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Regulation No. 116 (Anti-theft and alarm systems)

Proposal for amendments to Regulation No. 116 on uniform provisions concerning the protection of motor vehicles against unauthorized use and the approval of the device against unauthorized use

Submitted by the GRSG ambassador of the International Whole Vehicle Type Approval *

The text reproduced below was prepared by the ambassador of the International Whole Vehicle Type Approval (IWVTA) to the Working Party on General Safety Provisions (GRSG). At a previous session, GRSG decided to split Regulation No. 116 in three separate Regulations, respectively on devices against unauthorized use, immobilizers and vehicle alarm system (ECE/TRANS/WP.29/GRSG/89, para. 51). This document amends the existing Regulation No. 116 to remove the provisions related to the immobilizers and vehicle alarm system and keep only those related to the devices against unauthorized use. It is mainly based on informal document GRSG-112-39 distributed during the 112th session of GRSG (see report ECE/TRANS/WP.29/GRSG/91, para. 34).

* In accordance with the programme of work of the Inland Transport Committee for 2016–2017 (ECE/TRANS/254, para. 159 and ECE/TRANS/2016/28/Add.1, cluster 3.1), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



UN Regulation No. 116

Uniform provisions concerning the protection of motor vehicles against unauthorized use and the approval of the device against unauthorized use

1. Scope

This Regulation applies to:

- 1.1. Approval of a vehicle of category M₁ and N₁¹ with regard to its devices to prevent unauthorized use.
- 1.2. The fitting of devices to vehicles of other categories is optional but any such device fitted is required to comply with all relevant provisions of this Regulation.
- 1.3. At the request of the manufacturer, Contracting Parties may grant approvals according to this Regulation to vehicles of other categories and devices for fitment to such vehicles.

2. Definitions

- 2.1. "*Component*" means a device subject to the requirements of this Regulation and intended to be part of a vehicle, which may be type-approved independently of a vehicle where this Regulation makes express provisions for so doing.
- 2.2. "*Separate technical unit*" means a device subject to the requirements of this Regulation and intended to be part of a vehicle, which may be type-approved separately, but only in relation to one or more specified types of vehicle where this Regulation makes express provisions for so doing.
- 2.3. "*Manufacturer*" means the person or body who is responsible to the approval authority for all aspects of the type approval process and for ensuring conformity of production. It is not essential that the person or body is directly involved in all stage of the construction of the vehicle, system, component or separate technical unit which is the subject of the approval process.
- 2.4. "*Vehicle type*" means a category of motor vehicles which do not differ in such essential respects as:
 - 2.4.1. the manufacturer's type designation,
 - 2.4.2. the arrangement and design of the vehicle component or components on which the device to prevent unauthorized use acts,
 - 2.4.3. the type of device to prevent unauthorized use.

¹ As defined in 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).

- 2.5. "*Device to prevent unauthorized use*" means a system designed to prevent unauthorized normal activation of the engine or other source of main engine power of the vehicle in combination with at least one system which:
- (a) locks the steering; or
 - (b) locks the transmission; or
 - (c) locks the gearshift control; or
 - (d) locks brakes.
- In the case of a system which locks brakes, deactivation of the device shall not automatically release the brakes contrary to the driver's intention.
- 2.6. "*Steering*" means the steering control, the steering column and its accessory cladding, the steering shaft, the steering gearbox and all other components which directly affect the effectiveness of the device to prevent unauthorized use.
- 2.7. "*Combination*" means one of the specifically developed and constructed variations of a locking system which, when properly activated, permits operation of the locking system.
- 2.8. "*Key*" means any device designed and constructed to provide a method of operating a locking system which is designed and constructed to be operated only by that device.
- 2.9. "*Rolling code*" means an electronic code consisting of several elements the combination of which changes at random after each operation of the transmitting unit.

3. Application for approval

- 3.1. The application for approval of a vehicle or component type with regard to this Regulation shall be submitted by the manufacturer.
- 3.2. It shall be accompanied by an information document in accordance with the model shown in Annex 1, and giving a description of the technical characteristics of the device to prevent unauthorized and the method(s) of installation for each make and type of vehicle on which the protective device is intended to be installed.
- 3.3. Vehicle(s) / component(s) representative of the type(s) to be approved shall be submitted to the technical service responsible for conducting the approval tests.

4. Approval

- 4.1. If the type submitted for approval to this Regulation meets the requirements of the relevant part(s) of this Regulation, approval of that type 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 Regulation in its original form) shall indicate the series of amendments incorporating the most recent [major] technical amendment made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another type of vehicle or component as defined in this Regulation.

- 4.3. Notice of approval or of extension of approval of a type 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 2 to this Regulation.
- 4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle or component conforming to a type approved under this Regulation, an international approval mark consisting of:
 - 4.4.1. a circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval², and
 - 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.
- 4.5. If a type conforms to a type approved, under one or more other UN 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 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 4.4.1.
- 4.6. The approval mark shall be clearly legible and be indelible.
- 4.7. In the case of a vehicle, the approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 4.9. Annex 3 to this Regulation gives examples of arrangements of approval marks.

5. Approval of a vehicle of category M₁ and N₁ with regard to its devices to prevent unauthorized use

- 5.1. General specifications
 - 5.1.1. The device to prevent unauthorized use shall be so designed that it is necessary to put it out of action in order to enable:
 - 5.1.1.1. the engine to be started by means of the normal control, and
 - 5.1.1.2. the vehicle to be steered, driven or moved forward under its own power.
 - 5.1.1.3. The requirement of paragraph 5.1.1. can be achieved at the same time as or before to the actions described at paragraphs 5.1.1.1. and 5.1.1.2.
 - 5.1.2. The requirements of paragraph 5.1.1. shall be met by the application of a single key.
 - 5.1.3. Except in the case provided for in paragraph 5.2.1.5., a system operated with a key inserted in a lock shall not permit removal of the key before the device referred to in paragraph 5.1.1. has come into action or has been set to act.

² As defined 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).

- 5.1.4. The device to prevent unauthorized use referred to in paragraph 5.1.1. above, and the vehicle components on which it operates, shall be so designed that it cannot rapidly and without attracting attention be opened, rendered ineffective or destroyed by, for example, the use of low-cost, easily concealed tools, equipment or fabrications readily available to the public at large.
- 5.1.5. The device to prevent unauthorized use shall be fitted to the vehicle as an item of original equipment (i.e. equipment installed by the vehicle manufacturer prior to first retail sale). It shall be fitted in such a way that even after removal of its housing it cannot, when in the blocked condition, be dismantled other than with special tools. If it is possible to render the device to prevent unauthorized use ineffective by the removal of screws, those screws shall, unless they are of the non-removable type, be covered by parts of the blocked protective device.
- 5.1.6. Mechanical locking systems shall provide at least 1,000 different key combinations or a number equal to the total number of vehicles manufactured annually if less than 1,000. In vehicles of one type the frequency of occurrence of each combination shall be roughly one per 1,000.
- 5.1.7. Electrical/electronic locking systems, e.g. remote control, shall have at least 50,000 variants and shall incorporate a rolling code and/or have a minimum scan time of ten days, e.g. a maximum of 5,000 variants per 24 hours for 50,000 variants minimum.
- 5.1.8. Regarding the nature of the device to prevent the unauthorized use, paragraph 5.1.6. or 5.1.7., shall be applied.
- 5.1.9. The key and lock shall not be visibly coded.
- 5.1.10. The lock shall be so designed, constructed and fitted that turning of the lock cylinder, when in the locked position, with a torque of less than 2.45 Nm is not possible with any key other than the mating key, and
- 5.1.10.1. for lock cylinders with pin tumblers no more than two identical tumblers operating in the same direction shall be positioned adjacent to each other, and in a lock there shall not be more than 60 per cent identical tumblers;
- 5.1.10.2. for lock cylinders with disc tumblers no more than two identical tumblers operating in the same direction shall be positioned adjacent to each other, and in a lock there shall not be more than 50 per cent identical tumblers.
- 5.1.11. Devices to prevent unauthorized use shall be such as to exclude any risk of accidental operating failure while the engine is running, particularly in the case of blockage likely to compromise safety.
- 5.1.11.1. It shall not be possible to activate devices to prevent unauthorized use without first setting the engine controls to a stop condition and then performing an action which is not an uninterrupted continuation of stopping the engine or without first setting the engine controls to a stop condition and when the vehicle is stationary with the parking brake applied or the speed of the vehicle does not exceed 4 km/h.
- 5.1.11.2. In the case of devices to prevent unauthorized use, if the action of key withdrawal activates the device it shall either necessitate a minimum movement of 2 mm before activation of the device or incorporate an override facility to prevent accidental removal or partial withdrawal of the key.

- 5.1.11.3. Paragraphs 5.1.10., 5.1.10.1. or 5.1.10.2., and 5.1.11.2. are only applicable to devices which include mechanical keys.
- 5.1.12. Power assistance may be used only to activate the locking and/or unlocking action of the device to prevent unauthorized use. The device shall be kept in its operating position by any suitable means which does not need a power supply.
- 5.1.13. It shall not be possible to activate the motive power of the vehicle by normal means until the device to prevent unauthorized use has been deactivated.
- 5.1.14. Devices to prevent unauthorized use by preventing release of the brakes of the vehicle shall only be permitted when the working parts of the brakes are held in a locked position by a purely mechanical device. In this case the prescriptions of paragraph 5.1.13. do not apply.
- 5.1.15. If the device to prevent unauthorized use is equipped with a driver warning feature it shall be activated when the operator opens the driver's side door, unless the device has been activated and the key removed by the operator.
- 5.2. Particular specifications

In addition to the general specifications prescribed in paragraph 5.1., the device to prevent unauthorized use shall meet the particular conditions prescribed below:

 - 5.2.1. Devices to prevent unauthorized use acting on the steering
 - 5.2.1.1. A device to prevent unauthorized use acting on the steering shall render the steering inoperative. Before the engine can be started, the normal steering operation shall be restored.
 - 5.2.1.2. When the device to prevent unauthorized use is set to act, it shall not be possible to prevent the device from functioning.
 - 5.2.1.3. The device to prevent unauthorized use shall continue to meet the requirements of paragraphs 5.1.11., 5.2.1.1., 5.2.1.2. and 5.2.1.4. after it has undergone 2,500 locking cycles in each direction of the wear producing test specified in Part 1 of Annex 4 to this Regulation.
 - 5.2.1.4. The device to prevent unauthorized use shall, in its activated position, satisfy one of the following criteria:
 - 5.2.1.4.1. It shall be strong enough to withstand, without damage to the steering mechanism likely to compromise safety, the application of a torque of 300 Nm about the axis of the steering spindle in both directions under static conditions.
 - 5.2.1.4.2. It shall incorporate a mechanism designed to yield or slip, such that the system will withstand, either continuously or intermittently, the application of a torque of at least 100 Nm. The locking system shall still withstand the application of this torque after the test specified in Part 2 of Annex 4 to this Regulation.

- 5.2.1.4.3. It shall incorporate a mechanism designed to permit the steering wheel to rotate freely on the blocked steering spindle. The blocking mechanism shall be strong enough to withstand the application of a torque of 200 Nm about the axis of the steering spindle in both directions under static conditions.
- 5.2.1.5. If the device to prevent unauthorized use is such that the key can be removed in a position other than the position in which the steering is inoperative, it shall be so designed that the manoeuvre required to reach that position and remove the key cannot be effected inadvertently.
- 5.2.1.6. If a component fails such that the torque requirements specified in paragraphs 5.2.1.4.1., 5.2.1.4.2. and 5.2.1.4.3. cannot be easily applied, yet the steering system remains blocked, the system shall satisfy the requirements.
- 5.2.2. Devices to prevent unauthorized use acting on the transmission or on brakes
 - 5.2.2.1. A device to prevent unauthorized use acting on the transmission shall prevent the rotation of the vehicle's driving wheels.
 - 5.2.2.2. A device to prevent unauthorized use by acting on brakes shall brake at least one wheel on each side of at least one axle.
 - 5.2.2.3. When the device to prevent unauthorized use is set to act, it shall not be possible to prevent the device from functioning.
 - 5.2.2.4. It shall not be possible for the transmission or brakes to be blocked inadvertently when the key is in the lock of the device to prevent unauthorized use, even if the device preventing starting of the engine has come into action or been set to act. This does not apply wherever the requirements of paragraph 5.2.2. of this Regulation are met by devices used for another purpose in addition and the lock under the conditions above is necessary for this additional function (e.g. electrical parking brake).
 - 5.2.2.5. The device to prevent unauthorized use shall be so designed and constructed that it remains fully effective even after some degree of wear as a result of 2,500 locking cycles in each direction. In the case of a protective device acting on brakes, each mechanical or electrical sub-part of the device is concerned.
 - 5.2.2.6. If the device to prevent unauthorized use is such that the key can be removed in a position other than the position in which the transmission or brakes are locked, it shall be so designed that the manoeuvre required to reach that position and remove the key cannot be affected inadvertently.
 - 5.2.2.7. In the case when the protective device acting on the transmission is used, it shall be strong enough to withstand, without damage likely to compromise safety, the application in both directions and in static conditions of a torque 50 per cent greater than the maximum torque that can normally be applied to the transmission. In determining the level of this testing torque account shall be taken not of the maximum engine torque, but of the maximum torque that can be transmitted by the clutch or by the automatic transmission.
 - 5.2.2.8. In the case of a vehicle equipped with a protective device acting on brakes, the device shall be capable of holding the laden vehicle stationary on a 20 per cent up- or down-gradient.
 - 5.2.2.9. In the case of a vehicle equipped with a protective device acting on brakes, the requirements of this Regulation shall not be construed as a departure from

the requirements of UN Regulation No. 13 or 13-H even in the case of a failure.

- 5.2.3. Devices to prevent unauthorized use acting on the gearshift control
- 5.2.3.1. A device to prevent unauthorized use acting on the gearshift control shall be capable of preventing any change of gear.
- 5.2.3.2. In the case of manual gearboxes it shall be possible to lock the gearshift lever in reverse only; in addition locking in neutral shall be permitted.
- 5.2.3.3. In the case of automatic gearboxes provided with a "parking" position it shall be possible to lock the mechanism in the parking position only; in addition locking in neutral and/or reverse shall be permitted.
- 5.2.3.4. In the case of automatic gearboxes not provided with a "parking" position it shall be possible to lock the mechanism in the following positions only: neutral and/or reverse.
- 5.2.3.5. The device to prevent unauthorized use shall be so designed and constructed that it remains fully effective even after some degree of wear as a result of 2,500 locking cycles in each direction.
- 5.3. Electromechanical and electronic devices to prevent unauthorized use
- 5.3.1. Electromechanical and electronic devices to prevent unauthorized use, where fitted, shall comply with the requirements of paragraphs 5.1. and 5.2. above.
- 5.3.2. If the technology of the device is such that paragraph 5. is not applicable it shall be verified that care has been taken to preserve safety of the vehicle. The functioning process of these devices shall incorporate secure means to prevent any risk of blocking or accidental disfunctioning which could compromise the safety of the vehicle.

6. Modification of the type and extension of approval

- 6.1. Every modification of the vehicle type or component type shall be notified to the Type Approval Authority which approved the vehicle or component type. The Type Approval Authority shall then either:
 - (a) Decide, in consultation with the manufacturer, that a new type approval is to be granted; or
 - (b) Apply the procedure contained in paragraph 6.1.1. (Revision) below and, if applicable, the procedure contained in paragraph 6.1.2. (Extension) below.
- 6.1.1. Revision

When particulars recorded in the information documents have changed and the Type Approval Authority considers that the modifications made are unlikely to have appreciable adverse effects and that in any case the foot controls still meet the requirements, the modification shall be designated a "revision".

In such a case, the Type Approval Authority shall issue the revised pages of the information documents as necessary, marking each revised page to show clearly the nature of the modification and the date of re-issue. A consolidated, updated version of the information documents, accompanied by a detailed description of the modification, shall be deemed to meet this requirement.

- 6.1.2. The modification shall be designated as an "extension" if, in addition to the change of the data recorded in the information documents:
- (a) Further inspections or tests are required; or
 - (b) Any information on the communication document (with the exception of its attachments) has changed; or
 - (c) Approval to a later series of amendments is requested after its entry into force.
- 6.2. Confirmation or refusal of approval, specifying the alteration, shall be communicated by the procedure specified in paragraph 4.3. above to the Contracting Parties to the Agreement applying this Regulation.
- 6.3. The Type Approval Authority issuing the extension of approval shall assign a serial number to each communication form drawn up for such an extension.

7. Conformity of production procedures

The conformity of production procedures shall comply with those set out in the Agreement, Schedule 1 (E/ECE/324-E/ECE/TRANS/505/Rev.3), with the following requirements:

- 7.1. Vehicles/components under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements of the relevant part(s) of this Regulation.
- 7.2. For each type of vehicle or component the tests prescribed in the relevant part(s) of this Regulation shall be carried out on a statistically controlled and random basis, in accordance with one of the regular quality assurance procedures.
- 7.3. The authority which has granted approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be one every two years.

8. Penalties for non-conformity of production

- 8.1. The approval granted in respect of a vehicle/component type pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 7. above are not complied with.
- 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 form conforming to the model in Annex 2.

9. Production definitely discontinued

- 9.1. If the holder of the approval completely ceases to manufacture a vehicle/component type approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other

Contracting Parties to the Agreement applying this Regulation by means of a form conforming to the model in Annex 2.

10. Names and addresses of 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 Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries are to be sent.

Annex 1

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

Information document

in accordance with UN Regulation No. 116 relating to ECE system type approval of a vehicle type with regard to the devices to prevent unauthorized use

1. General
 - 1.1. Make (trade name of manufacturer):
 - 1.2. Type:
 - 1.3. Means of identification of type, if marked on the device¹:.....
 - 1.3.1. Location of that marking:
 - 1.4. Category of vehicle²:
 - 1.5. Name and address of the manufacturer:
 - 1.6. Location of the ECE approval mark:
 - 1.7. Address(es) of assembly plant(s):
2. General construction characteristics of the vehicle
 - 2.1. Photographs and/or drawings of a representative vehicle:
 - 2.2. Hand of drive: left / right³
3. Miscellaneous
 - 3.1. Devices to prevent unauthorized use of the vehicle
 - 3.1.1. Protective device:
 - 3.1.1.1. A detailed description of the vehicle type with regard to the arrangement and design of the control or of the unit on which the protective device acts:
 - 3.1.1.2. Drawings of the protective device and of its mounting on the vehicle:.....
 - 3.1.1.3. A technical description of the device:
 - 3.1.1.4. Details of the lock combinations use:.....

¹ If the means of identification of type contains characters not relevant to describe the vehicle, component or separate technical unit types covered in this information document, such characters shall be represented in the documentation by the symbol "?" (e.g. ABC??123??).

² As defined in 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).

³ Strike out what does not apply.

Annex 2

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 vehicle type with regard to its devices to prevent unauthorized use pursuant to UN Regulation No. 116

Approval No.

Extension No.

Reason for extension:

Section I

1. General

1.1. Make (trade name of manufacturer):

1.2. Type:

1.3. Means of identification of type, if marked on the vehicle/component/separate technical unit^{2 3}:

1.3.1. Location of that marking:

1.4. Category of vehicle⁴:

1.5. Name and address of manufacturer:

1.6. Location of the ECE approval mark:

1.7. Address(es) of assembly plant(s):

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

² Strike out what does not apply (there are cases where nothing needs to be deleted, when more than one entry is applicable).

³ If the means of identification of type contains characters not relevant to describe the vehicle, component or separate technical unit types covered in this information document, such characters shall be represented in the documentation by the symbol "?" (e.g. ABC??123??).

⁴ As defined in 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).

Section II

1. Additional information (where applicable): see addendum
2. Technical service responsible for carrying out the tests:
3. Date of test report:
4. Number of test report:
5. Remarks (if any): see addendum
6. Place:.....
7. Date:.....
8. Signature:
9. The index to the information package lodged with the approval authority, which may be obtained on request, is attached.

Addendum

to ECE type approval certificate No. ...

concerning the type approval of a vehicle with regard to UN Regulation No. 116

1. Additional information:
- 1.1. Brief description of the device(s) against unauthorized use and the vehicle parts on which it (they) act(s):
2. Remarks:

Annex 3

Arrangements of approval marks

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



$a = 8 \text{ mm min.}$

The above approval mark affixed to a vehicle shows that the type concerned was approved in the Netherlands (E4) pursuant to UN Regulation No. 116 under approval No. 001234. The first two digits (00) of the approval number indicate that the approval was granted in accordance with the requirements of UN Regulation No. 116 in its original form.

Annex 4 - Part I

Wear producing test procedure for devices to prevent unauthorized use acting on the steering

1. Test equipment

The test equipment shall consist of:

- 1.1. A fixture suitable for mounting the sample steering complete with the device to prevent unauthorized use attached, as defined in paragraph 2.5. of this Regulation.
- 1.2. A means for activating and deactivating the device to prevent unauthorized use which shall include the use of the key.
- 1.3. A means for rotating the steering shaft relative to the device to prevent unauthorized use.

2. Test method

- 2.1. A sample of the steering complete with the device to prevent unauthorized use is attached to the fixture referred to in paragraph 1.1. above.
- 2.2. One cycle of the test procedure shall consist of the following operations:
 - 2.2.1. Start position. The device to prevent unauthorized use shall be deactivated and the steering shaft shall be rotated to a position which prevents engagement of the device to prevent unauthorized use, unless it is of the type which permits locking in any position of the steering.
 - 2.2.2. Set to activate. The device to prevent unauthorized use shall be moved from the deactivated to the activated position, using the key.
 - 2.2.3.¹ Activated. The steering spindle shall be rotated such that the torque on it, at the instant of engagement of the device to prevent unauthorized use, shall be $40 \text{ Nm} \pm 2 \text{ Nm}$.
 - 2.2.4. Deactivated. The device to prevent unauthorized use shall be deactivated by the normal means, the torque being reduced to zero to facilitate disengagement.
 - 2.2.5.¹ Return. The steering spindle shall be rotated to a position which prevents engagement of the device to prevent unauthorized use.
 - 2.2.6. Opposite rotation. Repeat procedures described in paragraphs 2.2.2., 2.2.3., 2.2.4. and 2.2.5, but in the opposite direction of rotation of the steering spindle.
 - 2.2.7. The time interval between two successive engagements of the device shall be at least 10 seconds.
- 2.3. The wear-producing cycle shall be repeated the number of times specified in paragraph 5.2.1.3. of this Regulation.

¹ If the device to prevent unauthorized use permits locking in any position of the steering, the procedures described in paragraphs 2.2.3. and 2.2.5. shall be omitted.

Annex 4 - Part 2

Test procedure for devices to prevent unauthorized use acting on the steering using a torque limiting device

1. Test equipment

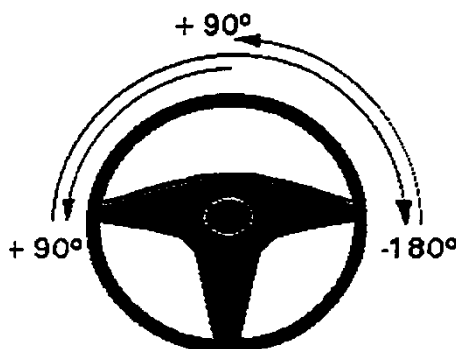
The test equipment shall consist of:

- 1.1. A fixture suitable for holding the relevant parts of a steering system or, if the test is carried out on a complete vehicle, a jacking system capable of lifting all the steered wheels clear of the ground, and
- 1.2. A device or devices capable of producing, and measuring, a torque applied to the steering control as prescribed in paragraph 2.3. The measurement precision shall be less than or equal to 2 per cent.

2. Test procedure description

- 2.1. If the test is carried out on a complete vehicle, the test shall be carried out with all the steered wheels of the vehicle held clear of the ground.
- 2.2. The steering lock shall be activated such that the steering is blocked.
- 2.3. A torque shall be applied to the steering control such that it rotates.
- 2.4. The test cycle includes a rotation of the steering control of 90° followed by a rotation in the opposite direction of 180° , and a new rotation of 90° in the original direction (see figure);

1 cycle = $+90^\circ / -180^\circ / +90^\circ$ with a tolerance of ± 10 per cent.



- 2.5. A cycle duration is equal to $20\text{ s} \pm 2\text{ s}$.
- 2.6. Five test cycles shall be carried out.
- 2.7. During each of the test cycles the minimum recorded value of the torque shall be higher than that given in paragraph 5.2.1.4.2. of this Regulation.

Annex 5

Electromagnetic compatibility

Note: To test the electromagnetic compatibility, either paragraph 1. or paragraph 2. shall be used, depending on the test facilities.

1. Method ISO

1.1. Immunity against disturbances conducted along supply lines

Apply the test pulses 1, 2a/2b, 3a, 3b, 4 and 5a/5b according to the International Standard ISO 7637-2:2004 to the supply lines as well as to other connections of device which may be operationally connected to supply lines.

Concerning pulse 5, pulse 5b shall be applied on vehicles which include an alternator with internal limitation diode and pulse 5a shall be applied for others cases.

Concerning the pulse 2, pulse 2a shall always be applied and pulse 2b could be performed with the agreement between the vehicle manufacturer and the technical approval services.

1.2. Device in unset state and set state

The test pulses 1 through 5, shall be applied with a degree of severity III. The required functional status for all applied test pulses are given in Table 1.

Table 1

Severity/functional status (for supply lines)

<i>Test pulse number</i>	<i>Test level</i>	<i>Functional status</i>
1	III	C
2a	III	B
2b	III	C
3a	III	A
3b	III	A
4	III	B
5a/5b	III	A

1.3. Immunity against disturbance coupled on signal lines

Leads which are not connected to supply lines (e.g. special signal lines) shall be tested in accordance with the International Standard ISO7637-3:1995 (and Corr.1). The required functional status for all applied test pulses are given in Table 2.

Table 2
Test level / functional status (for signal lines)

<i>Test pulse number</i>	<i>Test level</i>	<i>Functional status</i>
3a	III	C
3b	III	A

1.4. Immunity against radiated high frequency disturbances

Testing of the immunity of a device in a vehicle may be performed according to the technical prescriptions and transitional provisions of UN Regulation No. 10, 04 series of amendments and test methods described in Annex 6 for the vehicles and Annex 9 for a separate technical unit.

1.5. Electrical disturbance from electrostatic discharges

Immunity against electrical disturbances shall be tested in accordance with Technical Report ISO/TR 10605-1993.

1.6. Radiated emissions

Tests shall be performed according to the technical prescriptions and transitional provisions of UN Regulation No. 10, 04 series of amendments prescriptions and according to the test methods described in Annexes 4 and 5 for vehicles or Annexes 7 and 8, for a separate technical unit.

2. METHOD IEC

2.1. Electromagnetic field

The device shall undergo the basic test. It shall be subjected to the electromagnetic field test described in IEC Publication 839-1-3-1998 test A-13 with a frequency range from 20 to 1000 MHz, and for a field strength level of 30 V/m.

In addition, the device shall be subjected to the electrical transient conducted and coupled tests described in the International Standard ISO 7637 Parts 1:1990, 2:1990 and 3:1995, as appropriate.

2.2. Electrical disturbance from electrostatic discharges

The device shall undergo the basic test. It shall be subjected to testing for immunity against electrostatic discharge as described in either EN 61000-4-2, or ISO/TR 10605-1993, at the manufacturer's choice.

2.3. Radiated emissions

The device shall be subjected to testing for the suppression of radio frequency interference according to the technical prescriptions and transitional provisions of UN Regulation No. 10, 04 series of amendments and according to tests method described in Annexes 4 and 5 for vehicles and Annexes 7 and 8 for a separate technical unit.

Annex 6

Specifications for mechanical key switches

1. The cylinder of the key switch shall not protrude by more than 1 mm from the cowling, and the protruding part shall be conical.
 2. The joint between the cylinder core and the cylinder casing shall be capable of withstanding a tensile force of 600 N and a torque of 25 Nm.
 3. The key switch shall be provided with a cylinder drill obstruction.
 4. The key profile shall have at least 1,000 effective permutations.
 5. The key switch shall not be operable by a key which differs by only one permutation from the key matching the key switch.
 6. The key aperture to an external key switch shall be shuttered or otherwise protected against the penetration of dirt and/or water.
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