

## **Economic Commission for Europe**

### **Inland Transport Committee**

#### **Working Party on the Transport of Dangerous Goods**

114th session

27 October 2023

Geneva, 6-10 November 2023

Item 5 (a) of the provisional agenda

**Proposals for amendments to annexes A and B of ADR:**

**Construction and approval of vehicles**

### **Fire suppression system for engine compartments**

**Transmitted by the Governments of Spain and the Netherlands on behalf of the informal working group on the reduction of the risk of a BLEVE**

#### **I. Introduction**

1. Sub-section 9.7.9.1 of ADR requires a fire suppression system to be installed in the compartment where the internal combustion engine is installed. WP.15 asked the informal working group on the reduction of the risk of a BLEVE (“BLEVE WG”) to develop the technical requirements for such systems before their fitment becomes mandatory.
2. The BLEVE WG has been liaising with the testing institute RISE to develop the technical requirements. RISE has recognised expertise in this area, having developed the requirements for the UN Regulation No. 107 (R107), which are applicable to fire suppression systems for engine compartments of buses.
3. RISE has prepared a draft proposal which modifies the tests specified in R107 to make them applicable to FL and EX III vehicles. This proposal can be found in Annex 1 to this document.
4. The BLEVE WG met on 20<sup>th</sup> October 2023 to discuss the draft proposal. The BLEVE WG in principle agreed with the proposed text, but would prefer to have a clean and complete text applicable for its inclusion or reference in ADR, in order to simplify the application of these requirements.
5. To take forward this aim, consultations will be held with the UNECE Secretariat, CEN TC/301, WP.29 and RISE, to see how a separate text could be made available.
6. The BLEVE WG would welcome the feedback on the text proposed, and the different ways forward, and specifically would like to invite WP.15 members to participate in the next meeting of the BLEVE WG, to be held online in the second half of January 2024.
7. The BLEVE WG in principle would like to submit an updated proposal for the next session of WP.15 in April 2024.

#### **II. Justification**

8. The aim of the BLEVE WG is to include technical requirements in ADR to reduce the likelihood of a BLEVE occurring and thereby contributes to the United Nations Sustainable Development Goal 11 (Sustainable Transport).

## **Annex 1**

**Fire suppression system for engine compartments of FL and EX/III vehicles (RISE Research Institutes of Sweden AB)**



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 2023-10-16

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## Fire suppression system for engine compartments of FL and EX/III vehicles - rev 1

### Chapter 9.7

9.7.9 Amend to read as follows:

**“9.7.9 Additional safety requirements concerning FL and EX/III vehicles**

9.7.9.1 The following vehicles shall be equipped with an automatic fire suppression system for the compartment where the internal combustion engine propelling the vehicle is located:

(a) FL vehicles carrying liquefied and compressed flammable gases with a classification code including an F;

(b) FL vehicles carrying packing group I or packing group II flammable liquids; and

(c) EX/III vehicles.

9.7.9.2 The following vehicles shall be fitted with thermal protection capable of mitigating the propagation of a fire from all the wheels:

(a) FL vehicles carrying liquefied and compressed flammable gases with a classification code including an F;

(b) FL vehicles carrying packing group I or packing group II flammable liquids; and

(c) EX/III vehicles.

9.7.X.X Amend to read as follows:

The fire suppression system shall comply with the requirements in UN Regulation No. 107, with the following amendments:

The solid steel plate floor of the test apparatus described in Annex 13 – Appendix 1 shall be replaced with a steel net constructed by steel rods, diameter 2-3 mm, with 20 - 30 mm in between to create an open design towards the ground, see figure 1.

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 C2 - Internal

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Figure 1. Example of floor replaced with steel net.

Obstruction 4 as described in 1.9.1 in Annex 13 – Appendix 1 shall be equipped with a floor which reduces the aperture area of the floor with approximately 0,375 m<sup>2</sup>, see Figure 2.



Figure 2. Example of floor plate on obstruction 4.

The re-ignition test described in Annex 13 shall be performed without accepting any re-ignition. Paragraph 1.6.2 in Part 1 and 1.7.2. in Part 2 shall be read:

“Re-ignition shall not occur within 300 seconds of the fire being fully extinguished.”

Paragraph 3.4.6 in Annex 13 – Appendix 1 shall be read:

“In the test for re-ignition, the exhaust manifold mock-up tube is pre-heated with a burner prior to the test. Pressurized air may be added to the flame for better combustion.

**The** tube shall be heated from the inner side until the temperature of Tc2 is above 600°C and Tc1 is above 570 °C and the temperatures of Tc5, Tc6 and Tc7 not are less than 520°C. When the predefined temperatures are reached the pre-heating procedure stops.



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After 30 seconds the engine oil shall start dripping and the suppression system activated 15 seconds later. The engine oil shall ignite before activation of the suppression system. The oil shall continue to drip on to the tube until the result of the test is determined.”

The mass of extinguishing agent shall be increased with 50% as a safety margin. This means that a typed approved suppression system shall contain 50% more extinguishing agent than needed to pass all the required fire suppression tests.

In all other aspects, the fire suppression system shall comply with the requirements of UN Regulation No. 107, which includes the test procedures (Annex 13), the installation, fire hazard analysis and scaling rules (Annex 3, 7.5.1.5.4 and following paragraphs), the Conformity of production (7) and the Type Approval. The approval documentation shall be adjusted to fit the scope of FL and EX/III vehicles.

**RISE Research Institutes of Sweden AB**  
**Fire and safety - Fire Protection**

Performed by

Patrik Klämberg

RISE Research Institutes of Sweden AB

Transaction 09222115557502779072



Signed PK

# Verification

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## Document

**Fire suppression system for engine compartments of FL and EX\_rev 1**  
Main document  
3 pages  
*Initiated on 2023-10-16 14:58:48 CEST (+0200) by Patrik Klämberg (PK)*  
*Finalised on 2023-10-16 14:59:51 CEST (+0200)*

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