

**Fact File 89**



**Fire Industry Association**



**UNECE**

**UNECE Regulation 107**

# UNECE Regulation 107

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## 1. SCOPE

This FIA Fact File is intended to provide an overview including links to key reference material for the fitment of fire suppression systems in vehicles (predominately featuring Buses & Coaches) directly related to the UNECE Regulation 107. It is a collation of technical and legislative facts by the FIA.

## 2. INTRODUCTION

This UNECE Regulation 107 Fact File has been prepared to provide guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, operating, or maintaining a type-approved system that is capable of automatically detecting and suppressing fire within the engine compartment relating to the regulation.

**Whilst the UNECE Regulation 107 is required for both automatic detection and suppression it should be noted that the detection part of the fire suppression system is not tested, validated or approved in any way within the regulation.**

## 3. APPLICABLE STANDARDS & REFERENCES

- SP Method 4912
- ECE/TRANS/WP.29/343/Rev.27/Add.1
- ECE/TRANS/WP.29/343/Rev.27/Add.2/Rev.1
- E/ECE/324/Rev.2/Add.106/Rev.6–E/ECE/TRANS/505/Rev.2/Add.106/Rev.6
- E/ECE/324/Rev.2/Add.106/Rev.6/Amend.3–E/ECE/TRANS/505/Rev.2/Add.106/Rev.6/Amend.3
- E/ECE/324/Rev.2/Add.106/Rev.6/Amend.5–E/ECE/TRANS/505/Rev.2/Add.106/Rev.6/Amend.5

## 4. DEFINITIONS

**Mandatory Date** – The official date when contracting parties should be applying this regulation.

**Final Date of Transition** – Contracting parties applying this regulation to their vehicles shall refuse to grant approval under this regulation if products do not have type approval after this date.

**Category M2** – Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver’s seat, and having a maximum mass not exceeding 5 tonnes.

**Category M3** - Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver’s seat, and having a maximum mass exceeding 5 tonnes.

**Certificate of Conformity** – a certificate of conformity is a statement delivered by the vehicle manufacturer to assure the vehicle complies with the legislation.

**New Vehicle Type** – Vehicles of a new type / model not previously seen in production and sale.

**All New Vehicles** – Vehicles that can be past, current or new production models but are new to be declared for road use.

**Type Approval** – The term used for when a product meets a minimum set of regulatory, technical and safety requirements that allows it to be sold within contracting parties.

**Vehicle** - single-deck, double-deck, rigid or articulated vehicle of category M2 or M3. (Certain exclusions include but not limited to ambulances, off-road vehicles, vehicles used by police, security and armed forces, mobile libraries and mobile hospitality units).

**Vehicle Class I** - vehicles constructed with areas for standing passengers, to allow frequent passenger movement.

**Vehicle Class II** - vehicles constructed principally for the carriage of seated passengers and designed to allow the carriage of standing passengers in the gangway and/or in an area which does not exceed the space provided for two double seats.

**Vehicle Class III** - vehicles constructed exclusively for the carriage of seated Passengers.

**Vehicle Type** – a term used to explain which vehicle class the vehicle is categorised under, for example Class I or Class II.

**UNECE** - United Nations Economic Commission for Europe.

## 5. WHAT IS UNECE REGULATION 107?

### 5.1. Why it exists.

The UNECE Regulation 107 was developed to increase the safety of buses & coaches. It is a set of legislative documents that provide the framework through technical prescriptions and guidance documents for any contracting parties. This specifically looks at the installation and testing of fire suppression systems in engine compartments of all single-deck, double-deck, rigid or articulated vehicle of category M2 or M3 and specifically vehicles having a capacity exceeding 22 passengers.

### 5.2. What it offers.

Having a type-approved automatic fire suppression system ensures that the vehicle meets the relevant technical prescriptions, this will allow the vehicle manufacturer to provide a compliant UNECE Regulation 107 vehicle that can be sold within all contracting parties. The fully type-approved vehicle is proven through a Certificate of Conformity and allows the vehicle manufacturer to apply the correct marking.

### 5.3. What needs to be done to have a certified system.

Below is a concise overview of the steps involved with obtaining an automatic fire suppression and detection system that is compliant with UNECE Regulation 107:

1. Verify from the table in section 6.2 that the vehicle type & vehicle class requires protection.
2. Complete a full analysis / risk assessment of the vehicle in question.
3. Select an automatic fire suppression system from a fire suppression manufacturer that has a valid Type Approval certificates that was obtained as per section 7.2 & 7.4. If necessary, update the analysis / risk assessment to any fire suppression manufacturers specific parameters.
4. Once the installation is finalised, complete the declaration of installation. It is mandatory that the system installed meets the parameters of the analysis / risk assessment and the valid Type Approval certificate from the fire suppression manufacturer.

## 6. WHO IS RESPONSIBLE?

### 6.1. Who are the UNECE contracting parties?

The contracting parties or signatory parties are countries that have adopted the uniform provision concerning the approval of category M2 or M3 vehicles with regard to their general construction. A full list of the contracting parties, their designated type-approval authorities and designated technical services can be found at page 137 of:

<http://www.unece.org/fileadmin/DAM/trans/doc/2019/wp29/ECE-TRANS-WP.29-343-Rev.27-Add.1.pdf>

It is the responsibility of the vehicle manufacturer to ensure their vehicles are compliant by displaying the correct approval type mark. This can only be displayed if the vehicle has a UNECE Regulation 107 certified system correctly installed onboard.

### 6.2. Dates of Implementation

The requirement to have a fire suppression system that complies with the UNECE Regulation 107 came into force in July 2018 however, the enforcement dates are split into categories and have a phased introduction, please see below for a breakdown of these dates and categories:

MANDATORY DATE	FINAL DATE OF TRANSITION	VEHICLE CLASS	VEHICLE TYPE
11th July 2018	11th July 2019	Class III	New Vehicle Type
11th July 2019	11th July 2020	Class III	All New Vehicles
1st September 2020	1st September 2021	Class I & II	New Vehicle Type
1st September 2021	1st September 2022	Class I & II	All New Vehicles

It is not mandatory to refit vehicles made before the above dates, only vehicles being placed on the market according to the table above will need to comply.

## 7. TESTING OVERVIEW

### 7.1. Fire tests

The test apparatus, test fires and general test specifications that make up the test criteria on which a UNECE Regulation 107 fire suppression system is tested against can be found in Annex 13 – Appendix 1 of:

<https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2016/R107r6am3e.pdf>  
&

<https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2016/R107r6am5e.pdf>

The fire tests are based on 4 of the 11 tests described in the SP Method 4912 which was developed and created by the Research Institutes of Sweden (RISE).

There are 4 separate fire test scenarios:

- High fire load
- Low fire load
- High fire load with fan
- Re-Ignition

### 7.2. Minimum pass criteria

In order for the system to be considered passed the system shall successfully pass all the 4 tests in the series with the criteria below:

- **High fire load** – The test shall be conducted with the extinguishing agent and the propellant gas vessel or the suppression agent generator cooled to the minimum operating temperature for the fire suppression system, as declared by the fire suppression manufacturer. All fires shall be fully extinguished by the end of the discharge or within one minute after activation. If not passed on the first attempt, two successful tests in succession will be required.
- **Low fire load** - All fires shall be fully extinguished by the end of the discharge or within one minute after activation. If not passed on the first attempt, two successful tests in succession will be required.
- **High fire load with fan** - All fires shall be fully extinguished by the end of the discharge or within one minute after activation. If not passed on the first attempt, two successful tests in succession will be required.
- **Re-Ignition** - The fire shall be fully extinguished, and no re-ignition shall occur 45 seconds after the extinguishing of the fire. If not passed on the first attempt, two successful tests in succession will be required.

### **7.3. Who can carry out the official tests?**

Only technical services that have been appointed by the type-approval authority can carry out these tests. Further details of technical services are shown below:

A technical service is an organisation or a body designated by the national approval authority as a:

- Testing laboratory to carry out tests.
- Or as a conformity assessment body to carry out the initial assessment and other tests or inspections on behalf of the approval authority.

A full list of potential technical services can be found at:

**<https://ec.europa.eu/docsroom/documents?tags=technical-service-auto&pageSize=30&sortCol=title&sortOrder=asc>**

### **7.4. Who can carry out official certification?**

Only appointed approval authorities can issue certification. Further details of approval authority are shown below:

Approval authorities are established or appointed by EU countries and notified to the Commission. The approval authorities have competence for:

- All aspects of the approval of a type of vehicle, system, component or separate technical unit.
- The authorisation process.
- Issuing and, if appropriate, withdrawing or refusing approval certificates.
- Acting as the contact point for the approval authorities of other EU countries.
- Designating the technical services.
- Ensuring that the vehicle manufacturer meets his obligations regarding the conformity of production.

A full list of these appointed approval authorities can be found at:

**<https://ec.europa.eu/docsroom/documents/28647>**

## **8. COMPLIANCE**

### **8.1. Marking**

A product that has been granted type approval with regards to UNECE Regulation 107 shall apply the correct marking as shown from sections 4.4 onwards of:

**<https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2016/R107r6am3e.pdf>**

And Annex 2 of:

**<https://www.unece.org/fileadmin/DAM/trans/doc/2014/wp29grsg/ECE-TRANS-WP29-GRSG-2014-06e.pdf>**



## **8.2. Certificates**

The fire suppression manufacturer shall make Type Approval certificates available; to be valid, the vehicle manufacturer shall adhere to the design constraints specified.

## **9. FURTHER INFORMATION**

### **9.1. Sizing of Systems**

The test apparatus and testing specifications are based on a 4.0m<sup>3</sup> volume and therefore when an analysis / risk assessment identifies a larger or smaller engine compartment volume the appropriate up-scaling or down-scaling shall be applied.

The revised system size shall be in accordance with the technical manual of the fire suppression manufacturer used in the application.

For details of the formulas and parameters used in calculating the correct up-scaling or down-scaling please see the following link and reference clause 7.5.1.5.4.3.:

**<https://www.unece.org/fileadmin/DAM/trans/doc/2014/wp29grsg/ECE-TRANS-WP29-GRSG-2014-06e.pdf>**

### **9.2. Analysis / Risk Assessments & Declaration of Installation**

All analysis / risk assessments shall cover the items in clause 7.5.1.5.4.2 as a minimum: Please use the following link to locate these minimum requirements:

**<https://www.unece.org/fileadmin/DAM/trans/doc/2014/wp29grsg/ECE-TRANS-WP29-GRSG-2014-06e.pdf>**

The supplier of the fire suppression system will be able to assist in further guidance of what needs to be in an accurate analysis / risk assessment to allow the correct application of their product.

The declaration of installation is a simple form that verifies the correct application of the fire suppression system with regards to the design, installation following of the analysis / risk assessment and that the installation matches both the analysis / risk assessment and the parameters of the fire suppression manufacturer.

The declaration of installation shall be carried out by the fire suppression system installer and is recommended to be carried out on each vehicle.

**DISCLAIMER**

*The information set out in this document is believed to be correct in the light of information currently available but it is not guaranteed and neither the Fire Industry Association nor its officers can accept any responsibility in respect of the contents or any events arising from use of the information contained within this document.*



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