

Proposal for amendments to ECE/TRANS/WP29/GRVA/3, Annex A

Annex A

Draft new UN Regulation on uniform provisions concerning the approval of software update processes

Consistency amendments

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1. Scope

Amendment

- 1.1. This Regulation applies to vehicles of the categories [L], M, N, [O, R, S and T] ~~with regard to software update processes that permit software updates.~~

2. Definitions

Amendment

- 2.1. "Vehicle type" means vehicles ~~of a particular category~~ which do not differ in at least the following ~~essential respects~~:
- (a) ~~The manufacturer;~~
 - (b) The manufacturer's ~~type~~ designation **of the vehicle type**;
 - (~~e~~) Essential aspects of ~~vehiele~~ the design **of the vehicle type** with respect to software update processes
- 2.2. "*RX Software Identification Number (RXSWIN)*" means a dedicated identifier, defined by the vehicle manufacturer, representing information about the type approval relevant software of the Electronic Control System contributing to the Regulation N° X type approval relevant characteristics of the vehicle.
- 2.3. "*Software update*" means a package used to upgrade software to a new version.
- 2.4. "*Execution*" means the process of installing and activating an update that has been downloaded.
- 2.5. "*Software Update Management System (SUMS)*" means a systematic approach defining organizational processes and procedures to comply with the requirements for delivery of software updates according to this Regulation.

Amendment

- 2.6. "*Vehicle user*" means a person operating or driving the vehicle, a vehicle owner, an authorised representative or employee of a fleet manager, an authorised representative or employee of the vehicle manufacturer, or an authorized technician.
- 2.7. "*Safe state*" means an operating mode in case of a failure of an item without an unreasonable level of risk.
- 2.8. "*Software*" means the part of an Electronic Control System that consists of digital data and instruction.
- 2.9. "*Over the air (OTA) update*" means any method of making data transfers wirelessly instead of using a cable or other local connection.
- 2.10. "*Software update*" means a package used to upgrade software to a new version.

Note: The terms ‘update’ and ‘upgrade’ are used synonymously to refer to installing new versions of software. The update may contain a fix for a specific problem or introduce new product functionality.

- 2.11. “System” means a set of components and/or sub-systems that implement a function of functions.**

3. Application for Approval

- 3.1. The application for approval of a vehicle type with regard to software update processes shall be submitted by the vehicle manufacturer or by their duly accredited representative.
- 3.2. It shall be accompanied by the undermentioned documents in triplicate, and by the following particulars:
- 3.3. A description of the vehicle type with regard to the items specified in Annex 1 to this Regulation.
- 3.4. In cases where information is shown to be covered by intellectual property rights or to constitute specific know-how of the manufacturer or of their suppliers, the manufacturer or their suppliers shall make available sufficient information to enable the checks referred to in this Regulation to be made properly. Such information shall be treated on a confidential basis.

Consistency amendment

- 3.5. The **SUMS Certificate of Compliance for Software Update Management System according** to paragraph 6 of this Regulation.
- 3.6. A vehicle representative of the vehicle type to be approved shall be submitted to the Technical Service responsible for conducting approval tests.

4. Marking

- 4.1. 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 consisting of:
- 4.1.1. A circle surrounding the Letter "E" followed by the distinguishing number of the country which has granted approval.
- 4.1.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle described in paragraph 4.1.1. above.
- 4.2. 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 4.1.1. above need not be repeated; in this case the Regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.1.1. above.
- 4.3. The approval mark shall be clearly legible and shall be indelible.

- 4.4. The approval mark shall be placed on or close to the vehicle data plate affixed by the Manufacturer.
- 4.5. Annex 3 to this Regulation gives examples of the arrangements of the approval mark.

5. Approval

- 5.1. Approval Authorities shall grant, as appropriate, type approval with regard to software update procedures and processes, only to such vehicle types that satisfy the requirements of this Regulation.
- 5.2. Notice of approval or of extension or refusal of approval of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation, by means of a form conforming to the model in Annex 2 to this Regulation.
- 5.3. Approval Authorities shall not grant any type approval without ensuring that the manufacturer has put in place satisfactory arrangements and procedures to manage properly the software update processes aspects as covered by this regulation.

Consistency amendment

6. Certificate of Compliance for Software Update Management System (SUMS) Certificate of Compliance

Amendment (with consistency amendment)

- 6.1. Contracting Parties shall appoint an Approval Authority or Technical Service to carry out an ~~initial preliminary~~ assessment of the manufacturer and to issue a **SUMS Certificate of Compliance for Software Update Management System**.

Amendment

- 6.2. In the context of the ~~preliminary initial~~ assessment, ~~of the manufacturer, the Contracting Parties shall ensure that the manufacturer has installed the necessary processes to comply with all legal requirements from this which are relevant for delivery of~~ shall declare [using the model as defined in Annex XYZ] and demonstrate to the satisfaction of the Approval Authority or Technical Service that it has installed the necessary processes to comply with the requirements for software updates according to this Regulation.

Amendment (with consistency amendment)

- 6.3. When this this ~~preliminary initial~~ assessment has been ~~carried out satisfactorily completed demonstrated and in receipt of a signed declaration from the manufacturer [according to Annex XYZ]~~, a certificate named **SUMS Certificate of Compliance for Software Update Management System** with Annex 4 to this Regulation (~~hereinafter the SUMS Certificate of Compliance~~) shall be granted to the manufacturer.

Consistency amendment

- 6.4. The **SUMS** Certificate of Compliance **for Software Update Management System** shall remain valid for three years from the date of issuance of the certificate before a new assessment shall be conducted.

Consistency amendment

- 6.5. The Approval Authority which has granted the **SUMS** Certificate of Compliance **for Software Update Management System** may at any time verify its continued compliance. The **SUMS** Certificate of Compliance **for Software Update Management System** may be withdrawn if the requirements laid down in this Regulation are no longer met.

Amendment (with consistency amendment)

- 6.6. The manufacturer shall inform the Approval Authority or Technical Service of any ~~significant~~ change that ~~will could~~ affect the relevance of the **SUMS Certificate of Compliance for Software Update Management System**. After consultation with the manufacturer, the Approval Authority or Technical Service shall decide whether new checks are necessary.

Amendment (with consistency amendment)

- 6.7. At the end of the period of validity of the **SUMS Certificate of Compliance for Software Update Management System**, the Approval Authority shall, as appropriate, issue a new **SUMS Certificate of Compliance for Software Update Management System** or extends its validity for a further period of three years. The Approval Authority shall issue a new certificate in cases where ~~significant~~ changes have been brought to the attention of the Approval Authority or Technical Service.

Consistency amendment

- 6.8. Existing vehicle type approvals shall not lose their validity due to the expiration of the manufacturer's **SUMS** Certificate of Compliance **for Software Update Management System**.

7. General Specifications

- 7.1. Requirements for the Software Update Management System of the vehicle manufacturer

- 7.1.1. Processes to be verified at initial assessment

Amendment

- 7.1.1.1. A process whereby information relevant to this regulation is documented and securely held at the vehicle manufacturer and can be made available to an Approval Authority or Technical Service upon request ~~without any burden~~;

- 7.1.1.2. A process whereby information regarding all initial and updated software versions, including integrity validation data, and relevant hardware components of a type approved system can be uniquely identified;

- 7.1.1.3. A process whereby, for a vehicle type that has an RXSWIN, information regarding the RXSWIN of the vehicle type before and after an update can be

Commented [GER1]: Term and description should be added to the definitions section.

accessed and updated. This shall include the ability to update information regarding the software versions and their integrity validation data of all relevant software for each RXSWIN.

- 7.1.1.4. A process whereby, for a vehicle type that has an RXSWIN, the vehicle manufacturer can verify that the software version(s) present on a component of a type approved system are consistent with those defined by the relevant RXSWIN;
- 7.1.1.5. A process whereby any interdependencies of the updated system with other systems can be identified;

Amendment

- 7.1.1.6. A process whereby the vehicle manufacturer ~~can~~ **is able to** identify target vehicles for a software update;
- 7.1.1.7. A process to verify, before a software update is issued, the compatibility of possible software/ hardware configurations for the registered configuration or last known configuration of the target vehicles with the software update;
- 7.1.1.8. A process to assess, identify and record whether a software update will affect any type approved systems. This shall consider whether the update will impact or alter any of the parameters used to define the systems the update may affect or whether it may change any of the parameters used to type approve those system (as defined in the relevant legislation);

Amendment

- 7.1.1.9. A process to assess, identify and record whether a software update will add, alter or enable any functions that were not present, or enabled, when the vehicle was type approved or alter or disable any other parameters or functions that are defined within legislation. The assessment shall include consideration of whether:
- (a) Entries in the information package will need to be modified
 - (b) Test results no longer cover the vehicle after modification
 - (c) Any modification to functions on the vehicle will affect the vehicle's type approval**
- 7.1.1.10. A process to assess, identify and record if a software update will affect any other system required for the safe and continued operation of the vehicle or if the update will add or alter functionality of the vehicle compared to when it was registered;
- 7.1.1.11. A process whereby the vehicle user is able to be informed about updates.

Amendment

- 7.1.1.12. A process whereby the vehicle manufacturer shall be able to make the information according to paragraph 7.1.2.3. and 7.1.2.4. available to **relevant responsible** Authorities or Technical Services.

Amendment

- 7.1.2. The vehicle manufacturer shall record, and store ~~at their premises~~, the following information for each update applied to a given vehicle type:

Amendment

7.1.2.1. Documentation describing the processes used by the vehicle manufacturer for **providing** software updates and any relevant standards used to demonstrate their compliance;

Amendment with Proposed amendment from EC highlighted in yellow

7.1.2.2. Documentation describing the configuration of any relevant type approved systems before and after an update, this shall include unique **identifiers identification** for the type approved system's hardware and software **(including software versions)** and any relevant vehicle or system parameters;

Proposed amendment (EC)

7.1.2.3. For every RXSWIN, there shall be documentation describing the software relevant to the RXSWIN of the vehicle type before and after an update. This shall include information of the software versions **and parameters configuration** and their integrity validation data for all relevant software for each RXSWIN.

7.1.2.4. Documentation listing target vehicles for the update and verification of the compatibility of the registered configuration or last known configuration of those vehicles with the update.

Amendment (parts in blue to be confirmed) (proposed amendments by EC highlighted in yellow)

7.1.2.5. Documentation for all software updates for that vehicle type describing:

- (a) The purpose of the update;
- (b) What systems or functions of the vehicle the update may **affect impact**;
- (c) Which of these are type approved (if any);
- (d) If applicable, whether the software update affects **the fulfilment of** any of the relevant requirements of those type approved system;
- (e) Whether the software update affects any system type approval parameter;
- (f) Whether an approval for the update was sought from an approval body;
- (g) How the update may be executed and under what conditions;
- (h) **Confirmation Verification** that the software update will be conducted safely and securely.
- (i) **Confirmation Verification** that the software update has undergone **adequate and successfully passed** verification and validation procedures.

7.1.3. Security, the vehicle manufacturer shall demonstrate:

7.1.3.1. The process they will use to ensure that software updates will be protected to reasonably prevent manipulation before the update process is initiated. **This may be verified with a valid approval according to Regulation No. xxx;**

Amendment

7.1.3.2. The update processes used **is are** protected to reasonably prevent **it them from** being compromised, including development of the **system** update **delivery system**;

Commented [GER2]: The manufacturer should maintain an auditable register of all ECU software versions and updates. For the avoidance of doubt this may be formulated more directly.

Commented [GER3]: Reference to CS Regulation could be made.

- 7.1.3.3. The processes used to verify and validate software functionality and code for the software used in the vehicle are appropriate.
- 7.1.4. Additional Requirements for Software Updates over the air
- 7.1.4.1 The vehicle manufacturer shall demonstrate the processes and procedures they will use to assess that over the air updates will not impact safety if conducted during driving.

Proposed amendment (EC)

- 7.1.4.2. The vehicle manufacturer shall demonstrate the processes and procedures they will use to ensure that, when an over the air update requires a **skilled-person specific role fulfilled by a person**, such as a mechanic, in order to complete the update process, the update can only proceed when such a **person role** is present.
- 7.2. Requirements for the Vehicle Type
- 7.2.1. Requirements for Software updates
- 7.2.1.1. The authenticity and integrity of software updates shall be protected to reasonably prevent their compromise and reasonably prevent invalid updates.
- 7.2.1.2. Where a vehicle type uses RXSWIN:
- 7.2.1.2.1 Each RXSWIN shall be uniquely identifiable. When type approval relevant software is modified by the vehicle manufacturer, the RXSWIN shall be updated if it leads to a type approval extension or to a new type approval.

Commented with amendment to be confirmed highlighted in yellow

- 7.2.1.2.2 **The Each** RXSWIN shall be easily readable in a standardized way via the use of an electronic communication interface, at least by the standard interface (OBD port).

[If RXSWINs are not held on the vehicle the manufacturer shall declare the software versions of the single ECUs on each vehicle (VIN specific) with the connection to the RXSWIN to the Approval Authority. This declaration shall be updated each time the declared software relevant to type approved systems on a vehicle is updated. In this case, the software versions on the single ECUs shall be easily readable in a standardized way via the use of an electronic communication interface, at least by the standard interface (OBD port).]

Amendment to be confirmed

- 7.2.1.2.3. The vehicle manufacturer shall protect the RXSWINs **[and/or software versions of the ECUs]** on a vehicle against unauthorised modification. At the time of Type Approval, the means implemented to protect against unauthorized modification of the RXSWIN **[and/or software versions]** chosen by the vehicle manufacturer shall be **confidentially** outlined.
- 7.2.2. Additional Requirements for over the air updates

Proposed amendment (GER)

- 7.2.2.x **The vehicle manufacturer shall over the air inspect the vehicles before the software update process starts to detect manipulated vehicles or vehicles with malfunctions (relevant diagnostic trouble codes).**

Commented [GER4]: This confidentiality should not affect any third party access rights as defined in current UN-Regulations and standards.

7.2.2.x The vehicle manufacturer shall demonstrate appropriate measures for manipulated vehicles or vehicles with malfunctions (relevant diagnostic trouble codes)

7.2.2.x. The vehicle manufacturer shall visually inform the driver, in case of paragraph 7.2.2.1. with the complementary information of paragraph 7.2.2.2.

7.2.2.1. The vehicle shall have the following functionality with regards to software updates:

Proposed amendment (EC)

7.2.2.1.1. The vehicle manufacturer shall ensure that the vehicle is able to restore systems to their previous version **(including parameters configuration)** in case of a failed or interrupted update or that the vehicle can be placed into a safe state after a failed or interrupted update. **Before a software update, the existing software version including parameters configuration shall be saved**

7.2.2.1.2. The vehicle manufacturer shall ensure that software updates can only be executed when the vehicle has enough power to complete the update process (including that needed for a possible recovery to the previous version or for the vehicle to be placed into a safe state).

Amendment (proposed amendment from EC highlighted in yellow)

7.2.2.1.3. When the execution of an update may affect the safety of the vehicle, the vehicle manufacturer shall demonstrate how the update will be executed safely. This ~~may~~ **shall** be achieved through technical means ~~and/or through a process that will require the vehicle user to provide verification~~ that **ensures** the vehicle is in a state where the update can be executed safely. **The update process shall not use communication means which can impact the safety of the vehicle or the users of the road infrastructure.**

7.2.2.2. The vehicle manufacturer shall demonstrate that the vehicle user is able to be informed about an update before the update is executed. The information provided may contain:

- The purpose of the update. This could include the criticality of the update and if the update is for recall, safety and/or security purposes;
- Any changes implemented by the update on vehicle functions;
- The expected time to complete execution of the update;
- Any vehicle functionalities which may not be available during the execution of the update;
- Any instructions that may help the vehicle user safely execute the update;
- In case of groups of updates with a similar content one information may cover a group.

7.2.2.3. In the situation where the execution of an update whilst driving may not be safe, the vehicle manufacturer shall demonstrate how they will:

- Ensure the vehicle cannot be driven during the execution of the update;

- Ensure that the driver is not able to use any functionality of the vehicle that would affect the safety of the vehicle or the successful execution of the update.
- 7.2.2.4. After the execution of an update the vehicle manufacturer shall demonstrate how the following will be implemented:
- The vehicle user is able to be informed of the success (or failure) of the update;
 - The vehicle user is able to be informed about the changes implemented and any related updates to the user manual (if applicable).

Proposed amendment (GER)

- 7.2.2.x. **The successful installation of an update in the vehicle and the validation of the proper execution of the intended functionality of this update in the vehicle shall be (visually) confirmed to the driver.**

8. Modification and extension of the vehicle type

Amendment

- 8.1. Every modification of the vehicle type **which affects its technical performance and/or documentation required in this Regulation** shall be notified to the approval authority which granted the approval. The approval authority may then either:

Amendment

- 8.1.1. Consider that the modifications made ~~are unlikely to have an appreciable adverse effect and that in any case the vehicle~~ still **complies comply** with the requirements **and documentation of prior type approval**; or
- 8.1.2. Require a further test report from the technical service responsible for conducting the tests.
- 8.1.3. Confirmation or extension or refusal of approval, specifying the alterations, shall be communicated by means of a communication form conforming to the model in Annex 2 to this Regulation. The approval authority issuing the extension of approval shall assign a series number for such an extension and inform there of the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 2 to this Regulation.

9. Conformity of production

- 9.1. The Conformity of Production Procedures shall comply with those set out in the 1958 Agreement, Schedule 1 (E/ECE/TRANS/505/Rev.3) with the following requirements:
- 9.1.1. The holder of the approval shall ensure that results of the conformity of production tests are recorded and that the annexed documents remain available for a period determined in agreement with the Approval Authority or Technical Service. This period shall not exceed 10 years counted from the time when production is definitively discontinued;

- 9.1.2. The Approval Authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every three years.
- 9.1.3. The Approval Authority or Technical Service shall periodically validate that the processes used and decisions made by the vehicle manufacturer are compliant, particularly for instances where the vehicle manufacturer chose not to notify the Approval Authority or Technical Service about an update. This may be achieved on a sampling basis.

10. Penalties for non-conformity of production

- 10.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in this Regulation are not complied with or if sample vehicles fail to comply with the requirements of this Regulation.
- 10.2. If an Approval Authority withdraws an approval it has previously granted, it shall forthwith so notify the Contracting Parties applying this Regulation, by means of a communication form conforming to the model in Annex 2 to this Regulation.

11. Production definitively discontinued

- 11.1. 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. Upon receiving the relevant communication that authority shall inform thereof the other Contracting Parties to the Agreement applying this Regulation by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation "PRODUCTION DISCONTINUED".

12. Names and addresses of Technical Services responsible for conducting approval test, and of type approval authorities

- 12.1. The Contracting Parties to the Agreement which apply 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, issued in other countries, are to be sent.

Annex 1

Information document

The following information, if applicable, shall be supplied in triplicate and include a list of contents. Any drawings shall be supplied in appropriate scale and in sufficient detail on size A4 or on a folder of A4 format. Photographs, if any, shall show sufficient detail.

Amendment (with one to be confirmed)

- 0. ~~General~~
- 0.1. ~~Make (trade name of manufacturer):~~
- 0.2. ~~Type:~~
- 0.2.0.1. ~~Chassis:~~
- 0.2.1. ~~Commercial name(s) (if available):~~
- 0.3. ~~Means of identification of type, if marked on the vehicle/component/separate technical unit (1) (b):~~
- 0.3.1. ~~Location of that marking:~~
- 0.4. ~~Category of vehicle (c):~~
- 0.5. ~~Company name and address of manufacturer:~~

- 12.9. ~~Software Updates~~
- 12.9.1. ~~General construction characteristics of the vehicle type~~
- 12.9.1.1. ~~Schematic representation of the vehicle type~~
- 12.9.1.2. ~~Documents for the vehicle type to be approved describing:~~
 - (a) ~~the vehicle systems and functionality that will enable software updates to be conducted;~~
 - (b) ~~how vehicle users will be informed about software updates;~~
 - (c) ~~how the update process will be performed securely;~~
- 12.9.2 ~~The number of the SUMS Certificate of Compliance~~
- 1. **Make (trade name of manufacturer):**
- 2. **Type and general commercial description(s):**
(Type is the type to be approved, commercial description refers to the product in which the approved type is used)
- 3. **Means of identification of type, if marked on the vehicle:**
- 4. **Location of that marking:**
- 5. **Category(ies) of vehicle:**

6. **Name and address of manufacturer/ manufacturer's representative:**
7. **Name(s) and Address(es) of assembly plant(s):**
8. **Photograph(s) and/or drawing(s) of a representative vehicle:]**
9. **Software Updates**
- 9.1. **General construction characteristics of the vehicle type**
- 9.2. **The number of the Certificate of Compliance for Software Update Management System**
- 9.3. **Security measures.**
- 9.3.1. **Documents for the vehicle type to be approved describing that the update process will be performed securely**
- 9.3.2. **Documents for the vehicle type to be approved describing that the RXSWINs on a vehicle is protected against unauthorized manipulation.**
- 9.4 **Software updates over the air**
- 9.4.1 **Documents for the vehicle type to be approved describing that the update process will be performed safely**
- 9.4.2 **How a vehicle user is able to be informed about an update before and after its execution.**

Annex 2

Communication form

(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 xxx equipment pursuant to Regulation No. X

Approval No.

...

x.y.....

Extension No.:

1. **Make (trade name of manufacturer):**
2. **Type and general commercial description(s)**
3. **Means of identification of type, if marked on the vehicle:**
- 3.1. **Location of that marking:**
4. **Category(ies) of vehicle:**
5. **Name and address of manufacturer / manufacturer's representative:**
6. **Name(s) and Address(es) of the production plant(s)**
7. **Number of the certificate of compliance for software update management system:**
8. **Software updates over the air included (Yes/no):**
9. **Technical Service responsible for carrying out the tests:**

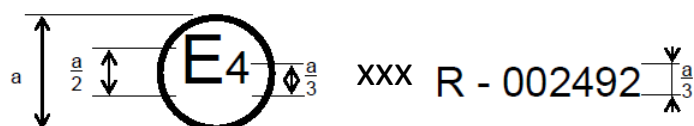
10. **Date of test report:**
11. **Number of test report:**
12. **Remarks: (if any).**
13. **Place:**
14. **Date:**
15. **Signature:**
16. **The index to the information package lodged with the Approval Authority, which may be obtained on request is attached.**

Annex 3

Arrangement of approval mark

Model A

(See paragraph 4.2 of this Regulation)



a = 8 mm min.

Amendment

The above approval mark affixed to a vehicle shows that the road vehicle type concerned has been approved in the Netherlands (E 4), pursuant to Regulation No. xxx, and under the approval number 002492. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of **this Regulation** ~~No. xxx in its original form~~ **(00)**.

Annex 4

Amendment

Model of ~~Software Update Management System Certificate of Compliance~~ Certificate of Compliance for Software Update Management System

~~Software Update Management System (SUMS)~~

Certificate of Compliance **for Software Update Management System**

With UN Regulation No. [software update process regulation] xxx

No. [Reference number]

[..... Approval Authority]

Certifies that

Manufacturer:

Address of the manufacturer:

Complies with the provisions of Regulation No. xxx

Checks have been performed on:

by (name and address of the ~~Type~~ Approval Authority or Technical Service):

Number of report:

The certificate is valid until [.....date]

Done at [.....Place]

On [.....Date]

[.....Signature]