures

5.7.1.1. There shall not be an appreciable time interval between each DDAW
self-check, and subsequently there shall not be a delay in displaying the failure warning signal in the case of an electrically detectable failure.

5.7.1.2. A constant visual failure warning signal (e.g. warning reflecting the relevant Diagnostic Trouble Codes for the system, tell-tale, pop-up message) shall be provided when there is a permanent failure detected in the DDAW system as a result of which the system does not meet the requirements of this Regulation.

5.7.1.3. Upon detection of a non-electrical failure condition (e.g. sensor obscuration, excluding temporary obscuration such as caused by sun glare), the failure warning signal as laid down in paragraph 5.7.1.2. shall be displayed.]

[5.7.2. Temporary failures

5.7.2.1. Upon detection of a temporary non-electrical failure condition, the failure warning signal as laid down in paragraph 5.7.1.2. may be displayed.

5.7.2.2. Information shall be provided to the driver concerning the current limitation of the DDAW system and/or typical limitations of the DDAW system. The limitations concerned include the ones causing the DDAW system to temporarily function inadequately because insufficient driver facial features are detectable (where applicable) due to excessive driver-, vehicle-, environment-related or other elements that affect the performance of the DDAW system. The vehicle manufacturer may use an active approach via an additional visual warning and/or a passive approach via written information.

5.7.3. Failures that activate the warning signal mentioned in paragraph 5.7.1.2, but which are not detected [when the DDAW is de-activated and/or the vehicle is stationary] [under static conditions], shall be retained upon detection and continue to be displayed from start-up of the vehicle after each initiation of the powertrain, for as long as the failure or defect persists.]

6. Modification of the vehicle type and extension of approval

6.1. Every modification, affecting the design characteristics of the vehicle type identified in paragraph 2.15. of this Regulation shall be brought to the attention of the Approval Authority which approved the vehicle type. The Type Approval Authority may then either:

6.1.1. Consider that the modification made will not have an appreciable adverse effect on the DDAW system performance and grant an extension of the approval; or

6.1.2. Consider that the modifications made could adversely affect the DDAW system performance and require further tests or additional checks before granting an extension of the approval.

6.2. 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 applying this UN Regulation.

6.3. The approval authority shall inform the other Contracting Parties of the extension by means of the communication form conforming to the model in Annex 1 of this Regulation. It shall assign a serial number to each extension, to be known as the extension number.

7. Conformity of production

7.1. Procedures for the conformity of production shall conform to the general provisions defined in Article 2 and Schedule 1 to the Agreement (E/ECE/TRANS/505/Rev.3) and meet the following requirements:

7.1.1. 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; and

7.1.2. The approval authority which has granted the 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.

8. Penalties for non-conformity of production

8.1. The approval granted in respect of a vehicle type, pursuant to this Regulation, may be withdrawn if the requirements laid down in paragraph 7.1. above is not complied with, or if the vehicle or vehicles selected have failed to pass the checks prescribed in paragraph 7.2. above.

8.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

9. Production definitively discontinued

9.1. If the holder of the approval completely ceases to manufacture a type of vehicle approved in accordance with this Regulation, it shall so inform the authority which granted the approval, which in turn shall forthwith notify the other Contracting Parties to the Agreement applying this Regulation by means of a communication for conforming to the model set out in Annex 1 to this Regulation.

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

10.1. The Contracting Parties to the Agreement applying this Regulation shall communicate to the United Nations secretariat 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.

Annex 1

Communication

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

issued by: Name of administration:

......................................

......................................

......................................



**1**



Concerning: [[5]](#footnote-6)2 Approval granted

 Approval extended

 Approval refused

 Approval withdrawn

 Production definitively discontinued

of a vehicle type with regard to the DDAW system performance pursuant to UN Regulation No. 1XX

Approval No. ……….……………. Extension No. ……………………………

1. Vehicle trademark:

2. Vehicle type and trade names:

3. Name and address of manufacturer:

4. If applicable, name and address of manufacturer's representative:

5. Brief description of vehicle:

6. Date of submission of vehicle for approval:

8. Technical Service performing the assessments and verifications:

9. Date of report issued by that Technical Service:

10. Number of the report issued by that Technical Service:

11. Approval granted/refused/extended/withdrawn: 2.

12. Position of approval mark on the vehicle:

13. Place:

14. Date: ..................................................................

15. Signature:

16. Any remarks:

17. The list of documents deposited with the Approval Authority which has granted approval is annexed to this communication and may be obtained on request.

Annex 2

Arrangement of the approval mark

# Model A

(See paragraph 4.5. of this Regulation)

a

a

3

##### 1XXR – 00192

a

2

a

3

a = 8 mm min.

 The above approval mark affixed to a vehicle shows that the vehicle type concerned has, with regard to its DDAW system, been approved in the Netherlands (E 4) pursuant to UN Regulation No. 1XX. The first two digits (00) of the approval number indicate that the approval was granted in accordance with the requirements of UN Regulation No. 1XX in its original form.

# Model B

(See paragraph 4.5.1. of this Regulation)

 

|  |  |
| --- | --- |
| **1XX** | **00 192** |
| **135** | **01 1628** |

 a = 8 mm min.

 The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to UN Regulations Nos. 1XX and 135.[[6]](#footnote-7) The first two digits of the approval numbers indicate that, at the dates when the respective approvals were granted, UN Regulation No. 1XX incorporated the 00 series of amendments and UN Regulation No. 135 incorporated the 01 series of amendments.

Annex 3

Documentation package on the DDAW system functionality

1. The documentation package provided by the manufacturer to both the Approval Authority and the Technical Service, to detail how the DDAW system functions, shall include:

1. a list of all the system inputs containing the primary metrics;
2. a description of how the metrics function and monitor the driver and/or driving behaviour;
3. a description of the trigger behaviour being monitored by the system;
4. [evidence on the relationship between a drowsy driver and the chosen trigger behaviour;]
5. the system’s drowsiness threshold;
6. [the vehicle speed at which the system is activated and at which a system learning phase is initiated];
7. an explanation of the system’s activation, reactivation and deactivation functions;
8. a document detailing the functionality of the system’s HMI; and
9. a document providing at least one test protocol to be tested by the Technical Service, for which the DDAW system shall deliver a warning when performed.

1.1. The document detailing the functionality of the system’s HMI shall include evidence of compliance with the DDAW HMI requirements set out in paragraph 5.6. of this Regulation, and justifications where the manufacturer has chosen not to follow the recommendations listed in paragraphs 5.6.2.3., 5.6.2.4. and/or 5.6.2.5. of this Regulation.

1.2. The list of system inputs shall only be provided to the Approval Authority and the Technical Service for the purpose of verifying the DDAW system for the
type-approval.

[1.3. The information provided in accordance with para 1 (f) shall include the strategy and limitations for completion of the system learning phase following deviations from the activation speed, including periods where the vehicle speed falls below the lower limit of the normal operational speed range.]

2. The manufacturer shall also provide the Technical Service with a list of all the system inputs containing both the primary metrics and secondary metrics.

2.1. The list of secondary metrics will not be passed on from the Technical Service to the Approval Authority.

[3. Provisions for the Periodic Technical Inspection of the system

3.1. For periodic technical inspections, the documentation shall describe how the correct operational status of the system can be confirmed, including where applicable the use of the vehicle electronic interface to confirm the integrity of the system software.]

Annex 4

Documentation package on the effectiveness of the DDAW system

1. The manufacturer shall carry out validation testing in accordance with Appendix 1 of this Annex, to ensure that the DDAW system is able to monitor driver drowsiness in a manner which is accurate, robust and scientifically valid.

2. The documentation package provided by the manufacturer to both the Approval Authority and the Technical Service, as evidence on the effectiveness of the DDAW system, including to document the validation testing, shall include:

1. the information on the number and demographics of the test participants assessed;
2. the description of the test conditions assessed;
3. evidence that the system works effectively in weather conditions not limiting the system’s operation;
4. a description of full test methodology used to assess the effectiveness of the system and the rationale behind, including any alternative or complementary measurements, and/or alternative drowsiness threshold (referred to in paragraphs 6.2., 6.3, and 7. respectively of Appendix 1 to this Annex);
5. a description of the statistical analysis technique used;
6. an analysis and description of the results, including demonstration that the performance levels meet the required minimum acceptance criteria referred to in paragraph 9 of Appendix 1 to this Annex;
7. evidence that the system alerts a driver at the time of, or before reaching the KSS level set out in paragraph 5.5.2. of this Regulation; and
8. the data of each participant for statistical anomaly assessment.

2.1.1. The information on demographics of the test participants referred to in paragraph 2. (a) of this annex shall include:

1. inclusionary or exclusionary criteria that were used when selecting participants; and
2. a statement on the adequacy of the participants in respect of the targeted demography for the vehicle set out in paragraph 4.3. of Appendix 1 to this Annex.

2.1.2. The evidence referred to in paragraph 2. (c) of this annex shall indicate the known or logical limitations due to weather conditions, the technical challenge, and the strategy for the system’s behaviour in these given weather conditions (for example strong rain, snow, high temperature etc.).

2.1.3. The information on full test methodology referred to in paragraph 2. (d) of this annex shall include:

1. evidence that the complementary measurement(s) or the combination of the primary (KSS or alternative measure) and complementary measurement(s) are a valid and accurate means to assess driver drowsiness;
2. information on how the data of the primary and complementary measurements were analysed and collated to assess the effectiveness of the DDAW system; and
3. evidence that the drowsiness threshold being used in the validation testing is equivalent to a KSS level referred to in paragraph 5.5.2. of this Regulation.

2.1.4. If a statistical analysis technique that differs from that set out in paragraph 9.1. of Appendix 1 of this Annex is used (refer paragraph 2. (e) above), evidence on the statistical analysis method and level of significance used shall be provided.

2.1.5. If the validation was performed on another vehicle type, the documentation shall contain information linking the validation process to the type-approval requirements for the motor vehicle concerned.

2.1.5.1. For example, the manufacturer may provide documents demonstrating the technical similarities or the adaptation required to enable the DDAW system to the vehicle presented for type-approval. The participants shall also be similar (target demography, involvement of professional driver) to those required for the assessment of the vehicle presented for type-approval.

2.1.6. If the validation was performed as part of a research to establish compliance with the technical requirements for the DDAW system, the documentation shall contain information linking the validation testing to the respective
type-approval requirements for the motor vehicle concerned.

2.1.6.1. For example, the manufacturer may provide an additional link between what is enabled in the version of the DDAW system installed in the motor vehicle concerned, and a recalculation of the equivalent sensitivity values from the data produced during the research phase.

Annex 4 – Appendix 1

Test procedures for the validation of DDAW systems

1. Purpose

1.1. Validation testing to ensure that DDAW systems are able to monitor driver drowsiness in a manner which is accurate, robust and scientifically valid.

2. Definitions

For the purposes of this Annex:

2.1. "*Concordance rate*" is a score calculated from the rating of a sleep expert on facial training video.

3. Testing requirements

3.1. Validation testing shall take place using human participants. Alternatively, the data used for the validation shall derive from behaviour data collected using human participants.

3.2. Any validation testing that includes a human participant operating a motor vehicle in a real-world, non-simulated road environment, shall have a safety backup.

3.2.1. The safety backup shall intervene if the driver becomes drowsy, so that he or she can no longer safely control the motor vehicle.

3.2.2. If the safety backup intervenes, the participant shall not be permitted to drive any further as part of the testing.

3.2.3. If the safety backup is a backup driver, an appropriate safety strategy (for example: double pedals) shall be required.

3.2.4. Once the safety backup intervenes, the safety strategy prepared for this test shall apply (for example, another non-drowsy driver takes primary control of the vehicle and the drowsy driver shall not be allowed to continue to drive).

3.3. If validation testing is performed in a simulator, the manufacturer shall document its limitations in comparison to real-world open-road testing of the DDAW system. Such documentation will include comparison of the primary input data used for the DDAW system, from the simulator and the vehicle in real-world conditions, together with an analysis of the validity of the simulated test results.

4. Testing sample

4.1. Each test participant shall generate at least 1 true positive or 1 false negative event as referred to in paragraphs 6.1.4. and 6.1.5. of this Annex. The total number, obtained by the sum of true positive events and false negative events, shall be equal to, or higher than 10. The minimum sample size shall be 10 participants. More than one test may be run for each participant in order to acquire more data for a given participant.

4.1.1. The sensitivity per participant shall be calculated first for each participant, then the average sensitivity and its standard deviation shall be calculated from the values of sensitivity per participant.

4.1.2. Results may be provided for a subgroup of participants from a larger test, to include only participants fitting the description above.

4.2. All the results from participants fitting the requirements of paragraph 4.1. above shall be accounted for the validation. Excluding results from participants with at least 1 true positive or 1 false negative is not allowed.

4.3. The participants shall correspond to the targeted demography for the vehicle (for example, participants with a valid licence to drive the vehicle on which the DDAW system is installed).

4.4. None of the 10 participants of the minimum sample size shall be involved in the development of the DDAW system. One of the acceptance criteria, of paragraph 9. below, shall be met with and without results from the additional participants involved in the DDAW system development.

5. Environmental conditions

5.1. At a minimum, the system shall be tested in both the day and night conditions listed below in paragraphs 5.1.3. and 5.1.4., and record at least a true positive event in each condition (overall, not for each participant tested in the condition).

5.1.1. It is not necessary for all participants to test both conditions.

5.1.2. Systems not affected by light do not need to meet the minimum number of true positive events in each condition.

5.1.3. For non-simulated road environment testing:

1. Day: testing shall start after sunrise and before sunset;
2. Night: testing shall start after sunset and before sunrise.

5.1.4. For simulated road environment testing:

1. Day: conditions diffuse with ambient light (ISO 15008:2017);
2. Night: condition of low ambient illumination under which the adaptation level of the driver is mainly influenced by the portion of the road ahead covered by the vehicle’s own headlights and surrounding street lights, and display and instrument brightness (ISO 15008:2017).

6. Measuring drowsiness

6.1. Application of the KSS

6.1.1. The participant’s level of drowsiness shall be measured using the KSS.

6.1.1.1. Participants shall be trained on the KSS before they apply it as part of the DDAW system validation testing.

6.1.1.1.1. The training process shall be the same for all participants.

6.1.1.1.2 The training process shall be clearly documented in the evidence dossier supplied to the Technical Service in accordance with Annex 4 of this Regulation.

6.1.1.2. The standardised wording in the paragraph 2.11 of this Regulation shall be used and all levels of the KSS shall be labelled.

6.1.2. Measurements shall be obtained during the testing at intervals of approximately 5 minutes, where each measurement obtained shall be assumed to cover the previous 5 minutes.

6.1.2.1 The recommended intervals do not apply before the participant first provides a self-assessment rating at level 6 or above on the KSS.

6.1.3. During the validation tests, [it is recommended to mute] the warnings from the DDAW system [shall be concealed] to prevent changes of the status of the participant before the next self-assessment. The time at which the warning from the DDAW [is provided (muted or not)][occurs] shall be recorded to clearly establish if it is a true positive event.

6.1.4. Any warning from the DDAW system shall be treated as a true positive event if the participant’s previous or next rating is at a KSS of level 7 or above. [Paragraphs 6.1.6. and 6.1.7. (a) provide further clarification on generation of true positive events].

6.1.4.1. Once a true positive event has occurred, all the data points after this event shall be considered irrelevant for this specific test. If the participant restarted the test after a rest, it shall be considered a different dataset (with the same participant).

[6.1.5. Once a false negative event has occurred, the testing shall continue where this is supported by the applicable safety strategy, and the measurements obtained after that event included in the test run for the participant, subject to the other provisions of this Appendix.

6.1.5.1. A false negative event shall be recorded where a participant rating changes from a KSS of level 7 or below, to a KSS of level 8 or above, and where the provisions of paragraph 6.1.7. set that a false negative event has occurred.

6.1.5.2. Except where paragraph 6.1.5.3. applies:

6.1.5.2.1. a false negative event shall only be recorded once after such a transition in participant KSS level as described by paragraph 6.1.5.1. - successive false negative events shall not be recorded after only one such transition; and

6.1.5.2.2. to record an additional false negative event will require the participant rating to fall below a KSS of level 8 again, and then increase to a KSS of level 8 or above again, subject to the other provisions of paragraph 6.1.7. that set a false negative event has occurred.]

[[6.1.5.3. After a transition in participant KSS level as described by paragraph 6.1.5.1. which results in the recording of a false negative event, successive false negative events shall be recorded every [X minutes] where;

6.1.5.3.1. the participant rating does not fall back below a KSS level of 8 and then increase to a KSS of level 8 or above again; and

6.1.5.3.2. no warning is given by the DDAW system.]]

[6.1.6. If a participant rating is at or below a KSS of level 7, and the subsequent rating is at a KSS of level 7 (e.g. a sequence of ratings can be 6-7 or 7-7), a warning from the DDAW system in the testing interval immediately prior to or following the second rating in this sequence shall be treated as a true positive and end the specific test as in paragraph 6.1.4.1.]

[6.1.7. If a participant rating is below the drowsiness threshold referred to in paragraph 5.5.2. of this Regulation, and the subsequent rating is above or equal to the drowsiness threshold (e.g. a sequence of ratings can be 6-8 or 7-8), either:

1. the DDAW system provides a warning [in the testing interval immediately prior to or following the second rating in this sequence] and it shall be treated as a true positive and end the specific test as in paragraph 6.1.4.1.; or
2. the DDAW system does not provide a warning [in the testing interval immediately prior to the second rating in this sequence], the testing continues for an extra testing interval after which the participant provides a self-assessment above or equal to the drowsiness threshold again (e.g. sequence of ratings can be 7-8-8, 7-9-9 or 7-9-8), and the DDAW system does not provide a warning during this extra testing interval, it shall be treated as a false negative; or
3. the DDAW system does not provide a warning [in the testing interval immediately prior to the second rating in this sequence], the testing continues for an extra testing interval after which either;
	1. the participant provides a self-assessment at the KSS level 7 (e.g. sequence of ratings can be 6-8-7, 7-8-7 or 7-9-7), and the DDAW system does not provide a warning during this extra testing interval, the data point shall be treated as true negative and marked as an outlier - outliers shall be documented in the documentation package; or
	2. without prejudice to other situations which can be excluded during the extra testing interval, the participant provides a self-assessment below the KSS level 7 (e.g. sequence of ratings can be 7-8-6 or 6-8-6), and the DDAW system does not provide a warning during this extra testing interval, the data points from this specific test shall be excluded from the overall testing data results as the drowsiness ratings of the participant are likely unreadable - is recommended to provide an additional training session to the participant after such a result.]

 6.2. Alternative measurement(s)

6.2.1. Manufacturers may use an alternative measurement(s) to validate a DDAW system under the following conditions:

1. if the alternative method directly monitors the participants’ state, such as Electroencephalogram or PERCLOS (percentage of eyelid closure);
2. if the alternative method fits the measurement described in paragraph 6.1. above, except for the drowsiness scale used and/or the time interval used;
3. if the measurement is performed by sleep video analysis performed by at least 3 assessors (sleep experts), who do not interact with the participant and each other before the rating process is finalised. The time interval of this method shall not exceed 5 minutes.

6.2.2. Where alternative measurements to the KSS are used to determine the participant’s level of drowsiness, the manufacturer shall provide evidence that the chosen measurement is a valid and accurate means to assess driver drowsiness, and that the drowsiness threshold used in the validation testing is equivalent to a KSS level referred to in paragraph 5.5.2. in this Regulation.

6.2.2.1 For the sleep video analysis, expected evidence concerns the quality of the video used, the visibility of the setup for the participant, the correspondence between the rating scale and the KSS, the training of the assessors (in addition a minimal performance level of ‘concordance rate’ superior or equal to 0.70 is required), information of independence of the assessors to the DDAW development, and description on how the final rating is calculated based on the input from the sleep experts.

$$Concordance rate= \sum\_{i=1}^{n}[1-(\left|A\_{i}-B\_{i}\right|)/D]/n$$

 A: *‘True’* Drowsiness rating of the training video;

 B: Evaluated drowsiness level by the sleep expert;

 D: Maximum of drowsiness level occurring during the training video;

 n: number of data points to rate during the training video

6.2.3. If the alternative measurement(s) uses a different time interval than the one specified in paragraph 6.1.2. above, paragraph 6.1.7. shall apply, where the intervals of assessment are equal to or shorter than 15 minutes, and above or equal to 5 minutes.

6.2.3.1. If the time interval is shorter than 5 minutes, the interpretation of paragraph 6.1.7. shall not apply. Instead, a false negative event occurs only if the DDAW does not provide a warning during the 10 minutes following the last rating below the drowsiness threshold. If during 5 minutes or more the ratings are above the drowsiness threshold, and then followed by a rating below the drowsiness threshold, this data point (below the drowsiness threshold) shall be treated as an outlier. All outliers shall be documented in the documentation package.

6.2.4. If the time intervals are longer than 15 minutes, the Technical Service may consider raising the requirements set by the below paragraphs 9.1. (a), and 9.1. (b) by the amount set out in paragraph 9.1. (c) to better allow for a correct assessment of the driver’s drowsiness.

6.3. Complementary measurement(s)

6.3.1. Manufacturers may use complementary measurement(s) to the KSS or the alternative measurement(s) to validate a DDAW system, which shall be duly documented in the documentation package under Annex 4.

6.3.1.1. Where sleep expert video analysis is used as a complementary measurement, at a minimum two raters and an inter-rater reliability test shall be conducted, and the results shall be included in the documentation package. The facial cues and body movements/behaviours for each level of drowsiness on the KSS shall be demonstrated (usually it is a confidential document).

7. Alternative drowsiness threshold

7.1. If alternative measurements to the KSS are used to validate a DDAW system, the manufacturer shall state the threshold being used and provide evidence detailing the equivalency between the threshold and a KSS level of 8.

7.1.1. If the alternative measurement uses a scale which has fewer descriptive levels than the KSS, the equivalence between the alternative scale and the KSS shall refer to the lowest corresponding level when compared to the KSS. The only exception is for the level of the alternative scale that includes the equivalency to a KSS level of 8, in which case it shall refer to the highest corresponding level when compared to the KSS.

7.1.1.1. For example, if the alternative scale level ‘4’ corresponds to a range between ‘6 and 7’ on the KSS, a ‘4’ on the alternative scale shall be considered a ‘6’ on the KSS.

7.1.1.2. If an alternative scale level ‘A’ corresponds to a range between ‘6.5 and 8.5’ on the KSS, an ‘A’ on the alternative scale shall be considered an ‘8’ on the KSS.

7.2. If a complementary measurement is used in addition to the KSS or to an alternative measurement to validate a DDAW system, the manufacturer shall state the threshold being used and provide evidence detailing the equivalency between the threshold and a KSS level of 8.

8. Test results

8.1. Test data shall only be discarded by the manufacturer before any statistical analysis is conducted in any of the following cases:

1. there is an error in carrying out the testing procedure;
2. the participant’s KSS ratings are deemed unreliable;
3. insufficient data is collected for a participant (e.g. length of trial was too short or participant did not generate at least 1 true positive event or 1 false negative event).

8.2. The manufacturer shall document any errors that occur during testing as part of the evidence in the documentation package, separate from the test results, along with the erroneous data and, if applicable, the reason for excluding a participant’s data from the statistical analysis.

9. Acceptance criteria

9.1. A DDAW system shall be deemed effective by the Technical Services if the following requirements (a) or (b) is satisfied as modified, if necessary, by the requirements (c) for tests using interval time above 15 minutes and (d) for tests performed in a simulated environment:

1. The average sensitivity is above 40 % (Sensitivity calculated from the average of the sensitivity of all participants);
2. The lower bound from the 90 % confidence interval of the sensitivity results shall be above 20 %. It means that 95 % of the participants statistically have more than 20 % average sensitivity, this is verified by satisfying the equation:

$$Average\left(Sensitivity\right)-1.645×\frac{Standard Deviation\left(Sensitivity\right)}{\sqrt{Number of participants}}\geq 20\%$$

1. The requirement listed in sub-paragraph (a) is increased by 5 % and the requirement listed in sub-paragraph (b) is increased by 2.5 % if the testing method does not use an interval time equal to or shorter than the 15 minutes possible in paragraph 6.2.3 above (upper bound possible between the recommended [interval and the alternative interval for measurements]).
2. The requirement listed in sub-paragraph (a) is lowered by 5 % and the requirement listed in sub-paragraph (b) is lowered by 2.5 % if the testing method is performed on an open road.

For example, the average sensitivity required for an open road test using an interval time equal to or shorter than 15 minutes will be ≥ 35 % and the average sensitivity required for a simulation test with interval time of more than 15 minutes will be ≥ 45 %.

Performance metric calculation

The performance metrics shall be calculated as:

Sensitivity value of a participant:

$$Sensitivity=\frac{n(TP)}{n\left(TP\right)+n(FN)}×100 \%$$

Average sensitivity for all participants:

$$Average\left(Sensitivity\right)=\frac{\sum\_{}^{}Sensitivity}{Number of participants}$$

Standard Deviation (Sensitivity):

$$Stadard Deviation\left(Sensitivity\right)=\sqrt{\frac{\sum\_{}^{}(Sensitivity-Average\left(Sensitivity\right))^{2}}{Number of participants}}$$

Where:

n(TP) is the total number of events in which the system and driver both correctly identify as drowsy;

n(FN) is the total number of events in which the system predicts that the driver is not drowsy, but when the driver is in fact drowsy;

n(FP) is the total number of events in which the system predicts that the driver is drowsy, but the driver is not drowsy;

n(TN) is the total number of events in which the system and driver both correctly identify as not being drowsy;

∑ is the sum over all the participants.

Note: The distribution of the results is approximated by a Gaussian distribution.

9.2. If the DDAW system requires a learning phase, the acceptance criteria listed in paragraph 9.1. above shall exclude [results][false negative events] obtained during the learning phase or for 30 minutes after the conditions for activation of the DDAW are fulfilled, whichever is shorter.

Annex 5

 Assessment by the Technical Service of the DDAW system documentation packages and test report

1. The Technical Service shall check that the manufacturer has proved that the DDAW system meets the technical requirements specified in paragraph 5. of this Regulation by using the validation criteria specified in Annex 4 – Appendix 1. At least the following actions are expected:

1. check that the reported performance levels meet the required minimum thresholds referred to paragraph 5.5.2 of this Regulation;
2. review the test report to verify whether the underlying methodology presented in the test report meets the requirements set out in
Annex 4 – Appendix 1;
3. perform an assessment of the test report from the validation testing carried out by the manufacturer.

1.1. The assessment of the test report shall verify whether the underlying evidence from the tests performed correspond with the reported test results to a level of overall effect such that the performance declaration is confirmed as being adequate. This includes assessing the participant data for statistical anomalies such as the number of outliers.

1.2. The Technical Service may use means at its discretion for the assessment of the test report. Such means may include a review of the full raw data sets from a selection of test drives chosen by the Technical Service (including any data that was excluded from the analysis) and re-running parts of the validation testing based on collected data (may only be possible for limited validation methods, such as sleep video analysis).

2. The Technical Service assess the capability of the test protocol proposed by the manufacturer to detect a drowsy driving event, including by considering the information on system functionality submitted by the manufacturer as part of the documentation package in accordance with Annex 3. The Technical Service shall also perform the test based on the proposed protocol.

2.1. The test shall be deemed to be passed as soon as the DDAW system provides a warning for a drowsy driver.

2.2. If the test fails to provide a warning for a drowsy driver, the Technical Service may repeat it up to two times.

2.3. The root cause of any failed test run shall be analysed by the Technical Service and the analysis shall be annexed to the test report. If the root cause cannot be linked to a deviation in the test setup, the Technical Service may test any variation of a parameter within that parameter’s range, as defined in the test protocol provided by the manufacturer.

2.4. A reference to the code of the respective test protocol, which has been run by the Technical Service, shall be included in the ‘Remarks’ section of the
Type-Approval Certificate in order to allow competent authorities to request the test protocol from the Technical Service that carried out the test (for example, when performing market surveillance activities).

1. \* Former titles of the Agreement:

 Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version);

 Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2). [↑](#footnote-ref-2)
2. As defined in section 2 of the Consolidated Resolution on the Construction of Vehicles (R.E.3)

(document TRANS/WP.29/78/Rev.7, para.2)-<https://unece.org/transport/vehicle-regulations/wp29/resolutions> [↑](#footnote-ref-3)
3. As defined in Mutual Resolution No. 2 (M.R.2) of the 1958 and the 1998 Agreements - Containing Vehicle Propulsion System Definitions, see document ECE/TRANS/WP.29/1121. [↑](#footnote-ref-4)
4. The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html [↑](#footnote-ref-5)
5. Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

Delete what does not apply. [↑](#footnote-ref-6)
6. The latter number is given only as an example. [↑](#footnote-ref-7)