UTAC CERAM

Behavior of M2 & M3 general construction in case of Fire Event

Regulations updates synthesis – UNECE n° 118 & n° 107

Regulation UNECE n° 107

- **Application scope :**
  - Approval of category M2 or M3 vehicles with regard to their general construction
  - “This Regulation applies to every single-deck, double-deck, rigid or articulated vehicles of categories M_2 or M_3“
- **Vehicles categories :**
  - "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

Regulation UNECE n° 107

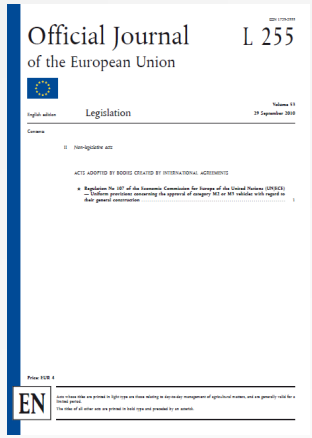
Vehicles categories:

- For vehicles having a capacity exceeding 22 passengers in addition to the driver, there are three classes of vehicles:
  - "Class I": vehicles constructed with areas for standing passengers, to allow frequent passenger movement.
  - "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.
  - "Class III": vehicles constructed exclusively for the carriage of seated passengers

- For vehicles having a capacity not exceeding 22 passengers in addition to the driver, there are two classes of vehicles:
  - "Class A": vehicles designed to carry standing passengers; a vehicle of this class has seats and shall have provision for standing passengers.
  - "Class B": vehicles not designed to carry standing passengers; a vehicle of this class has no provision for standing passengers.

Regulation UNECE n° 107

- **In 2011 (vehicle entry into operation date)**
  - EU requirements according to Official Journal of the European Union L 255 from 2010 September 29th
  - Required version : Incorporating all valid text up to UNECE n° 107, 03 series


Official Journal L 255
of the European Union
Legislation
EN

- **Current application, GSR 661/2009 requires since 2016 July 1st :**
  - New type vehicle : UNECE n° 107, 05 series
  - All types vehicle : UNECE n° 107, 06 series, supplement 1 (only possible starting 2018 June 10th)

Regulation UNECE n° 107

UNECE n° 107 series 03 supplement 02 (WP29/2011/36)

- Application : Entry into force 28/10/2011

- Major concerned updates :

  Annex 3

  - If the construction of a Class I or A vehicle does not permit the installation of an exit either in the rear or front face and when the installation of an escape hatch is considered dangerous for passengers, an additional exit on both sides of the vehicle should be provided.

  - This is considered satisfactory for the evacuation of passengers from Class I or A vehicles, which are not prone to roll-over due to their relatively low speed.

Regulation UNECE n° 107

UNECE n° 107 series 05 (WP29/2011/110)

- Application : Entry into force 26/07/2012
  - New types : 26/07/2014
  - All types : 26/07/2015

- Major concerned updates :

  Annex 3

  - Studies from different countries show that in a significant number of cases, fire is initiated from the interior compartment of buses and coaches.

  - An alarm system is recommended to inform the driver at an early stage of a possible fire hazard in compartments which are not directly visible.

  - The alarm system will inform the driver of the need to evacuate the passengers quickly.

Regulation UNECE n° 107

UNECE n° 107 series 05 supplement 02 (WP29/2014/69)

- Application : Entry into force 15/06/2015
- Major concerned updates :

Annex 3

- Emergency window shall be capable of being easily and instantaneously operated.
- This proposed solution does not require the use of laminated glass or plastic panes but let the opportunity and it does not prohibit the use of breakable glass.
- It provides wider flexibility to the manufacturers and opens the way for future developments to increase safety.

Regulation UNECE n° 107

UNECE n° 107 series 06 (WP29/2013/100)

- Informal Working Group on Service Doors, Windows and Emergency Exits (SDWE)

- Application : Entry into force 10/06/2014
  - New types : 10/06/2018
  - All types : 10/06/2019

- Major concerned updates :

  Annex 3

  - The passenger compartment requires that the number of exits does not count the driver's and front passenger's doors.

  - The threshold for an additional escape hatch is brought back from 50 to 30 for the sake of improved safety as roof hatches are usually the main emergency exit when the vehicle is on its side.

Regulation UNECE n° 107

UNECE n° 107 series 06 (WP29/2013/100)

- Major concerned updates :

Annex 3

- The informal group was keen to revise the minimum dimensions of the emergency doors in order to align them with the evolution of the technology and with the corpulence of average users

- The proposal increases the surface of the hatch by 12.5% in order to take into account the situations in the real world, i.e. the occupants wearing winter clothes, elderly people, etc. With the same attention given to safety, the minimum area of the rectangle to be inscribed in the hatch aperture is increased by 20%.

- The proposed wording clarifies that either such a control or a control for the dedicated emergency door can be used to operate the door.

Regulation UNECE n° 107

UNECE n° 107 series 06 supplement 04 (WP29/2015/88)

- Application : Entry into force 18/06/2016
- Major concerned updates :

Annex 3

- Addition requirement details regarding the visbility of safety signs
- The informal group agreed that some safety improvement could be achieved in the medium term by regulating emergency lighting (activation, illuminance, time, …)
- Annex 3 includes requirements on the installation of fire suppression systems for class III. Buses and coaches with an internal combustion engine located to the rear of the driver's compartments shall be equipped with a fire suppression system in the engine compartment and in each compartment where a combustion heater is located.
- The requirements for fire detection are adjusted to fit automatic fire suppression systems.

Regulation UNECE n° 107

UNECE n° 107 series 06 supplement 04 (WP29/2015/88)

- Major concerned updates :

Annex 13

- Annex 13 has been added with requirements for type approval of fire suppression systems. The system's ability to extinguish fires in the environment of an engine compartment shall be tested. Test equipment, test conditions and test scenarios are described to ensure that the test methods are repeatable and correspond to realistic fire scenarios.

- The tests include four different scenarios: high fire load, low fire load, high fire load with fan and re-ignition.

Regulation UNECE n° 107

UNECE n° 107 series 07 (WP29/2016/12)

- Application : Entry into force 08/10/2016
  - New types : 01/09/2020
  - All types : 01/09/2021

- Major concerned updates :

  Annex 3 & annex 13

  - Includes requirements on the installation of fire suppression systems for class I and II as mandatory based on technical requirements coming from UNECE n° 107, series 06, supplement 04.

Regulation UNECE n° 118

- **Application scope :**
  - Technical prescriptions concerning the burning behavior and/or the capability to repel fuel or lubricant of materials used in the construction of certain categories of motor vehicles
  - “This Regulation applies to the burning behaviour (ignitibility, burning rate and melting behaviour) and to the capability to repel fuel or lubricants of materials used in vehicles of categories M_3, Classes II and III“
- **Vehicles categories :**
  - "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

Regulation UNECE n° 118

- **Vehicles categories:**
  - For vehicles having a capacity exceeding 22 passengers in addition to the driver, there are three classes of vehicles:
    - "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.
    - "Class III": vehicles constructed exclusively for the carriage of seated passengers

Regulation UNECE n° 118


Official Journal L 177
of the European Union
Legislation
EN

- **In 2011 (vehicle entry to operation date)**
  - EU requirements according to Official Journal of the European Union L 177 from 2010 July 10th
  - Required version : Incorporating all valid text up to UNECE n° 118, 00 series

- **Current application, GSR 661/2009 requires since 2016 July 1st :**
  - New type vehicle : UNECE n° 118, 02 series, supplement 01
  - All types vehicle : UNECE n° 118, 01 series

Regulation UNECE n° 118

UNECE n° 118 series 01

- Application : Entry into force 09/12/2010
  - New types : 09/12/2012
  - All types : 09/12/2015

- Major concerned updates :

  Paragraph 6

  - Integration of requirements for the capability to repel fuel or lubricant

  - Integration of oblique flammability resistance for cable under test protocol from ISO 622:2006

Regulation UNECE n° 118

UNECE n° 118 series 02

- Application : Entry into force 26/07/2012
  - New types vehicle : 26/07/2017
  - New types component : 26/07/2016
  - All types vehicle : 26/07/2020

- Major concerned updates :

  - This proposal extends the application of the tests for the passenger compartment to the overall interior compartment of the vehicle.

  - The existing Regulation No. 118 requires testing of materials in a horizontal position independently from their real installation in the vehicle. Only curtains are tested in vertical position.

  - To represent a realistic scenario, this proposal requires materials and components to be tested taking into account their real installation situation.

Regulation UNECE n° 118

UNECE n° 118 series 03

- Application : Entry into force 10/10/2017
  - New types vehicle : 01/09/2019
  - New types component : 01/09/2019
  - All types vehicle : 01/09/2021

- Major concerned updates :
  - Classification of cables requirement
  - Addition of test protocol for cable oblique flammability (annex 10)
  - Introduction of requirements for cable sleeves and cable conduit (vertical combustion)

Recommandations declinaison

- Need to collect all data coming from other similar accidents

- Ways of improvement (to be discussed)

Proposals	Technical feasibility	Impact assesment	Cost evaluation
Reduction of combustion speed			
Comparison of rail / naval / aeronautical standards			
Baggage burning: introduction of an extinguishing or wall insulation system in the bunkers			
Smoke toxicity and opacity			

Recommandations declinaison

Ways of improvement (to be discussed)

Proposals	Technical feasibility	Impact assesment	Cost evaluation
Automatic / manual opening of the roof hatches (influence on smoke extraction)			
Addition of a rear exit (cost/efficiency study)			
Automatic / manual opening of (all) windows (evacuation + smoke extraction)			
Laminated glass on emergency exits			
Optimization of luminous trajectories and functionalities			