

## Modifications to ECE/TRANS/WP.29/GRSP/2025/7\*

The text reproduced below was prepared by TF-R134, involving France, Japan, the Kingdom of the Netherlands, the European Commission, the European Association of Automotive Suppliers (CLEPA) and OICA, as well as related industry experts on transposing amendment 1 to UN Global Technical Regulation (GTR) No. 13, Phase 2 into a UN Regulation under the 1958 Agreement. It is a further development of GRSP-76-14-Rev.1 and GRSP-76-43 (see also paragraph 31 of ECE/TRANS/WP.29/GRSP/76). Amendments to UN Regulation No. 134, as amended in the seventy-sixth session of the Working Party on Passive Safety (see paragraph 30 and annex IX of ECE/TRANS/WP.29/GRSP/76), are marked in bold for new or strikethrough for deleted characters. The amendments to working document ECE/TRANS/GRSP/2025/7 are marked in red and blue.

### I. Proposal

*Paragraph 1., footnote 1, amend to read:*

“<sup>1</sup> This Regulation does not cover the electrical safety of electric power train, the material compatibility and hydrogen embrittlement of the vehicle fuel system, and the post crash fuel system integrity in the event of rear impact.

**This Regulation also does not cover supply lines for additional TPRDs made of materials other than metal until specific requirements for such materials have been defined.”**

*Paragraph 2.1., amend to read:*

“2.1. **“Appropriate adaptor” means a test component that substitutes for the container valve or end plug and includes an outlet with the proper fitting size and geometry to connect the supply line to the additional TPRD.**

~~“Burst disc” means the non-reclosing operating part of a pressure relief device which, when installed in the device, is designed to burst at a predetermined pressure to permit the discharge of compressed hydrogen.”~~

*Paragraphs 2.3., amend to read:*

2.3. **“Compressed hydrogen storage system (CHSS)” means a system designed to store compressed hydrogen fuel for a hydrogen-fuelled vehicle and composed of a container, container attachments (if any), supply lines for additional Thermally activated Pressure Relief Device (TPRD) (if any), and all primary closure devices required to isolate the stored hydrogen from the remainder of the fuel system and the environment.”**

*Paragraph 2.5., amend to read:*

“2.5. “Container Attachments” mean non-pressure bearing parts attached to the container that provide additional support and/or protection to the container and that may be only temporarily removed for maintenance and/or inspection only with the use of tools.

**Note: The non-pressure bearing parts attached to the container, that provide additional support or protection to additional TPRDs and their supply lines, are also considered as container attachments.”**

*Paragraph 2.29., amend to read:*

“2.29. “Type of specific components of hydrogen storage system” means a component or an assembly of components

---

\* Proposal for the 03 series of amendments to UN Regulation No. 134 (Hydrogen and fuel cell vehicles)

which do not differ significantly in such essential aspects as:

- (a) The manufacturer's trade name or mark;
- (b) The state of stored hydrogen fuel; compressed gas;
- (c) The sort of component: (T)PRD, **supply lines for additional TPRDs**, check-valve or shut-off valve; and
- (d) The structure, materials and essential characteristics.“

Paragraph 5., amend to read:

**“5. Part I – Specifications of the Compressed Hydrogen Storage System**

This part specifies the requirements for the compressed hydrogen storage system.

- (a) The primary closure devices shall include the following functions, which may be combined:
  - (i) TPRD;
  - (ii) Check valve; and
  - (iii) Shut-off valve
- (b) The primary closure devices shall be mounted directly on or within each container. **If needed, manufacturers may choose to locate additional TPRDs in alternative locations on the container. However, any high-pressure supply lines for such additional TPRDs shall have demonstrated mechanical integrity and durability as part of qualification tests for the container (verification tests for baseline metrics in paragraph 5.1., hydraulic sequential test in paragraph 5.2. excluding the drop test; see Annex 9 – Description of test articles for performance requirements in paragraphs 5.1. to 5.4.).**
- (c) The CHSS shall meet the performance test requirements **specified in paragraphs 5.1. to 5.5. and** summarized in Table 2. The corresponding test procedures are specified in Annex 3 **and Annex 4;**

**Note: The post-crash fuel system integrity requirements in paragraph 7.2. also apply to supply lines for additional TPRDs.**

...”

Paragraph 5., Table 2, amend to read:

**“Table 2**

**Overview of performance requirements**

<i>Requirement section</i>	<i>Test article</i>
5.1. Verification tests for baseline metrics	Container or container plus container attachments, <b>and supply lines for additional TPRDs</b> <sup>4</sup> , as applicable
5.2. Verification test for performance durability	Container or container plus container attachments <b>and supply lines for additional TPRDs</b> <sup>4</sup> , as applicable
5.3. Verification test for expected on-road performance	CHSS
5.4. Verification test for service terminating performance in fire	CHSS
5.5. Verification test for closure durability	Primary closure devices

”

*Paragraph 5., Table 2, add footnote, to read:*

“<sup>4</sup> **For detailed requirements on supply lines for additional TPRDs see Annex 9 – Description of test articles for performance requirements in paragraphs 5.1. to 5.4.”**

*Paragraphs 5.1.1. to 5.1.2., amend to read:*

“5.1.1. Baseline initial burst pressure

Three (3) containers **(as well as supply lines for additional TPRDs (if any) through appropriate adaptors; the same shall apply under this paragraph and paragraphs 5.1.2. to 5.2.8., 5.3.1., 5.3.4. and 5.3.5.)** shall be hydraulically pressurized until burst in accordance with Annex 3, paragraph 2.1. The container attachments, if any, shall also be included in this test, unless the manufacturer can demonstrate that the container attachments do not affect the test results and are not affected by the test procedure. The manufacturer shall supply documentation (measurements and statistical analyses) that establish the midpoint burst pressure of new containers, BPO.

All containers tested shall have a burst pressure within  $\pm 10$  per cent of BPO and greater than or equal to a minimum BP<sub>min</sub> of 200 per cent NWP.

Containers having glass-fibre composite as a primary constituent shall have a minimum burst pressure greater than 350 per cent NWP.”

5.1.2. Baseline initial pressure cycle life

Three (3) containers **(as well as supply lines for additional TPRDs (if any) through appropriate adaptors)** shall be hydraulically pressure cycled without rupture for 22,000 cycles or until a leak occurs in accordance with Annex 3, paragraph 2.2. The container attachments, if any, shall also be included in this test, unless the manufacturer can demonstrate that the container attachments do not affect the test results and are not affected by the test procedure. Leakage shall not occur within 11,000 cycles.”

*Paragraph 5.2. to 5.2.8, amend to read:*

“5.2. Verification tests for performance durability (Hydraulic sequential tests)

One (1) container is tested in paragraph 5.2.

Unless otherwise specified, the tests in paragraph 5.2. shall be conducted on the container equipped with its container attachments (if any) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** that represent the CHSS without the primary closures. **At the discretion of the Technical Service and the Type Approval Authority, for such supply lines the worst-case approach may be applied, e.g., longest lines, largest diameter, smallest bend radius and highest number of fittings.”**

5.2.1. Proof pressure test

The container is pressurized in accordance with the procedure specified in Annex 3, paragraph 3.1. The container attachments, if any, **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** shall also be included in this test, unless the manufacturer can demonstrate that the container attachments do not affect the test results. and are not affected by the test procedure. The container that has undergone a proof pressure test in manufacture is exempt from this test.

5.2.2. Drop (impact) test

The container with its container attachments (if any) is dropped once in one of the impact orientations specified in Annex 3, paragraph 3.2. **This test does not apply to supply lines for additional TPRDs.**

**Note: The manufacturer applying for approval shall provide handling procedures to ensure that the supply lines for additional TPRDs will not suffer damage or contamination during handling. The handling procedure shall require the removal from service of supply lines that have unacceptable damage.”**

5.2.3. Surface damage test

The container with its container attachments (if applicable) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** is subjected to surface damage specified in Annex 3, paragraph 3.3.

All-metal containers are exempt from the surface flaw generation portion of testing.

5.2.4. Chemical exposure and ambient-temperature pressure cycling test

The container with its container attachments (if applicable) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** is exposed to chemicals found in the on-road environment and pressure cycled in accordance with Annex 3, paragraph 3.4.

5.2.5. High temperature static pressure test.

The container with its container attachments (if applicable) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** is pressurized in accordance with Annex 3, paragraph 3.5. test procedure.

5.2.6. Extreme temperature pressure cycling test.

The container with its container attachments (if applicable) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** is pressure cycled in accordance with Annex 3, paragraph 3.6.

5.2.7. Residual proof pressure test.

The container with its container attachments (if applicable) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** is pressurized-in accordance with the procedure specified in Annex 3, paragraph 3.1.

5.2.8. Residual strength burst test

The container with its container attachments (if applicable) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** undergoes a hydraulic burst test. The burst pressure measured in accordance with the procedure specified in Annex 3, paragraph 2.1. shall be at least 80 per cent of the BP<sub>0</sub> provided by the manufacturer in paragraph 5.1.1.”

*Paragraph 5.3., amend to read:*

“5.3. Verification test for expected on-road performance (Pneumatic sequential tests)

**A single** CHSS shall undergo the following sequence of tests, which are illustrated in Figure 2. Specifics of applicable test procedures for the CHSS are provided in Annex 3. **At the discretion of the Technical Service and the Type Approval Authority, for supply lines for additional TPRDs, the worst-case approach may be applied, e.g., longest lines, largest diameter, smallest bend radius and highest number of fittings.**

...”

*Paragraph 5.3.1., amend to read:*

“5.3.1. Proof pressure test

The container of a CHSS, **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**, is pressurized in accordance with the

procedure specified in Annex 3, paragraph 3.1. The container attachments, if any, shall also be included in this test, unless the manufacturer can demonstrate that the container attachments do not affect the test results and are not affected by the test procedure. The container that has undergone a proof pressure test in manufacture may be exempted from this test.”

*Paragraph 5.3.4. to 5.3.5, amend to read:*

“5.3.4. Residual proof pressure test (hydraulic)

The container with its container attachments (if any), **as well as supply lines for additional TPRDs (if any) through appropriate adaptors** as specified, is pressurized in accordance with the procedure specified in Annex 3, paragraph 3.1.

5.3.5. Residual strength burst test (hydraulic)

The container with its container attachments (if any), **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**, as specified, undergoes a hydraulic burst. The burst pressure measured in accordance with the procedure specified in Annex 3, paragraph 2.1. shall be at least 80 per cent of the BPO provided by the manufacturer in paragraph 5.1.1.”

*Paragraph 5.4., amend to read:*

“5.4. Verification test for service terminating performance in fire

...

If the container pressure has not fallen below 1 MPa when the time limit defined above is reached, then fire testing is terminated and the CHSS fails the fire test (even if rupture did not occur).

**During the entire fire test, additional TPRDs shall remain connected to the container by at least one attachment point.”**

*Paragraph 7.1.1.5., amend to read:*

“7.1.1.5. The geometry of the fuelling receptacle of compressed hydrogen gas vehicles shall, depending on its nominal working pressure and specific application, be compatible with specification H35, ~~H35HF~~ **H35MF** or H70, ~~conform to international standard ISO 17268:2020 and in accordance with international standard ISO 17268:2020 [or with specification H35, H35MF or H70 in accordance with ISO 17268-1:2025].~~”

*Paragraphs 9.2. to 9.2.1., amend to read:*

“9.2. The production control of the compressed hydrogen storage system container **(and supply lines for additional TPRDs (if any); the same shall apply for paragraphs 9.2.1. to 9.2.3.2.)** shall satisfy the following additional requirements;

9.2.1. Every container of CHSS, **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**, shall be pressurized smoothly and continually with a hydraulic fluid or gas to the target pressure of  $\geq 125$  per cent NWP until the target test pressure level is reached and then held for  $\geq 30$  seconds. Temperature variation during the test shall be taken into account. The quality variability of the products shall be assessed with a method defined by the manufacturer e.g., variability of elastic expansion, etc. If applicable, upon agreement of the Type Approval Authority and Technical Service, as an alternative, every pressure bearing chamber and every high-pressure fuel line of multiple permanently interconnected chambers **and supply lines for additional TPRDs** may also be subjected to the same test described above individually. When applying this separate testing option, the test article shall be connected to a hydraulic pressure source at one of its openings by use of

appropriate hydraulic mating connections and the remaining openings, if any, shall be closed by use of appropriate means.”

*Paragraph 9.2.3.2., amend to read:*

“9.2.3.2. Ambient temperature pressure cycling test in batch testing

The test shall be performed according to paragraph 2.2. (a) to (c) (hydrostatic pressure cycling test) of Annex 3, except that the temperature requirements for the fuelling fluid and the container skin, and the relative humidity requirement, do not apply. The container, **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**, of the CHSS shall be pressure cycled using hydrostatic pressures  $\geq 125$  per cent of NWP, to 22,000 cycles in case of no leakage or until leakage occurs. The container of the CHSS shall not leak or burst within the first 11,000 cycles.”

*Insert new paragraphs 13.1. to 13.2.1, to read:*

### **~~“13.~~——Transitional provisions**

#### **13.1. General**

**13.1.1. Contracting Parties applying this Regulation may grant type approvals according to any of the preceding series of amendments to this Regulation.**

**13.1.2. Contracting Parties applying this Regulation shall continue to grant extensions of existing approvals to any of the preceding series of amendments to this Regulation.**

#### **13.2. Transitional provisions applicable to the 01 series of amendments.”**

**13.2.1. As from the official date of entry into force of the 01 series of amendments, no Contracting Party applying this UN Regulation shall refuse to grant or refuse to accept UN type approvals under this UN Regulation as amended by the 01 series of amendments.”**

*Paragraphs 13.2. to 13.4. (former), renumber as paragraphs 13.2.2. to 13.2.4.*

*Paragraph 13.5. (former), renumber as paragraphs 13.2.5. and amend to read:*

“13.2.5. Notwithstanding paragraphs 13.2.2 and 13.2.4., Contracting Parties applying this Regulation shall continue to accept type approvals issued according to this Regulation in its original form, for the vehicles/vehicle systems which are not affected by the changes introduced by the 01 series of amendments.”

*Insert new paragraph 13.3., to read:*

#### **“13.3. Transitional provisions applicable to the 02 series of amendments.”**

*Paragraph 13.1. (former), renumber as paragraph 13.3.1.*

*Paragraphs 13.6 to 13.7. (former), renumber as paragraphs 13.3.2. to 13.3.3.*

*Delete paragraphs 13.8 to 13.9.*

*Insert new paragraphs 13.4. to 13.4.4., to read:*

#### **“13.4. Transitional provisions applicable to the 03 series of amendments.**

**13.4.1. As from the official date of entry into force of the 03 series of amendments, no Contracting Party applying this UN Regulation shall refuse to grant or refuse to accept UN type approvals under this UN Regulation as amended by the 03 series of amendments.**

**13.4.2. As from 1 September 2028, Contracting Parties applying this Regulation shall not be obliged to accept type approvals to any of the preceding series of amendments, first issued after 1 September 2028.**

- 13.4.3.** Until 1 September 2029, Contracting Parties applying this Regulation shall accept type approvals to any of the preceding series of amendments, first issued before 1 September Date 2028, provided the transitional provisions in these respective preceding series of amendments foresee this possibility.
- 13.4.4.** As from 1 September 2029, Contracting Parties applying this Regulation shall not be obliged to accept type approvals issued to any of the preceding series of amendments to this Regulation.
- 13.4.5.** Notwithstanding paragraph 13.4.4., Contracting Parties applying this Regulation shall also continue to accept type approvals issued according to any of the preceding series of amendments to this Regulation, for the vehicles or vehicle systems which are not affected by the changes introduced by the 03 series of amendments, provided the transitional provisions in these respective preceding series of amendments foresee this possibility.”

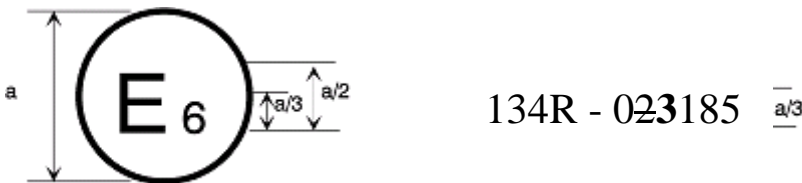
Annex 2, amend to read:

## “Annex 2

### Arrangements of the approval marks

Model A

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

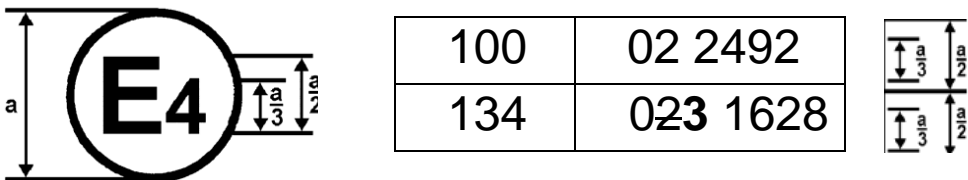


a = 8 mm min

The above approval mark affixed to a vehicle/ storage system/specific component shows that the vehicle/storage system/specific component type concerned has been approved in Belgium (E 6) for its the safety-related performance of hydrogen-fuelled vehicles pursuant to Regulation No. 134. The first two digits of the approval number indicate that the approval already contained the 023 series of amendments at the time of approval.

Model B

(See paragraph 4.5. of this Regulation)



a = 8 mm min.

The above approval mark affixed to a vehicle shows that the road vehicle concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos. 134 and 100.\* The approval number indicates that, at the dates when the respective approvals were granted, Regulation No. 100 was amended by the 02 series of amendments and Regulation No. 134 was amended by the 023 series of amendments.”

Annex 3, paragraphs 2.1. to 2.2., amend to read:



“2.1. Burst test (hydraulic)

The burst test is conducted at the ambient temperature using a hydraulic fluid. The rate of pressurization is less than or equal to 1.4 MPa/sec for pressures higher than 150 per cent of the nominal working pressure. If the rate exceeds 0.35 MPa/sec at pressures higher than 150 per cent NWP, then either the container **(as well as supply lines for additional TPRDs (if any) through appropriate adaptors; the same shall apply under this paragraph, paragraphs 2.2., 3.1., 3.4 to 3.6. and 5.1.)** is placed in series between the pressure source and the pressure measurement device, or the time at the pressure above a target burst pressure exceeds 5 seconds. The burst pressure of the container shall be recorded.

2.2. Ambient pressure cycling test (hydraulic)

The test is performed in accordance with the following procedure and the test parameters specified in Table 1 below:

- (a) The test article **(the container as well as supply lines for additional TPRDs if any through appropriate adaptors)** is filled with a hydraulic fluid;
- (b) The test article and fluid are stabilized at the temperature specified in Table 1 at the start of testing. The environment, hydraulic fluid and the surface of the test article are maintained at the specified temperature for the duration of the cycling. The test article temperature may vary from the environmental temperature during cycling;
- (c) The test article is pressure cycled between  $2 \pm 1$  MPa and the target pressures specified in accordance with Table 1;
- (d) The temperature of the hydraulic fluid entering the container shall be maintained at the specified temperature and monitored as close as possible to the container inlet;

Note: The manufacturer may specify a hydraulic pressure cycle profile that will prevent premature failure of the container due to test conditions outside of the container design envelope.

...”

*Annex 3, paragraph 3.1., amend to read:*

“3.1. Proof pressure test

The container with its container attachments (if any) **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**, as specified, is pressurized smoothly and continually with a hydraulic fluid or gas until the target test pressure level is reached and then held for the duration specified in Table 2 below:

.. “

*Annex 3, paragraph 3.2., amend to read:*

“3.2. Drop (impact) test (unpressurized)

The container and its container attachments (if any) is drop tested without internal pressurization, ~~or~~ attached valves **or supply lines for additional TPRDs**. The surface onto which the test article is dropped shall be a smooth, horizontal concrete pad or other flooring type with equivalent hardness. No attempt shall be made to prevent the test article from bouncing or falling over during a drop test, but the test article shall be prevented from falling over during the vertical drop test.

**The test article shall be dropped in any one of the following four orientations, the orientation chosen for the test shall be determined by the Technical Service in consultation with the manufacturers:**



...”

*Annex 3, paragraph 3.3, amend to read:*

“3.3. Surface damage test (unpressurized):

...

- (a) Surface flaw generation: A saw cut at least 0.75mm deep and 200mm long is made on the surface specified above. If the container is to be affixed to the vehicle by compressing its composite surface **or if the container attachments for additional TPRDs or supply lines are attached to the composite surface of the container**, then a second cut at least 1.25 mm deep and 25 mm long is applied at the end of the container which is opposite to the location of the first cut;

...”

*Annex 3, paragraph 3.4., amend to read:*

“3.4. Chemical exposure and ambient-temperature pressure cycling test

Each of the 5 areas of the unpressurized container (with container attachments, if applicable **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**) preconditioned by pendulum impact (Annex 3, paragraph 3.3.) is exposed to one of five solutions:

..”

*Annex 3, paragraph 3.5., amend to read:*

“3.5. Static pressure test (hydraulic)

The test article (**as described in Annex 9 for Test No. 5.2.5.**) is filled with a hydraulic fluid and pressurized to  $\geq 125$  per cent NWP in a temperature-controlled chamber at  $\geq 85$  °C for at least 1,000 hr during which the temperature of the chamber and the surface of the test article are maintained at the target temperature for the specified duration.

3.6. Extreme temperature pressure cycling test

The test is performed in accordance with the following procedure and the test parameters specified in Table 4:

- (a) The test article (**as described in Annex 9 for Test No. 5.2.6.**) is filled with a hydraulic fluid for each test;

..”

*Annex 3, paragraph 5.1., amend to read:*

“5.1. **CHSS test article**

In addition to the container and primary closure devices such as shut-off valve(s), check valve(s), and TPRD(s) required to isolate the system, the CHSS test article shall include container attachments (if any) including gas housings or barriers that could impede TPRD response, **as well as supply lines for additional TPRDs (if any) through appropriate adaptors**. Vent lines shall be connected to TPRDs to direct TPRD exhausts in a manner representative of the configuration in the vehicle.

..”

*Annex 7, Table 1 and Notes, amend to read:*

“Table 1

**Change of Design**

Changed Item	Required Tests

<i>Changed Item</i>		<i>Required Tests</i>
Metallic container or liner material		- Initial burst, Initial pressure cycle life - Sequential hydraulic tests - Fire test
Plastic liner material		- Initial pressure cycle life - Sequential hydraulic tests - Sequential pneumatic tests - Fire test
Fiber material <sup>1</sup>		- Initial burst, Initial pressure cycle life - Sequential hydraulic tests - Fire test
Resin material		- Initial burst, Initial pressure cycle life - Sequential hydraulic tests - Fire test
Diameter <sup>2</sup>	≤20%	- Initial burst, Initial pressure cycle life
	>20%	- Initial burst, Initial pressure cycle life - Sequential hydraulic tests - Fire test
Length	≤50%	- Initial burst, Initial pressure cycle life - Fire test <sup>3</sup>
	>50%	- Initial burst, Initial pressure cycle life - Sequential hydraulic tests - Fire test <sup>3</sup>
Coating		- Sequential hydraulic tests - Fire test <sup>4</sup>
Boss <sup>5</sup>	Material, geometry, opening size	- Initial burst, Initial pressure cycle life
	Sealing (liner and/or valve interface)	- Sequential pneumatic tests
Fire protection system		- Fire test
Valve change <sup>6</sup>		- Sequential pneumatic tests - Fire test <sup>7</sup>
Container attachment	Material, geometry	- Sequential hydraulic tests - Fire test <sup>7</sup>
<b>Supply lines for additional TPRDs</b>	<b>Changed location of additional TPRD</b>	- <b>Fire test<sup>8</sup></b>
	<b>Diameter<sup>2</sup> ≤ 20%</b>	- <b>Initial burst and Initial pressure cycle life<sup>8</sup></b>
	<b>Diameter<sup>2</sup> &gt; 20%</b>	- <b>Initial burst, Initial pressure cycle life<sup>8</sup></b> - <b>Sequential hydraulic test<sup>8</sup></b>

Changed Item		Required Tests
		- Fire test <sup>8</sup>
	Bend radius	- Initial burst, Initial pressure cycle life <sup>8</sup> - Sequential hydraulic test <sup>8</sup> - Fire test <sup>8</sup>
	Length	- Initial burst, Initial pressure cycle life <sup>8</sup> - Fire test <sup>8</sup> - Sequential hydraulic test <sup>8</sup>
	Line routing	- Initial burst, Initial pressure cycle life <sup>8</sup> - Fire test <sup>8</sup>
	Number of fittings	- Pneumatic sequential test <sup>8</sup> - Initial burst, Initial pressure cycle life <sup>8</sup> - Fire test <sup>8</sup>

...

8. Fire test, initial burst, initial pressure cycle life, hydraulic and pneumatic sequential tests are not required if the parameters of the supply lines are covered by the tested worst-case configuration.”

Insert new Annex 9:

## “Annex 9

### Description of test articles for performance requirements in paragraphs 5.1. to 5.4.

Test No.	Test title	CHSS			Notes
		Container with attachments (if any)	Primary closure devices	Supply lines	
		Test article			
5.1.	Verifications test for baseline metrics				
5.1.1.	Baseline initial burst pressure	x		x <sup>1</sup>	
5.1.2.	Baseline initial pressure cycle life	x		x <sup>1</sup>	
5.2.	Verification tests for performance durability (Hydraulic sequential tests)				At the discretion of the Technical Service and the Type Approval Authority, for supply lines the worst-case approach may be applied, e.g., longest lines, largest diameter, smallest bend radius and highest number of fittings.
5.2.1.	Proof pressure test	x		x <sup>1</sup>	
5.2.2.	Drop (impact) test	x			The manufacturer applying for approval shall provide handling procedures to ensure that the supply lines for additional TPRDs will not suffer damage or contamination during handling. It shall require the removal from service of supply lines that have unacceptable damage.

5.2.3.	Surface damage test	x <sup>2</sup>			Not applicable to metallic supply lines for additional TPRDs
5.2.4.	Chemical exposure and ambient-temperature pressure cycling test	x <sup>2</sup>		x <sup>1</sup>	
5.2.5.	High temperature static pressure test	x <sup>2</sup>		x <sup>1</sup>	
5.2.6.	Extreme temperature pressure cycling test	x <sup>2</sup>		x <sup>1</sup>	
5.2.7.	Residual proof pressure test	x <sup>2</sup>		x <sup>1</sup>	
5.2.8.	Residual strength burst test	x <sup>2</sup>		x <sup>1</sup>	
5.3.	Verification test for expected on-road performance (Pneumatic sequential tests)				At the discretion of the Technical Service and the Type Approval Authority, for such supply lines the worst-case approach may be applied, e.g., longest lines, largest diameter, smallest bend radius and highest number of fittings.
5.3.1.	Proof pressure test	x		x <sup>1</sup>	
5.3.2.	Ambient and extreme temperature gas pressure cycling test (pneumatic)	x	x	x	
5.3.3.	Extreme temperature static gas pressure permeation, leak test (pneumatic)	x	x	x	
5.3.4.	Residual proof pressure test (hydraulic)	x		x <sup>1</sup>	
5.3.5.	Residual strength burst test (hydraulic)	x		x <sup>1</sup>	
5.4.	Verification test for service terminating performance in fire	x	x	x	

1. Supply lines for additional TPRDs (if any) shall be tested with the container through appropriate adaptors.
2. Container attachments may be removed in accordance with Annex 3, paragraph 3.3."

## II. Justification

### A. Additional thermally activated pressure relief devices and supply lines, test procedures

1. Additional thermally activated pressure relief devices (TPRDs) and their supply lines are not excluded from the 02 series of amendments to UN Regulation No. 134. No clear requirements were defined though, leading to differing interpretations among Technical Services and Type Approval Authorities. This proposal clarifies the requirements in alignment with UN GTR No. 13, amendment 1.
2. A definition of an appropriate adaptor has been added to describe a part used for hydraulic testing purposes which allows for the connection of the container to the supply line in the absence of an on-tank valve. It replaces the definition of burst discs which was copied into the Regulation during the initial transposition of GTR 13 but is needed only for liquefied hydrogen systems which are currently not in scope of this Regulation.
3. The limitation to metallic material for supply lines is based on the lack of appropriate test procedures for other materials such as composites.
4. To better understand the applicability of test procedures, an annex was introduced with an overview of parts and systems to be subjected to specific tests. The footnote 1 in Annex 9 indicates that supply lines need to be subjected only if an additional TPRD is part of the CHSS and when the respective test is conducted without the primary closure devices.
5. To address changes to supply lines to additional TPRDs after initial type certification of the compressed hydrogen storage system (CHSS) an item including differentiation of

changes of different characteristics of the lines was added to the change of design table. However, as clarified in footnote 8, the repetition of these tests is only needed if the changes are not already covered by the worst-case approach applied during the CHSS certification tests.

6. The supply lines for the additional TPRDs are excluded from the drop test in 5.2.2. as the manufacturer will replace any damaged supply lines with new ones. For this reason a note was added to the paragraph to ensure that a handling procedure will require the worker to do so.

7. During the development of ISO 17268-1:2025, a safety concern of H35HF has been identified where some of H35HF nozzles could be mated with H70 receptacle that may potentially result in overheating of the container. Therefore, the option of H35HF as included in ISO 17268:2020 has been deleted. [Accordingly, ISO 17268-1:2025 adopted a new specification H35MF and removed H35HF in order to prevent such unintended incorrect assembly.

8. ISO is also working on the new standard. ISO 17268-2, for higher flow rate, that will be published around 2026-2027. Once such new standard becomes available, another supplement will be proposed to include such latest technologies.]

## **B. Annex 3, paragraph 3.2**

9. Part I of UN Regulation No. 134 requests a drop test on the storage container.

10. In the 01 series of amendment to UN Regulation No.134, the requirement was to drop one or more additional containers in each of the four orientations. The drop test procedure was then modified in amendment 1 to UN GTR No. 13: it was streamlined so that only one container will be dropped once (“The container shall withstand the one drop out of any impact orientations specified in the test procedure”).

11. The surface damage test was revised to include potential severe abrasions that can be caused by mounting fixtures of the supply lines or container attachments.

12. This updated procedure was then transposed into the 02 series of amendments to UN Regulation No. 134. However, the test description does not specify who should choose this orientation. This is clarified in our proposal.

## **C. Other considerations**

13. The amendment to the general guidelines for the transitional provision (ECE/TRANS/WP.29/2024/76) was adopted at the 193<sup>rd</sup> session of the World Forum for Harmonization of Vehicle Regulations (WP.29) in June 2024. Transitional provisions for the 03 series of amendments to UN Regulation No. 134 should also respect this updated guideline.

14. The previous series of amendments to UN Regulation No. 134 has the following aspects:

- (a) 01 series of amendments, entered into force on 7 January 2022. The technical changes only apply to vehicles of categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub> and N<sub>3</sub> and therefore the approvals of components and vehicles of categories M<sub>1</sub> and N<sub>1</sub> to the original version remain accepted.
- (b) 02 series of amendments, entered into force on 15 June 2024. In these transitional provisions, it was agreed not to apply the 02 series to existing vehicles.
- (c) 03 series of amendments. The technical changes are basically specific to the supply lines for remote TPRDs. Therefore, most of the existing approvals will not be affected by the changes.

---

15. Taking account of the situation above, it will be necessary to maintain the transitional provisions of previous series of amendments, but it is also important to clarify which provisions apply to which series. In particular some of the provisions are the same across several series of amendments, except for their application dates.

---