UNITED NATIONS

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*

(Revision 3, including the amendments which entered into force on 20 October 2017)

Addendum: XXX: Regulation: XXX-00

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REGULATION ON UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR VEHICLES WITH REGARD TO THE ADVANCED EMERGENCY BRAKING SYSTEM (AEBS)

UNITED NATIONS

Colour code:

- Red: internal references to be further cross-checked at the end of the exercise
- Light blue: Values still to be fixed according to the decisions of the informal group.
- ~~Strikethrough: deleted text compared to the previous version of the document~~
- **Bold: added text compared to the previous version of the paragraph (except some titles)**
- *Italic: Note of the Secretariat*

* Former title 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.

REGULATION No. XXX-00

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF: MOTOR VEHICLES WITH REGARD TO THE ADVANCED EMERGENCY BRAKING SYSTEMS (AEBS)

INTRODUCTION

The intention of this Regulation is to establish uniform provisions for Advanced Emergency Braking Systems (AEBS) fitted to motor vehicles of the Categories M1 and N1 primarily used within urban driving conditions.

The system shall automatically detect a potential forward collision, provide the driver with a warning and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating the severity of a collision in the event that the driver does not respond to the warning.

In the case of a failure in the system, the safe operation of the vehicle shall not be endangered.

During any action taken by the system (the collision warning and emergency braking phases), the driver can, at any time through a conscious action, e.g. by a steering action or an accelerator kick-down, take control and override the system.

The Regulation cannot include all the traffic conditions and infrastructure features in the type-approval process. Actual conditions and features in the real world should not result in false warnings or false braking to the extent that they encourage the driver to switch the system off.

Regulation No. XXX

Uniform provisions concerning the approval of motor vehicles with regard to the Advanced Emergency Braking System (AEBS)

Contents

1. Scope

This Regulation applies to the approval of vehicles of Category M1 and N1 with regard to an on-board system to avoid or mitigate the severity of a rear-end in lane collision with a passenger car or to avoid or mitigate the severity of an impact with a vulnerable road user.

2. Definitions

For the purposes of this Regulation:

2.1. "*Advanced Emergency Braking System (AEBS)*" means a system which can automatically detect a potential forward collision~~, provide the driver with a warning~~ and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating ~~the severity of~~ a collision ~~in the event that the driver does not respond to the warning. The Advanced Emergency Braking System shall include a Collision Warning Phase and an Emergency Braking Phase~~.

2.2. "*Emergency Braking Phase*" means the phase starting when the AEBS emits a braking demand ~~for at least 6.43m/s² deceleration~~ to the service braking system of the vehicle.

2.3. "*Collision Warning Phas*e" means the phase directly preceding the emergency braking phase, during which the AEBS warns the driver of a potential forward collision.

2.4. "*Vehicle Type with Regard to its Advanced Emergency Braking System*" means a category of vehicles which do not differ in such essential respects as:

(a) Vehicle features which significantly influence the performances of the Advanced Emergency Braking System;
(b) The type and design of the Advanced Emergency Braking System.

2.5. "*Subject Vehicle*" means the vehicle being tested.

~~2.6. "*Vehicle Target*" means a high volume series production passenger car of Category M1 AA saloon(1) or in the case of a soft target an object representative of such a vehicle in terms of its detection characteristics applicable to the sensor system of the AEBS under test.~~

~~2.7. "*Pedestrian Target*" means a soft target is an object that is representative of the human attributes applicable to the sensor system of the AEBS under test.~~

~~2.8. "*Bicycle Target*" means a soft target is an object that is representative of the human and bicycle attributes applicable to the sensor system of the AEBS under test.~~

2.9. "*Soft Target"* means a target that will suffer minimum damage and cause minimum damage to the subject vehicle in the event of a collision.

2.10. "*Moving Target*" means a target travelling at a constant speed in the same direction and in the centre of the same lane of travel as the subject vehicle.

2.11. "*Stationary Target*" means a target at standstill facing the same direction and positioned on the centre of the same test lane of travel as the subject vehicle.

2.12. "*Common Space*" means an area on which two or more information functions (e.g. symbol) may be displayed, but not simultaneously.

2.13. "*Self-Check*" means an integrated function that checks for a system failure on a semi-continuous basis at least while the system is active.

2.14. "*Time to Collision (TTC)*" means the value of time obtained by dividing the distance between the subject vehicle and the target by the relative speed of the subject vehicle and the target, at an instant in time.

3. Application for approval

3.1. The application for approval of a vehicle type with regard to the Advanced Emergency Braking System shall be submitted by the vehicle manufacturer or by his authorised representative.

3.2. It shall be accompanied by the documents mentioned below in triplicate:

3.2.1. A description of the vehicle type with regard to the items mentioned in Paragraph 2.X., together with a documentation package which gives access to the basic design of the AEBS 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.

3.3. 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 shall be granted.

4.2. An approval number shall be assigned to each type approved; its first two digits (at present 00 corresponding to the 00 series of amendments) 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 AEBS, 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 which apply this Regulation by means of a form conforming to the model in Annex 1 and documentation supplied by the applicant being in a format not exceeding A4 (210 × 297mm), or folded to that format, and on an appropriate scale or electronic format.

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 Annex 2, consisting of:

4.4.1. A circle surrounding the Letter "E" followed by the distinguishing number of the country which has granted approval; [1]

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.

5. Specifications

5.1. General

5.1.1. Any vehicle fitted with an AEBS complying with the definition of Paragraph 2.1. above shall meet the performance requirements contained in Paragraphs 5.1. to 5.6.2. of this Regulation and shall be equipped with an anti-lock braking function in accordance with the performance requirements of **Annex 6 to Regulation No.13-H 01 Series of amendments for vehicles of Category M1 and N1 or of** Annex 13 to Regulation No. 13 **11 Series of amendments for vehicles Category N1.**

5.1.2. The effectiveness of AEBS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10 by applying:

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

5.1.3. Conformity with the safety aspects of complex electronic control systems shall be shown by meeting the requirements of Annex 4.

5.2. Performance Requirements

5.2.1. The system shall provide the driver with appropriate warning(s) as below:

5.2.1.1. A collision warning when the **vehicle speed is above 30 km/h and the** AEBS has detected the possibility of a collision with a preceding vehicle of Category M1 in the same lane or the possibility of a collision with a pedestrian **[and a bicycle]** that is crossing the road. The warning shall be as specified in Paragraph 5.5.1. below.

[1] 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.3.

5.2.1.2. A failure warning when there is a failure in the AEBS that prevents the requirements of this Regulation of being met. The warning shall be as specified in Paragraph 5.5.4. below.

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

5.2.1.3. A deactivation warning, if the vehicle is equipped with a means to manually deactivate the AEBS, shall be given when the system is deactivated. This shall be as specified in Paragraph 5.4.2. below.

5.2.2. Subsequent to the warning(s) of Paragraph 5.2.1.1. above, and subject to the provisions of Paragraphs 5.3.1. **and** ~~to~~ 5.3.**2.** below, there shall be an emergency braking phase having the purpose of significantly decreasing the speed of the subject vehicle. This shall be tested in accordance with Paragraphs 6.4., 6.5., 6.6., 6.7. and 6.8. of this Regulation.

5.2.2.1. In an emergency braking phase, the AEBS shall emit a braking demand for at least [6.4 / 9.0]m/s² deceleration to the service braking system of the vehicle.

5.2.3. The system shall be active at least within the vehicle speed range between [10]km/h and [50/**60**]km/h, and at all vehicle load conditions, unless manually deactivated as per Paragraph 5.4. below.

5.2.4. The system shall be designed to minimise the generation of collision warning signals and to avoid autonomous braking in situations where the driver would not recognise an impending **[forward or crossing]** collision. This shall be demonstrated in accordance with Paragraph 6.11. of this Regulation.

5.3. Interruption by the Driver

5.3.1. The AEBS **shall** ~~may~~ provide the means for the driver to interrupt the collision warning phase **and**~~. However, when a vehicle braking system is used to provide a haptic warning, the system shall provide the driver with a means to interrupt the warning braking.~~

~~5.3.2. The AEBS shall provide the means for the driver to interrupt~~ the emergency braking phase.

5.3.**2**. In both cases above, this interruption may be initiated by any positive action (e.g. kick-down, operating the direction indicator control) that indicates that the driver is aware of the emergency situation. The vehicle manufacturer shall provide a list of these positive actions to the technical service at the time of type approval and it shall be annexed to the test report.

5.4. Manual deactivation

When a vehicle is equipped with a means to deactivate the AEBS function, the following conditions shall apply as appropriate:

5.4.1. The AEBS function shall be automatically reinstated at the initiation of each new ignition cycle.

5.4.2. A constant optical warning signal shall inform the driver that the AEBS function has been deactivated. The yellow warning signal specified in Paragraph 5.5.4. below may be used for this purpose.

5.4.3. The AEBS control shall be installed so as to comply with the relevant requirements and transitional provisions of UN Regulation No. 121, 01 series of amendments or any later series of amendments.

5.4.4. The AEBS control shall be designed a in such a way that its operation shall not be possible with less than two deliberate actions.

5.4.5. It shall not be possible to deactivate the AEBS at a speed above [10 km/h].

5.5. Warning Indication

5.5.1. The collision warning referred to in Paragraph 5.2.1.1. above shall be provided by at least two modes selected from acoustic, haptic or optical.

The timing of the warning signals shall be such that they provide the possibility for the driver to react to the risk of collision and take control of the situation, and shall also avoid nuisance for the driver by too early or too frequent warnings. This shall be tested in accordance with the provisions of Paragraphs 6.4.2., 6.5.2., 6.6.2, 6.7.2. and 6.8.2. of this Regulation.

5.5.2. A description of the warning indication and the sequence in which the collision warning signals are presented to the driver shall be provided by the vehicle manufacturer at the time of type-approval and recorded in the test report.

5.5.3. Where an optical means is used as part of the collision warning, the optical signal may be the flashing of the failure warning signal specified in Paragraph 5.5.4. below.

5.5.4. The failure warning referred to in Paragraph 5.2.1.2. above shall be a constant yellow optical warning signal.

5.5.5. Each AEBS optical warning signal shall be activated either when the ignition (start) switch is turned to the "on" (run) position or when the ignition (start) switch is in a position between the "on" (run) and "start" 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.

5.5.6. 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.

5.5.7. When the driver is provided with an optical warning signal to indicate that the AEBS is temporarily not available, for example due to inclement weather conditions, the signal shall be constant and yellow in colour. The failure warning signal specified in Paragraph 5.5.4. above may be used for this purpose.

5.6. Provisions for the Periodic Technical Inspection

5.6.1. At a periodic technical inspection it shall be possible to confirm the correct operational status of the AEBS by a visible observation of the failure warning signal status, following a "power-ON" and any bulb check.

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.

5.6.2. 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.

Alternatively, this protection requirement is fulfilled when a secondary means of checking the correct operational status of the AEBS is available.

6. Test procedure

6.1. **Test Conditions**

6.1.1. The test shall be performed on a flat, dry concrete or asphalt surface affording good adhesion.

6.1.2. The ambient temperature shall be between 0°C and 45°C.

6.1.3. The horizontal visibility range shall allow the target to be observed throughout the test.

6.1.4 The tests shall be performed when there is no wind liable to affect the results.

6.2. Vehicle Conditions

6.2.1. Test Weight

The vehicle shall be tested in a condition of load to be agreed between the manufacturer and the Technical Service. No alteration shall be made once the test procedure has begun.

6.3. Test Targets

6.3.1. The target used for the vehicle detection tests shall be a regular high volume series production passenger car of Category M1 AA saloon, or alternatively a "soft target" representative of such a vehicle in terms of its identification characteristics applicable to the sensor system of the AEBS under test. [2]

[2] The identification characteristics of the soft target shall be agreed upon between the Technical Service and the vehicle manufacturer as being equivalent to a passenger car of Category M1 AA saloon.

6.3.2. The targets used for the pedestrian detection tests shall be a “soft target” and be representative of the human attributes applicable to the sensor system of the AEBS under test.[3]

6.3.3. The targets used for the bicycle detection tests shall be a “soft target” and be representative of the human and bicycle attributes applicable to the sensor system of the AEBS under test.[4]

6.3.4. Details that enable the target(s) to be specifically identified and reproduced shall be recorded in the vehicle type approval documentation.

6.4. Warning and Activation Test with a Stationary Vehicle Target

6.4.1. The subject vehicle shall approach the stationary target in a straight line for at least two seconds prior to the functional part of the test with a subject vehicle to target centreline offset of not more than 0.5m.

The functional part of the test shall start when the subject vehicle is travelling at a constant speed ~~between~~ [10]~~km/h and~~ [50]~~km/h~~ as defined in Table I, Column B of Annex 3 and is at a distance of at least 50m from the target.

From the start of the functional part until the point of collision there shall be no adjustment to any control of the subject vehicle by the driver other than slight adjustments to the steering control to counteract any drifting.

6.4.2. The timing for the collision warning modes referred to in Paragraph 5.5.1. above shall comply with the following:

6.4.2.1. At least an optical warning and either an acoustic or haptic warning shall be provided no later than specified in Table I, Column C, of Annex 3.

6.4.2.3. Any speed reduction during the warning phase, shall not exceed either [15]km/h or [30]% of the total subject vehicle speed reduction, whichever is higher.

6.4.3. The warning phase shall be followed by the emergency braking phase.

6.4.4. The total speed reduction of the subject vehicle at the time of the impact with the stationary target shall be not less than the value specified in Table I, Column F of Annex 3.

6.4.5. The emergency braking phase shall start no later than a TTC equal to or less than the value specified in Table I, Column D of Annex 3.

6.4.6. The emergency braking phase shall not start before a TTC equal to or less than the value specified in Table I, Column E of Annex 3.

[3] The identification characteristics of the soft target shall be agreed upon between the Technical Service and the vehicle manufacturer as being equivalent to an adult or child pedestrian.

[4] The identification characteristics of the soft target shall be agreed upon between the Technical Service and the vehicle manufacturer as being equivalent to a cyclist.

6.4.7. Compliance to 6.4.5 and 6.4.6. shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.

6.5. Warning and Activation Test with a Moving Vehicle Target

6.5.1. The subject vehicle and the moving target shall travel in a straight line, in the same direction, for at least two seconds prior to the functional part of the test, with a subject vehicle to target centreline offset of not more than 0.5m.

The functional part of the test shall start when the subject and target vehicle are travelling at a constant **speed** ~~speeds between [10]km/h and [50]km/h~~ as defined in Table II, Column B and G of Annex 3 and at a distance of at least 50m.

From the start of the functional part of the test until the subject vehicle comes to a speed equal to that of the target there shall be no adjustment to any subject vehicle control by the driver other than slight steering adjustments to counteract any drifting.

6.5.2. The timing for the collision warning modes referred to in Paragraph 5.5.1. above shall comply with the following:

6.5.2.1. At least an optical warning and either an acoustic or haptic warning shall be provided no later than specified in Table II, Column C of Annex 3

6.5.2.3. Any speed reduction during the warning phase shall not exceed either [15]km/h or [30]% of the total subject vehicle speed reduction, whichever is higher.

6.5.3. The warning phase shall be followed by the emergency braking phase.

6.5.4. The total speed reduction of the subject vehicle at the time of the impact with the target vehicle shall be not less than the value specified in Table II, Column F of Annex 3.

6.5.5. The emergency braking phase shall start no later than a TTC equal to or less than the value specified in Table II, Column D of Annex 3.

6.5.6. The emergency braking phase shall not start before a TTC equal to or less than the value specified in Table II, Column E of Annex 3.

6.5.7. Compliance to 6.5.5 and 6.5.6. shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.

~~**6.6. Warning and Activation Test with a Braking Vehicle Target**~~

~~6.6.1. The subject vehicle and the moving target shall travel in a straight line, in the same direction, for at least two seconds prior to the functional part of the test, with a subject vehicle to target centreline offset of not more than 0.5m.~~

~~The functional part of the test shall start when the subject and target vehicle are travelling at a constant speed of [50]km/h, at a distance specified in Table III, Column H of Annex 3, and the target vehicle begins to deceleration as specified in Table III, Column I of Annex 3.~~

~~From the start of the functional part of the test until the subject vehicle comes to a speed equal to that of the target there shall be no adjustment to any subject vehicle control by the driver other than slight steering adjustments to counteract any drifting.~~

~~6.6.2. The timing for the collision warning modes referred to in Paragraph 5.5.1. above shall comply with the following:~~

~~6.6.2.1. At least an optical warning and either an acoustic or haptic warning shall be provided no later than specified in Table III, Column C of Annex 3.~~

~~6.6.2.3. Any speed reduction during the warning phase shall not exceed either [15]km/h or [30]% of the total subject vehicle speed reduction, whichever is higher.~~

~~6.6.3. The warning phase shall be followed by the emergency braking phase.~~

~~6.6.4. The total speed reduction of the subject vehicle at the time of the impact with the target vehicle shall be not less than the value specified in Table III, Column X of Annex X.~~

~~6.6.5. The emergency braking phase shall start no later than a TTC equal to or less than the value specified in Table III, Column D of Annex 3.~~

~~6.6.6. The emergency braking phase shall not start before a TTC equal to or less than the value specified in Table III, Column E of Annex 3.~~

~~6.6.7. Compliance to 6.6.5 and 6.6.6. shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.~~

6.7. Warning and Activation Test with a Pedestrian Target

[Outcome of AEBS-03: EuroNCAP/J-NCAP for the time being as it is the only one available]

6.7.1. The subject vehicle shall approach the impact point with the pedestrian target in a straight line for at least two seconds prior to the functional part of the test with a subject vehicle to impact point centreline offset of not more than [0.5]m.

The pedestrian target shall travel in a straight line perpendicular to the subject vehicle's direction of travel at a speed defined in Table IV, Column G of Annex 3. The pedestrian target's positioning shall be coordinated with the subject vehicle in such a way that the impact point of the pedestrian target on the subject vehicle is the centreline of the subject vehicle if the subject vehicle remains at the prescribed test speed throughout the functional part of the test and does not brake.

The functional part of the test shall start when the subject vehicle is travelling at a constant speed between [10]km/h and [50]km/h as defined in Table IV, Column B of Annex 3 and is at a distance of at least 50m from the target.

From the start of the functional part until the subject vehicle has avoided the collision or the subject vehicle has passed the impact point with the pedestrian target there shall be no adjustment to any control of the subject vehicle by the driver other than slight adjustments to the steering control to counteract any drifting.

The test prescribed above shall be carried out with both an adult and child pedestrian "soft target" defined in 6.3.2.

6.7.2. The timing for the collision warning modes referred to in Paragraph 5.5.1. above shall comply with the following:

6.7.2.1. At least an optical warning and either an acoustic or haptic warning shall be provided no later than specified in Table IV, Column C of Annex 3.

6.7.2.3. Any speed reduction during the warning phase, shall not exceed either [15]km/h or [30]% of the total subject vehicle speed reduction, whichever is higher.

6.7.3. The warning phase shall be followed by the emergency braking phase.

6.7.4. The total speed reduction of the subject vehicle at the time of the impact with the pedestrian target shall be not less than the value specified in Table IV, Column F of Annex 3.

6.7.5. The emergency braking phase shall start no later than a TTC equal to or less than the value specified in Table IV, Column D of Annex 3.

6.7.6. The emergency braking phase shall not start before a TTC equal to or less than the value specified in Table IV, Column E of Annex 3.

6.7.7. Compliance to 6.7.5 and 6.7.6. shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.

6.8. Warning and Activation Test with a Bicycle Target

6.8.1. The subject vehicle shall approach the impact point with the bicycle target in a straight line for at least two seconds prior to the functional part of the test with a subject vehicle to impact point centreline offset of not more than [0.5]m.

The bicycle target shall travel in a straight line perpendicular to the subject vehicle's direction of travel at a speed defined in Table V, Column G of Annex 3. The bicycle target's positioning shall be coordinated with the subject vehicle in such a way that the impact point of the bicycle target on the subject vehicle is the centreline of the subject vehicle if the subject vehicle remains at the prescribed test speed throughout the functional part of the test and does not brake.

The functional part of the test shall start when the subject vehicle is travelling at a constant speed between [10]km/h and [50]km/h as defined in Table V, Column B of Annex 3 and is at a distance of at least 50m from the target.

From the start of the functional part until the subject vehicle has avoided the collision or the subject vehicle has passed the impact point with the bicycle target there shall be no adjustment to any control of the subject vehicle by the driver other than slight adjustments to the steering control to counteract any drifting.

6.8.2. The timing for the collision warning modes referred to in Paragraph 5.5.1. above shall comply with the following:

6.8.2.1. At least an optical warning and either an acoustic or haptic warning shall be provided no later than specified in Table V, Column C of Annex 3.

6.8.2.3. Any speed reduction during the warning phase, shall not exceed either [15]km/h or [30]% of the total subject vehicle speed reduction, whichever is higher.

6.8.3. The warning phase shall be followed by the emergency braking phase.

6.8.4. The total speed reduction of the subject vehicle at the time of the impact with the bicycle target shall be not less than the value specified in Table V, Column F of Annex 3.

6.8.5. The emergency braking phase shall start no later than a TTC equal to or less than the value specified in Table V, Column D of Annex 3.

6.8.6. The emergency braking phase shall not start before a TTC equal to or less than the value specified in Table V, Column E of Annex 3.

6.8.7. Compliance to 6.8.5 and 6.8.6. shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.

6.9. Failure Detection Test

6.9.1 Simulate an electrical failure, for example by disconnecting the power source to any AEBS component or disconnecting any electrical connection between AEBS components. When simulating an AEBS failure, neither the electrical connections for the driver warning signal of Paragraph 5.5.4. above nor the optional manual AEBS deactivation control of Paragraph 5.4. shall be disconnected.

6.9.2. The failure warning signal mentioned in Paragraph 5.5.4. above shall be activated and remain activated not later than 10s after the vehicle has been driven at a speed greater than [10]km/h and be reactivated immediately after a subsequent ignition "off" ignition "on" cycle with the vehicle stationary as long as the simulated failure exists.

6.10. Deactivation Test

6.10.1. For vehicles equipped with means to deactivate the AEBS, turn the ignition (start) switch to the "on" (run) position and deactivate the AEBS. The warning signal mentioned in Paragraph 5.4.2. above shall be activated. Turn the ignition (start) switch to the "off" position. Again, turn the ignition (start) switch to the "on" (run) position and verify that the previously activated warning signal is not reactivated, thereby indicating that the AEBS has been reinstated as specified in Paragraph 5.4.1. above. If the ignition system is activated by means of a "key", the above requirement shall be fulfilled without removing the key.

6.11. False Reaction Test

6.11.1 Vehicle Target

6.11.1.1. Two stationary vehicles, of Category M1 AA saloon, shall be positioned:

(a) So as to face in the same direction of travel as the subject vehicle,
(b) With a distance of 4.5m between them(1),
(c) With the rear of each vehicle aligned with the other.

6.11.1.2. The subject vehicle shall travel for a distance of at least **[60]**m, at a constant speed of 50 ± 2km/h to pass centrally between the two stationary vehicles.

During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.

6.11.1.3. The AEBS shall not provide a collision warning and shall not initiate the emergency braking phase.

6.11.2 Pedestrian Target

6.11.2.1. A pedestrian target as prescribed in 6.3.2., shall be positioned:

(a) So as to face in the direction perpendicular to that of the subject vehicle,
(b) With a distance of [2]m from the subject vehicle centreline,

6.11.2.2. The subject vehicle shall travel in a straight line for a distance of at least **[**50**]**m, at a constant speed of **[**50 ± 2**]**km/h to pass the stationary pedestrian target.

During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.

6.11.2.3. The AEBS shall not provide a collision warning and shall not initiate the emergency braking phase.

6.11.3. Bicycle Target

6.11.3.1. A ~~pedestrian~~ **bicycle** target as prescribed in 6.3.3., shall be positioned:

(a) So as to face in the direction perpendicular to that of the subject vehicle,
(b) With a distance of [2]m from the subject vehicle centreline,

6.11.3.2. The subject vehicle shall travel in a straight line for a distance of at least **[**50**]**m, at a constant speed of **[**50 ± 2**]**km/h to pass the stationary bicycle target.

During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.

6.11.3.3. The AEBS shall not provide a collision warning and shall not initiate the emergency braking phase.

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;

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 conform to the general provisions defined in Appendix 2 to the Agreement (E/ECE/324-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 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)
.....
.....
.....

Concerning: [2] Approval granted
Approval extended
Approval refused
Approval withdrawn
Production definitively discontinued

of a type of vehicle with regard to the advanced emergency braking system pursuant to Regulation No. XXX

Approval No.:..... Extension 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:.....
6. Date of submission of vehicle for approval: .....
7. Technical Service performing the approval tests: .....
8. Date of report issued by that Service: .....
9. Number of report issued by that Service:.....
10. Approval granted/refused/extended/withdrawn:[2]
11. Place:.....
12. Date:.....
13. Signature:.....

[1] Distinguishing number of the country which has granted/extended/refused/withdrawn an approval (see approval provisions in the Regulation).
[2] Strike out what does not apply.

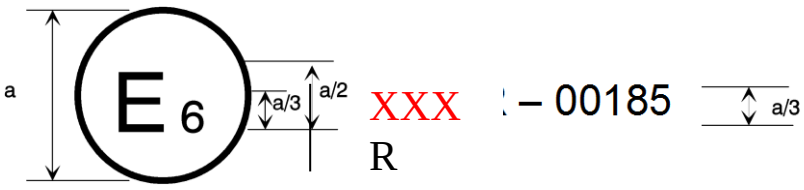
14. Annexed to this communication are the following documents, bearing the approval number indicated above: .....

15. Any remarks:.....

Annex 2

Arrangements of approval marks

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



a = 8 mm min

The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in Belgium (E 6) with regard to to the Advanced Emergency Braking Systems (AEBS) pursuant to Regulation No. XXX. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No. XXX in its original form.

Annex 3

Warning and activation test requirements – pass/fail values

Table I: Warning and Activation Test with a Stationary Vehicle Target

A	B	C	D	E	F
	Subject Vehicle speed ref. 6.4.1.	Timing of warning modes ref. 6.4.2.1.	Timing of emergency braking phase ref. 6.4.5.	Timing of emergency braking phase ref. 6.4.6.	Speed reduction ref. 6.4.4.
M1	~~10km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	~~20km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	~~30km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	~~40km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	50km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h
N1	~~10km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	~~20km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	~~30km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	~~40km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~
	50km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h

Table II: Warning and Activation Test with a Moving Vehicle Target

A	B	C	D	E	F	G
	Subject Vehicle speed ref. 6.5.1.	Timing of warning modes ref. 6.5.2.1.	Timing of emergency braking phase ref. 6.5.5	Timing of emergency braking phase ref. 6.5.6.	Speed reduction ref. 6.5.4.	Target speed ref. 6.5.1.
M1	~~30km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
	~~40km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
	60km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	20km/h
	~~70km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
N1	~~30km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
	~~40km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~
	60km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	20km/h
	~~70km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~20km/h~~

~~**Table III: Warning and Activation Test with a Braking Vehicle Target**~~

~~A~~	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~	~~G~~	~~H~~	~~I~~
	~~Subject Vehicle speed ref. 6.6.1~~	~~Timing of warning modes ref. 6.6.2.1.~~	~~Timing of emergency braking phase ref. 6.6.6.~~	~~Timing of emergency braking phase ref. 6.6.6.~~	~~Speed reduction ref. 6.6.4~~	~~Target speed ref. 6.6.1.~~	~~Target vehicle distance ref. 6.6.1~~	~~Target vehicle deceleration ref. 6.6.~~
~~M1~~	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~12m~~	~~2m/s²~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~12m~~	~~6m/s²~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~40m~~	~~2m/s²~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~40m~~	~~6m/s²~~
~~N1~~	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~12m~~	~~2m/s²~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~12m~~	~~6m/s²~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~40m~~	~~2m/s²~~
	~~50km/h~~	~~[X.X]s~~	~~[X.X]s~~	~~[X.X]s~~	~~[XX]km/h~~	~~50km/h~~	~~40m~~	~~6m/s²~~

Table IV: Warning and Activation Test with a Pedestrian Target
[Outcome of AEBS-03: EuroNCAP/J-NCAP for the time being as it is the only one available]

A	B	C	D	E	F	G
	Subject Vehicle speed ref. 6.7.1.	Timing of warning modes ref. 6.7.2.1.	Timing of emergency braking phase ref. 6.7.5.	Timing of emergency braking phase ref. 6.7.6.	Speed reduction ref. 6.7.4.	Target speed ref. 6.7.1.
M1	10km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	20km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	30km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	40km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	50km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
N1	10km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	20km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	30km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	40km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	50km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h

Table V: Warning and Activation Test with a Bicycle Target

A	B	C	D	E	F	G
	Subject Vehicle speed ref. 6.8.1.	Timing of warning modes ref. 6.8.2.1.	Timing of emergency braking phase ref. 6.8.5.	Timing of emergency braking phase ref. 6.8.6.	Speed reduction ref. 6.8.4.	Target speed ref. 6.8.1.
M1	10km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	20km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	30km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	40km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	50km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
N1	10km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	20km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	30km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	40km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h
	50km/h	[X.X]s	[X.X]s	[X.X]s	[XX]km/h	[X]km/h

Annex 4

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

TBC Outcome of ECE/TRANS/WP.29/GRRF/2017/27 - (GRRF) Proposal for amendments to Regulation No. 79 (Steering equipment) WP.29 in March 2018 ***(ECE/TRANS/WP.29/2018/35)***