PROPOSAL FROM THE EXPERT GROUP ON AERODYNAMICS

REAR DEVICES

(January 2015)

1. Rear aerodynamic devices: technical requirements

NOTE: the words "flaps" or "rear devices" are used in this document as a generic term for all equipment added to the rear of the trailer, semi-trailer or rigid truck for the purpose of improving the aerodynamic performance of the vehicle.

1.1 Technical requirements for the rear devices

- a. external projections: All the components of the rear devices shall satisfy the same requirements as those defined in points 5 and 6.9 of UNECE Regulation N°61 on external projections forward of the cab's rear panel of "Class N" motor vehicles, irrespective of the field of application and the scope of that UNECE Regulation:

a1. The surfaces of the rear devices shall not exhibit, directed outwards, any part likely to catch on pedestrians, cyclists or motor cyclists.

a2. The parts of the rear devices shall not exhibit, directed outwards, any pointed or sharp parts or any projections of such shape, dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injury to a person hit by the external surface or brushing against it in the event of a collision.

a3. Sheet metal edges are permitted provided that the edge is folded back towards the body so that it cannot be touched by a sphere of 100 mm diameter or is provided with a protective covering having a radius of curvature of not less than 2.5 mm.

a4. The provisions in a2. and a3. shall not apply to parts that cannot be contacted by a sphere 100 mm in diameter, located higher than 2.00 m above the ground, or projecting parts having a hardness of not more than 60 Shore A.

- b. resistance of materials: during the whole life time of the rear devices when these are guaranteed by the manufacturer, these may not be torn or broken, whatever the weather conditions in the following ranges:

- Temperature range from -30 to +50 °C

- Wind speed: The rear devices shall be designed, constructed and fitted so as to withstand in normal use (ground speed of the vehicle at 90 km/h) in deployed and retracted position, despite the wind forces and vibrations to which it may be subjected. This takes into account the wind produced by the movement of the vehicle in forward and rear direction including the additional wind produced by weather conditions as well as the forces produced by blast waves in tunnels and in intermodal/combined transport on railways (ground speed up to 160 km/h). This section is detailed below.
- c. fixation and behavior on trailers and trucks:

The aim of this paragraph is to certify that rear devices shall not fall down from the trailers or semi-trailers or be blown up, neither when the vehicle is driving or moving (combined transport), nor when the equipment is manipulated by the driver, to avoid any risk for the other road users, for the driver or for the infrastructure.

When flaps are folded, they shall be securely locked to stay folded. Their fixation to the vehicle and the locking system shall resist against a wind velocity up to 160 km/h (use in combined transport). When flaps are deployed, their fixation to the vehicle shall resist a pressure difference of 330 N/m² (perpendicular to the flaps surfaces) which equates to a wind velocity in normal use of the vehicle at 90 km/h.

When deployed, rigidity of rear devices shall be sufficient to avoid dangerous swaying or oscillating behavior of the flaps due to cross winds or aerodynamic oscillations at the rear of the moving vehicle.

The presence of rear aerodynamic devices shall not be taken into account for the position of the rear underrun protection device according to UNECE Regulation 58.

- d. foldability/retractability:

In the situation where rear aerodynamic devices have the capability to be foldable/deployed by the driver from the cab (assistance by motorization), rear devices shall not be deployed without a deliberate action from the driver. For reasons of safety of other road users, automatic systems triggered by the vehicle speed are not allowed for flaps longer than 50 cm.

Power operated devices must have the capability to be foldable manually when the vehicle is stopped.

When folded, it must be ensured that the rear devices will not be unintentionally opened up (by wind etc.), should the vehicle be in motion or stopped.

- e. maximum width and height allowed for deployed rear devices

The equipped vehicle shall not exceed 2600 mm in width when the rear devices are folded or 2650 mm when deployed. It is not allowed to exceed the maximum height set in point 1.3 of the same Annex for international traffic.

The lowest part of the rear devices shall not be lower than the loading floor.

- f. maximum dimension allowed for folded rear devices

Maximum length added to the vehicle by folded rear devices for trailers subject to be transported on a rail wagon in combined transport: 20 cm.

1.2 Technical requirements imposed by the infrastructures
Vehicle combinations equipped with rear aerodynamic devices have to comply with the requirements of maneuverability on the infrastructure as set by Directive 96/53/EC, Annex I point 1.5, and Reg 1230/2012. The following requirements must also be met:

a. When the vehicle is parked, engine stopped or not, devices longer than 50 cm must be folded, as parking places are designed according to the directive limits.

b. Vehicles equipped with rear devices should be able to travel on all road infrastructures accessible to trucks in interurban areas when the devices are deployed. The driver deploys the rear devices only where and when it is possible without risk for the other road users and for himself during the operation.

c. The use of rear devices longer than 50 cm in deployed position is prohibited in areas where the allowed maximum speed limit is less or equal to 50 km/h, except on motorways.

1.3 Requirements on marking, signaling and lighting

a. A vehicle equipped with aerodynamic devices shall comply with the provisions of UNECE Regulation N°48 regarding the installation of lighting and light signaling devices, when devices are folded or unfolded. Rear aerodynamic devices shall not obscure dangerous goods markings, or any other mandatory plates installed on the rear of the vehicle. UNECE R48 should be updated to take into accounts the fitting of rear aerodynamic devices.

b. For rear aerodynamic devices longer than 50 cm, the outward edges of the rear devices shall be marked with retro-reflecting material having at least the same minimum values for the coefficient of retro-reflection R’ like Class C material according to UNECE Regulation N°104 in order to make visible the lower, upper, longitudinal and lateral limits of the deployed rear devices. The width of the retro-reflecting material may be reduced to minimum 2 cm if the edge of the rear aerodynamic device is smaller than 5 cm.

c. If additional provisions concerning rear aerodynamic devices are introduced in UNECE Regulation N°48, they shall be fulfilled.

d. The provisions on geometric visibility of the rear registration plate in Annex II to Regulation (EU) N°1003/2010 for the space for mounting and the fixing of rear registration plates shall be fulfilled with by retracted and deployed rear aerodynamic devices.

1.4 Other safety requirements in case of impact

Rear aerodynamic devices attached to a vehicle shall not increase the risks of injuries to drivers and to passengers of other road vehicles in case of a rear collision, whatever the direction of the colliding vehicle. The rear devices shall not penetrate laminated windscreens, increase the risk for vulnerable road users including cyclists and motorcyclists, or reduce the performance of the existing fixed rear underrun protection. Fragments and splinters produced by fracture of the rear aerodynamic devices shall not increase the risks of injury.
Manual operations by the driver shall be safe in any circumstance.

2. Certification of rear aerodynamic devices

2.1 Principles

The proposed revision of the directive on maximum weights and dimensions of heavy goods vehicles, COM (2013) 195, requires in its article 8 point 3 that the additional aerodynamic devices shall be authorized by the Member States which shall issue a certificate to this effect, attesting compliance with the requirements here above. The certificates shall be recognized by all other Member States. For that purpose, it is necessary to harmonize the certification procedures to be used in the Member States.

The procedure shall be included inside the EU type approval process as defined by Directive 2007/46/EC.

In addition to the certification of the rear devices as such, the equipped vehicles shall be subject to regular inspection during the road worthiness tests.

2.2 Compliance of aerodynamic devices with the requirements of paragraph 1 above

Compliance with the requirements of paragraph 1 will be included in the type approval procedures governed by Regulation (EC) N°661/2009/EC.

2.3 National procedures for retrofitting of vehicles with rear aerodynamic devices

Member States shall determine in their national provisions whether or not they consider as necessary to execute an approval process for the retrofitting of the vehicles with rear aerodynamic devices, after the first registration of the vehicle, as well as the provisions for that approval process.

Member States shall not prohibit the use on their territory of vehicles registered in other Member States and retrofitted with rear aerodynamic devices, if these rear devices and their fixation comply with the harmonized provisions.

Member States shall accept the EC type-approval certificate of the rear aerodynamic devices if they are fitted according to the mounting instructions attached.

2.4 Road worthiness certificate for equipped vehicles
The rear devices on the equipped vehicle shall be tested during the periodic road worthiness tests according to Directive 2014/45/EU and the technical roadside inspections according to Directive 2014/47/EU.