

30 January 20XX

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 2, including the amendments which entered into force on 16 October 1995)

Addendum AEBS: Regulation No. AEBS+1

Date of entry into force: XXX

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR VEHICLES WITH REGARD TO THE ADVANCED EMERGENCY BRAKING SYSTEM



UNITED NATIONS

*/ 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.

GE.08-

Regulation No. AEBS

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR VEHICLES
WITH REGARD TO THE ADVANCED EMERGENCY BRAKING SYSTEM

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1. SCOPE AND PURPOSE

- 1.1. This Regulation applies to the advanced emergency braking system of vehicles of category M₂, N₂, M₃ and N₃^{1/}.
- 1.2. Contracting Parties shall issue or accept approvals to vehicles equipped with AEBS detecting both moving and stationary targets unless they notify to the Secretary-General of the United Nations their option for vehicles equipped with AEBS detecting moving targets only. Such notification shall have effect in accordance with the time scales laid down in Article 1, paragraphs 6. and 7. of the 1958 Agreement (E/ECE/TRANS/505/Rev.2).

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. "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) the manufacturer's trade name or mark,
(b) vehicle features which significantly influence the performances of the Advanced Emergency Braking System,
(c) the type and design of the Advanced Emergency Braking System.
- 2.3. "Advanced Emergency Braking System (AEBS)" means a system which can automatically detect [a potentially forward collision / an emergency situation] and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating a collision.
- 2.4. "Time to collision" means the delay remaining between the instant considered and the time of the collision between the subject vehicle and the target vehicle, notwithstanding any alteration of speeds and directions during that delay.
- 2.5. "Remaining reaction time" means the particular time to collision when the instant considered is defined by the vehicle manufacturer as permitting the driver to undertake an action successfully avoiding the collision.
- 2.5. "Subject vehicle" means the vehicle being subject to testing.

^{1/} As defined in Annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3) (document TRANS/WP.29/78/Rev.1/Amend.2, as last amended by Amend.4).

- 2.6. “Target vehicle” or “target” means a target simulating the bulk and the radar cross section of a regular passenger car of category M1 AA saloon 1/
- 2.7. “Stationary target” means a target fixed on the ground on the axis of the test course.
- 2.8. “Moving target” means a target having a speed of at least 15 km/h along the axis of the test course and in the same direction as the subject vehicle.
- 2.9. “Radar cross section (RCS)” means a measure of how detectable an object is with a radar.
- 2.10. “Collision mitigation” means the actions taken by the system, such as the detection of a stationary obstacle, the computing of the relevant data and the activation of the service brakes, for significantly decreasing the impact speed.
- 2.11. “Collision avoidance” means the actions taken by the system, such as the obstacle detection, the computing of the relevant data and the activation of the service brakes, for slowing down the subject vehicle to a speed equal to or lower than the target vehicle speed.

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 authorized representative.
- 3.2. It shall be accompanied by the documents mentioned below in triplicate and include the following particulars:
- 3.2.1. a description of the vehicle type with regard to the items mentioned in paragraph 2 above, together with dimensional drawings and 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; and
- 3.2.2. particulars of the primary reference marks in sufficient detail to enable them to be readily identified and the position of each in relation to the others and to the "R" point verified.
- 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 (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 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 photographs and/or plans supplied by the applicant being in a format not exceeding A4 (210 x 297 mm), or folded to that format, and on an appropriate scale.
- 4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark conforming to the model described in 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 2;

2/ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Serbia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35 (vacant), 36 for Lithuania, 37 for Turkey, 38 (vacant), 39 for Azerbaijan, 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia, 46 for Ukraine, 47 for South Africa, 48 for New Zealand, 49 for Cyprus, 50 for Malta, 51 for the Republic of Korea, 52 for Malaysia, 53 for Thailand, 54 and 55 (vacant) and 56 for Montenegro. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the 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, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

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. 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. Subject to the requirements of paragraph 12, any vehicle fitted with a AEBS complying with the definition of paragraph 2.3 shall meet the performance requirements contained in paragraphs 5.1 to 5.5.4. of this regulation and shall be equipped with an anti-lock device.

5.1.2. Any AEBS fitted on a vehicle shall comply with the requirements of Regulation No. 10 on electromagnetic interferences.

5.2. Performance requirements

5.2.1. When tested in the conditions of paragraphs 6.1. to 6.5., the AEBS shall:

5.2.1.1. provide the driver with the warning specified in paragraph 5.5.1. when tested in accordance with the provisions of paragraph 6.6. (reaction time warning test);

5.2.1.2. activate the subject vehicle service braking system when tested in accordance with the provisions of paragraph 6.7. (braking system activation test) and

5.2.1.3. provide the driver with the warning specified in paragraph 5.5.2. when tested in accordance with the provisions of paragraph 6.8. (malfunction detection test).

5.2.2. The AEBS shall be active at least within the vehicle speed range of 15 km/h to 90 km/h, unless manually de-activated as per paragraph 5.4. below.

5.3. The driver shall always have the capability of overriding the AEBS.

- 5.4. When a vehicle is equipped with a means to disable 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 disabled. The yellow warning signal specified in paragraph 5.5.2. below may be used for this purpose.
- 5.5. Warning requirements
- 5.5.1. The remaining reaction time warning referred to in paragraph 6.6. shall be by means of an optical, audible or haptic warning signal, or any combination thereof.
- 5.5.2. The malfunction warning referred to in paragraph 6.8. shall be by means of a yellow optical warning signal.
- 5.5.3. Any 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 (bulb check). This requirement does not apply to tell-tales shown in a common space.
- 5.5.4. The optical warning signals shall be visible even by daylight; the satisfactory condition of the signal must be easily verifiable by the driver from the driver's seat.

6. TEST PROCEDURE

- 6.1. Test conditions
- 6.1.1. The test shall be performed on a flat surface affording good adhesion.
- 6.1.2. The ambient temperature shall be between 0° C and 45° C.
- 6.1.4. The horizontal visibility range shall be greater than 1 km.
- 6.2. Accuracy of measurements
- 6.2.1. Distances shall be measured with an accuracy of +/- 5%.
- 6.2.2. Speeds shall be measured with an accuracy of +/- 5%.
- 6.2.3. Time and delays shall be measured with an accuracy of +/- 1%.

6.3. Test course

The course shall be a segment of straight road of sufficient length in order to maintain the subject vehicle speeds required below and to allow detecting a target vehicle moving at a minimum speed of 15 km/h and braking the subject vehicle up to collision avoidance.

6.4. Vehicle conditions

6.4.1. Test weight

The vehicle shall be tested in the unladen conditions of the Type-0 test as described in Annex 4 to Regulation N° 13. No alteration shall be made once the test procedure has begun.

6.4.2. The AEBS shall be configured in accordance with the instructions provided by the vehicle manufacturer. In the case where the AEBS is equipped with a user-adjustable warning threshold, each test shall be performed twice: once with the warning threshold set at its earliest setting, and once with the warning threshold set at its latest setting. No alteration shall be made once the test procedure has begun.

6.5. Target vehicle

6.5.1. The target used for the test shall have the bulk of a regular passenger car of category M1 AA saloon and a total radar cross section (RCS) of at least $2 \text{ m}^2 \pm 1 \%$.

6.5.2. When the target carries radar reflector(s),

6.5.2.1. the reflector(s) shall be oriented toward the subject vehicle;

6.5.2.2. the reflectors shall be placed between 0.09 m to 1.00 m height; and

6.5.2.3. the structure supporting the reflector(s) on the target shall not reflect radio waves emitted by the subject vehicle AEBS.

6.5.3. Stationary target

The stationary target shall be positioned such that its component nearest to the subject vehicle is positioned at the collision point on the axis of the test course.

6.5.4. Moving target

The moving target shall be moving on the axis of the test course at a constant speed comprised between 5 km/h and 70 km/h.

- 6.5.5. Details that enable the target vehicle to be specifically identified shall be recorded in the vehicle type-approval documentation.
- 6.6. Remaining reaction time warning test
- 6.6.1. With the subject vehicle stationary and the ignition locking system in the "Lock" or "Off" position, activate the ignition locking system to the "On" or "Run" position. The AEBS shall perform a check of lamp function as specified in paragraph 5.5.3. of this Regulation.
- 6.6.2. Warning test with stationary target
- 6.6.2.1. Drive the vehicle, enter the vehicle the test course and smoothly track the lane so that the posture of the vehicle is stable. Perform three trials at the respective constant speeds of 20 km/h, 40 km/h and 80 km/h.
- 6.6.2.2. The AEBS shall warn the driver as mentioned in paragraph 5.2.1.1. at the latest when the remaining reaction time has fallen below 1,5 s.
- 6.6.2.3. If the AEBS did not warn the driver as mentioned in paragraph 6.6.2.2. above, discontinue the test.
- 6.6.3. Warning test with moving target
- 6.6.3.1. Drive the moving target as in paragraph 6.5.4.
- 6.6.3.2. Increase the subject vehicle speed and perform three trials at the relative speed between the subject vehicle and the target equalling to 20 km/h, 40 km/h and 60 km/h.
- 6.6.3.3. The AEBS shall warn the driver as mentioned in paragraph 5.2.1.1. at the latest when the remaining reaction time has fallen below 1,5 s.
- 6.6.3.4. If the AEBS did not warn the driver as mentioned in paragraph 6.6.3.3. above, discontinue the test.
- 6.7. Braking system activation test
- 6.7.1. With the vehicle stationary and the ignition locking system in the "Lock" or "Off" position, activate the ignition locking system to the "On" or "Run" position. The AEBS shall perform a check of lamp function as specified in paragraph 5.5.3. of this Regulation.
- 6.7.2. Braking system activation with stationary target

- 6.7.2.1. Drive the vehicle, enter the vehicle the test course and smoothly track the lane so that the posture of the vehicle is stable. Perform three trials at the respective constant speeds of 20 km/h, 40 km/h and 80 km/h.
- 6.7.2.2. The AEBS shall:
 - 6.7.2.2.1. activate the service braking system as mentioned in paragraph 5.2.1.2. at the latest at a time to collision equalling 0,8 s, and
 - 6.7.2.2.2. provoke an average deceleration of at least 3,3 m/s².
- 6.7.2.3. If the AEBS did not activate the service braking system as mentioned in paragraph 6.7.2.2. above, discontinue the test.
- 6.7.3. Braking system activation with moving target
 - 6.7.3.1. Drive the moving target as in paragraph 6.5.4. and drive the subject vehicle, enter it the test course and smoothly track the lane so that the posture of the vehicle is stable.
 - 6.7.3.2. Perform three trials at the relative speed between the subject vehicle and the target equalling to 20 km/h, 40 km/h and 60 km/h.
 - 6.7.3.3. The AEBS shall:
 - 6.7.3.3.1. activate the service braking system as mentioned in paragraph 5.2.1.2. at a time to collision equalling 0,8 s, and
 - 6.7.3.3.2. provoke an average deceleration of at least 3,3 m/s².
 - 6.7.3.4. If the AEBS did not activate the service braking system as mentioned in paragraph 6.7.3.3. above, discontinue the test.
- 6.8. Malfunction detection
 - 6.8.1. Simulate a AEBS malfunction, for example by disconnecting the power source to any AEBS component, disconnecting any electrical connection between AEBS components, or misaiming the sensor(s). When simulating an AEBS malfunction, the electrical connections for the telltale lamps shall not be disconnected.
 - 6.8.2. Drive the vehicle for up to 60 minutes along any portion of the test course.
 - 6.8.3. The sum of the total cumulative drive time under paragraph 6.8.2. shall be the lesser of 60 minutes or the time at which the AEBS malfunction telltale illuminates in accordance with paragraph 5.5.2.

6.8.4. If the AEBS malfunction indicator did not illuminate in accordance with paragraph 5.5.2. as required, discontinue the test.

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 Administrative Department which approved the vehicle type. The department 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 Competent Authority shall inform the other Contracting Parties of the extension by means of the communication form which appears in Annex 2 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.2) 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 Competent 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 DEFINITELY 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 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 ADMINISTRATIVE DEPARTMENTS

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 Administrative Departments which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval are to be sent.

12. INTRODUCTORY PROVISIONS

12.1. As from the date of entry into force of this Regulation, Contracting Parties applying this Regulation shall not:

(a) Refuse to grant ECE approval for a type of vehicle under this Regulation; or

(b) Prohibit the sale or entry into service of a vehicle

if the vehicle falls within the scope of this Regulation and complies with the requirements of this Regulation.

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 DEFINITELY DISCONTINUED

of a type of vehicle with regard to the lane departure warning system pursuant to Regulation No. AEBS

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. Data to enable the identification of reference point "R" of the seating position designated for the driver in relation to the primary reference marks:
.....
7. Identification, place and relative positions of the primary reference marks:
8. Date of submission of vehicle for approval:
9. Technical Service performing the approval tests:

10. Date of report issued by that service:
11. Number of report issued by that service:
12. Approval with regard to the AEBS is granted/refused: 2/
13. Place:
14. Date:
15. Signature:
16. Annexed to this communication are the following documents, bearing the approval number indicated above:

..... dimensional drawings

..... exploded view or photograph of the passenger compartment
17. Any remarks:

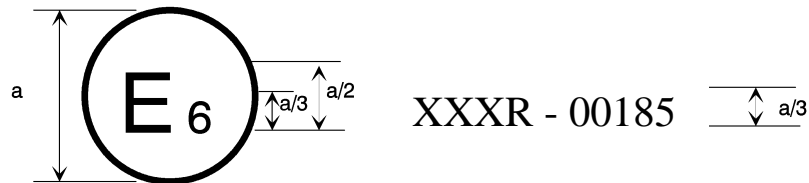
1/ Distinguishing number of the country which has granted/extended/refused/withdrawn an approval (see approval provisions in the Regulation).

2/ Delete what does not apply.

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 (E6) with regard to the AEBS pursuant to Regulation No. AEBS. 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.
