

**Proposal for Supplement 1 to the 02 series of amendments of
UN Regulation No. 67**
(Part I Approval of specific equipment / Part II Approval of vehicles)

The text reproduced below was prepared by the expert from Germany. It is based on informal document GRSG-112-31, working document GRSG/2017/16 and the discussions during two meetings of a Task Force as described in informal documents GRSG-114-08 and GRSG-115-05.

The modifications to the current text of UN Regulation No. 67 are marked in bold for new characters.

I. Proposal

Add a new paragraph 11.6. to the transitional Provisions regarding components to read:

- 11.6. Upon the expiration of a period of 12 months after the date of entry into force of the 02 series of amendments, Contracting Parties applying this Regulation may refuse the sale of a type of component which does not meet the requirements of the 02 series of amendments to this Regulation, unless the component is intended as a replacement for fitting on vehicles in use.**

Amend section 3 of Annex 3 "Provisions regarding the approval of LPG container accessories" to read:

- 3. Pressure relief valve (discharge valve) **and components connecting the pressure relief valve with the gaseous phase inside the LPG container****
- 3.6. Applicable test procedures:**
Overpressure test Annex 15, para. 4
[...]
Temperature cycle Annex 15, para. 16 (**)
Test on non-metallic material inside a container Annex 15, para. 18 ()**

[...]
(**) Only for non-metallic parts.
[...]

Amend section 7 of Annex 3 "Provisions regarding the approval of LPG container accessories" to read:

- 7. Provisions regarding the approval of the pressure relief device (fuse) **and components connecting the pressure relief device with the gaseous phase inside the LPG container****
- 7.6. Test procedures to be applied:**
Overpressure test Annex 15, para. 4
[...]
Temperature cycles Annex 15, para. 16 (**)
Test on non-metallic material inside a container Annex 15, para. 18 ()**

[...]
(**) Only for non-metallic parts.
[...]

Add a new paragraph 18. to Annex 15 “Test Procedures” to read:

18. **Test on non-metallic material inside a container**

All components connecting the pressure relief valve and/or the pressure relief device with the gaseous phase in the LPG container shall be tested using the following procedure.

The tests shall be carried out on two samples, “a” and “b”: Sample “a” shall be aged according 18.1.1. or according 18.1.2. The aged sample “a” shall undergo the vibration test according 18.2. The virgin sample “b” shall be used as a reference for the flow test according 18.3.

 - 18.1. **Ageing tests on sample “a”**
 - 18.1.1. **Ageing procedure 1 (component disassembled)**

18.1.1.1. Disassemble, using instructions from the manufacturer, all non-metallic materials from the component in contact with the liquid LPG.

18.1.1.2. Age the non-metallic materials using the test description of annex 15 paragraph 11.1 [The n-Pentane used shall have an odorant concentration of 50 ppm ($\pm 10\%$).]

18.1.1.3. Check compliance to annex 15 paragraph 11.2

18.1.1.4. Reassemble the aged non-metallic materials to the component using the instructions from the manufacturer.
 - 18.1.2. **Ageing procedure 2 (entire component)**

18.1.2.1. Expose the entire component to n-Pentane according to annex 15 paragraph 11.1 [The n-Pentane used shall have an odorant concentration of 50 ppm ($\pm 10\%$).]

18.1.2.2. Check compliance to annex 15 Paragraph 11.2
 - 18.2. **Vibration test on aged sample “a”:**

Perform on the aged sample the vibration test annex 15 paragraph 10.5 procedures A or B. The sample has to comply with the test requirements in annex 15 paragraph 10.5 procedure A or B.
 - 18.3. **Flow test with dummy tank to compare sample “a” and reference sample “b”.**

Perform for both samples the flow test according paragraph 6.15.8.3. Make sure the required pressure inside the dummy tank for both tests is maintained for at least 90 seconds.

Requirements:

Both aged and non-aged samples shall comply with the flow requirements [as per paragraph 6.15.8.3.]

The non-metallic material of the sample shall show no cracks, deformation or any visual damage.

II. Justification

1. At the 112th GRSG Germany introduced informal document GRSG-112-31 suggesting that all components connecting the pressure relief valve (PRV) or device (PRD) with the gaseous phase inside the container shall be made of metallic material. Reason for this informal document was an accident in Germany. The vehicle involved caught fire and even so PRV and PRD were activated they could not release the pressure properly. It was found that this was due to parts of the destroyed hose inside the tank blocking the connection between the tank and the PRV- and PRD-port.
2. The reasons leading to that blocking were discussed during a Task Force meeting in February 2018. They are described in informal document GRSG-114-08. The modifications to the Regulation are suggested on foundation of the discussion at a second Task Force Meeting in June 2018 as described in informed document GRSG-115-05. The suggested measures aim at avoiding a restriction to use metallic material only.
3. The task force did not discuss if transitional provisions may be necessary.

The modifications suggested may be added as a supplement 1 to the 02 series of amendments. A 02 series of amendments was suggested with Annex V to the report of the 114th session (ECE/TRANS/WP.29/GRSG/93) and agreed to at the 176 session of wp.29 (ECE/TRANS/WP.29/2018/124).

In this case section 22.13. newly introduced will provide stipulations regarding approval and first registration of vehicle types.

Additionally needed to provide stipulations regarding parts is a new section 11.6. Section 11.6 is a copy of section 11.5. which dealt with the same situation as the 01 series of amendments was introduced.

4. The tests to be applied are to some extend already defined in the UN Regulation. Anyhow according the current Regulation the tests in question are not applied subsequently. It is suggested to carry out the tests on an aged and on a virgin sample to identify a possible influence due to aging. Due to the fact that the odorant in LPG might have an influence a defined concentration should be added to the n-pentane. This is left in brackets because a consensus could not be reached by the task force.

The odorization of fuel gases is an important safety measure. To enable the customer to quickly detect leaks or faulty systems, the odourless gas is supplemented with warning odours. This is usually done using volatile, typically smelling organic sulphur compounds such as tetrahydrothiophene (THT), whose smell is reminiscent of rotten eggs, and mercaptan mixtures. THT are cyclic organic compounds consisting of Carbon and Sulphur, mercaptan is an organic compound comparable to an alcohol where OH is replaced by SH. Since susceptibility of the non-metallic compounds to the ingredients of the odorant cannot be excluded, a respective test shall be performed to have evidence.

5. The performance of the aged sample "a" that has undergone a vibration test shall be compared with the performance of a virgin sample "b". Both samples shall be installed into a dummy container, which can be a usual type-approved container as well, and the container shall be pressurized according the flow test stipulations of the Regulation.
6. Both samples shall fulfill the flow test stipulations. They have to show the same flow capacity. To be sure that the gas volume of any possible dimensions of container will be released safely, the flow shall be maintained for at least 90 sec. Following this process the non-metallic components of both samples shall undergo a visual inspection. There shall not be no cracks or deformations.