

ANNEX IV

Requirements for type-approval of vehicles with regard to their spray suppression systems

0. GENERAL

- 0.1. Category N and O vehicles, with the exception of off-road vehicles as defined in Annex II to Directive 2007/46/EC, shall be constructed and/or fitted with spray suppression systems in such a way as to meet the requirements laid down in this Annex. In the case of chassis/cab vehicles, these requirements may only be applied to the wheels covered by the cab.

For vehicles of category N₁ and N₂ with a permissible maximum laden mass not exceeding 7,5 tonnes, the requirements of Council Directive 78/549/EEC⁽¹⁾ may be applied as alternative to the requirements of this Regulation at the request of the manufacturer.

- 0.2. The requirements of this Annex relating to spray-suppression devices, as defined in Article 2(4), are not mandatory for categories N, O₁ and O₂ vehicles with a permissible maximum laden mass not exceeding 7,5 tonnes, chassis/cab vehicles, unbodied vehicles or vehicles on which the presence of spray-suppression devices would be incompatible with their use. However, if such devices are fitted to those vehicles, they must conform to the requirements of this Regulation.

1. A vehicle representative of the vehicle type to be approved, fitted with its spray-suppression system, must be submitted to the technical service conducting the approval tests.

GENERAL REQUIREMENTS

2. AXLES

2.1. Retractable axles

Where a vehicle is fitted with one or more retractable axles, the spray-suppression system must cover all the wheels when the axle is lowered and the wheels in contact with the ground when the axle is raised.

2.2. Self-tracking axles

For the purpose of this Regulation, a self-tracking axle of the 'pivot steering' type is considered to be, and treated as, an axle fitted with steered wheels.

Where a vehicle is fitted with a self-tracking axle, the spray-suppression system must satisfy the conditions applicable to non-steered wheels if mounted on the pivoting part. If not mounted on that part it must satisfy the conditions that are applicable to steered wheels.

3. POSITION OF OUTER VALANCE

The distance 'c' between the longitudinal plane tangential to the outer tyre wall, apart from any tyre bulge near the ground, and the inner edge of the valance must not exceed 100 mm (Figures 1a and 1b of Annex VI).

4. STATE OF VEHICLE

For the checking of compliance with this Regulation the vehicle must be in the following state:

- (a) it must be unladen and with the wheels in the straight-ahead position;

- (b) in the case of semi-trailers, the loading surfaces must be horizontal;
- (c) the tyres must be inflated to their normal pressure.

5. SPRAY-SUPPRESSION SYSTEMS

- 5.1. The spray-suppression system must meet the specifications set out in point 6 or 8.
- 5.2. The spray-suppression system for non-steered or self-steered wheels that are covered by the bodywork floor, or by the lower part of the load platform, must meet either the specifications set out in point 6 or 8 or else those in point 7.

SPECIFIC REQUIREMENTS

- 6. Requirements concerning energy-absorption spray suppression systems for axles fitted with steered or self-steering or non-steered wheels.

6.1. Mudguards

- 6.1.1. The mudguards must cover the zone immediately above, ahead and behind the tyre or tyres in the following manner:

- (a) in the case of a single or multiple axle, the forward edge (C) must extend forwards to reach a line O-Z where Θ (theta) is no more than 45° above the horizontal.

The rearmost edge (Figure 2 of Annex VI) must extend downwards in such a way as not to be more than 100 mm above a horizontal line passing through the centre of the wheel;

- (b) in the case of multiple axles the angle Θ relates only to the foremost axle and the requirement relating to the height of the rearmost edge applies only to the rearmost axle;

- (c) the mudguard must possess a total width 'q' (Figure 1a of Annex VI) at least adequate to cover the width of the tyre 'b' or the entire width of two tyres 't' in the case of twin wheels, account being taken of the extremes for the tyre/wheel unit specified by the manufacturer. Dimensions 'b' and 't' shall be measured at hub height, excluding any markings, ribs, protective bands, etc., on the tyre walls.

- 6.1.2. The front side of the rear part of the mudguard must be fitted with a spray-reduction device complying with the specifications set out in Part 2 of Annex III. This material must cover the inside of the mudguard up to a height determined by a straight line running from the centre of the wheel and forming an angle of at least 30° with the horizontal (Figure 3 of Annex VI).

- 6.1.3. If the mudguards are made up of several components, when fitted, they must not incorporate any aperture enabling spray to exit while the vehicle is in motion. This requirement is deemed to be met if, when the vehicle is either laden or unladen, any radial jet running outwards from the wheel centre over the entire width of the tyre running surface and within the range covered by the mudguard always strikes against a part of the spray suppression system.

6.2. Outer valances

- 6.2.1. In the case of single axles, the lower edge of the outer valance may not be situated beyond the following distances and radii, as measured from the centre of the wheel, except at the lowest extremities that may be rounded (Figure 2 of Annex VI).

Air suspension:

Status: This is the original version (as it was originally adopted).

(a) Axles fitted with steered wheels or self-steering wheels: From the front edge (towards the front of the vehicle) (tip C) To the rear edge (towards the rear of the vehicle) (tip A)	$R_v \leq 1,5 R$
(b) Axles fitted with non-steered wheels: From the front edge (tip C) To the rear edge (tip A)	$R_v \leq 1,25 R$

Mechanical suspension

- (a) general case} $R_v \leq 1,8 R$
- (b) non-steered wheels for vehicles with a technically permissible laden mass more than 7,5 t} $R_v \leq 1,5 R$

where R is the radius of the tyre fitted to the vehicle, and R_v the distance, expressed as a radius, at which the lower edge of the outer valence is situated.

- 6.2.2. In the case of multiple axles the requirements laid down in point 6.2.1 do not apply between the vertical transversal planes passing through the centre of the first and the last axles where the outer valance may be straight in order to ensure the continuity of the spray suppression system. (Figure 4 of Annex VI).
- 6.2.3. The distance between the uppermost and the lowermost points of the spray suppression system (mudguard and outer valance) measured in any cross section perpendicular to the mudguard (see Figures 1b and 2 in Annex VI) must extend to not less than 45 mm at all points behind a vertical line passing through the centre of the wheel or the first wheel in the case of multiple axles. This dimension may be gradually reduced in front of this line.
- 6.2.4. No openings enabling spray to emerge when the vehicle is moving are allowed in the outer valances or between the outer valances and the other parts of the mudguards.
- 6.2.5. The requirements of points 6.2.3 and 6.2.4 may not be respected locally when the valance is composed by different elements with relative movement.
- 6.2.6. Tractors for semi-trailers with a low chassis, namely those which may have a height of coupling face (defined in point 6.20 of standard ISO 612 of 1978) equal to or less than 1 100 mm, may be designed in such a way as to be exempted from the requirements of points 6.1.1(a), 6.1.3 and 6.2.4. In this regard, mudguards and valances may not cover the area immediately above the tyres of the rear axles, when these tractors are coupled to a semi-trailer, in order to avoid the spray-suppression system being destroyed. However, the mudguards and valances of these vehicles must conform to the requirements of the above points, in sectors more than 60° from the vertical line passing through the centre of the wheel, in front and behind these tyres.

Those vehicles must therefore be designed in such a way as to meet the requirements set out in the first paragraph when they are operated without a semi-trailer.

In order to be able to meet those requirements, mudguards and valances may, for example, comprise a removable part.

6.3. Rain flaps

- 6.3.1. The width of the flap must fulfil the requirement for 'q' in point 6.1.1(c), except for any part of the flap that is contained within the mudguards. In such cases this part of the flap must be at least equal in width to the tread of the tyre.

The width of the part of the rain flaps positioned beneath the mudguard must satisfy the condition laid down in this paragraph with a tolerance of ± 10 mm at each side.

- 6.3.2. The orientation of the flap must be basically vertical.
- 6.3.3. The maximum height of the bottom edge must not exceed 200 mm (Figure 3 of Annex VI).

This distance is increased to 300 mm in the case of the last axle where the radial distance of the lower edge of the outer valancing, R_v , does not exceed the dimensions of the radius of the tyres fitted to the wheels on that axle.

The maximum height of the bottom edge of the rain flap in relation to the ground, may be raised to 300 mm if the manufacturer deems it technically appropriate with regard to the suspension characteristics.

- 6.3.4. The rain flap must not be more than 300 mm from the rearmost edge of the tyre, measured horizontally.
- 6.3.5. In the case of multiple axles where distance d between the tyres on adjacent axles is less than 250 mm, only the rear set of wheels must be fitted with rain flaps. There must be a rain flap behind each wheel when distance d between the tyres on adjacent axles is at least 250 mm (Figure 4 of Annex VI).
- 6.3.6. Rain flaps must not be deflected by more than 100 mm towards the rear under a force of 3 N per 100 mm of flap width, applied to a point located 50 mm above the lower edge of the flaps.
- 6.3.7. The whole of the front face of the part of the rain flap having the minimum dimensions required must be fitted with a spray-suppression device that meets the specifications set out in Part 2 of Annex III.
- 6.3.8. No openings enabling spray to emerge are allowed between the lower rear edge of the mudguard and the rain flaps.
- 6.3.9. Where the spray-suppression device meets the specifications relating to rain flaps (point 6.3), no additional rain flap is required.

7. Requirements relating to spray-suppression systems fitted with energy-absorption spray-suppression devices for certain axles that are fitted with non-steered or self-steering wheels (see point 5.2).

7.1. Mudguards

- 7.1.1. Mudguards must cover the zone immediately above the tyre or tyres. Their front and rear extremities must extend at least to the horizontal plane that is tangent to the upper edge of the tyre or tyres (Figure 5 of Annex VI). However, the rear extremity may be replaced by the rain flap, in which case this must extend to the upper part of the mudguard (or equivalent component).

7.1.2. All of the inner rear part of the mudguard must be fitted with a spray-suppression device that meets the requirements set out in Part 2 of Annex III.

7.2. Outer valances

7.2.1. In the case of single or multiple axles where the distance between the adjacent tyres is at least 250 mm, the outer valance must cover the surface extending from the lower to the upper part of the mudguard up to a straight line formed by the tangent to the upper edge of the tyre or tyres and lying between the vertical plane formed by the tangent to the front of the tyre and the mudguard or rain flap located behind the wheel or wheels (Figure 5b of Annex VI).

In the case of multiple axles an outer valance must be located by each wheel.

7.2.2. No openings enabling spray to emerge are allowed between the outer valance and the inner part of the mudguard.

7.2.3. Where rain flaps are not fitted behind each wheel (see point 6.3.5), the outer valance must be unbroken between the outer edge of the rain flap to the vertical plane that is tangent to the point furthest to the front of the tyre (Figure 5a of Annex VI) of the first axle.

7.2.4. The entire inner surface of the outer valance, the height of which must not be less than 100 mm, must be fitted with an energy-absorption spray-suppression device complying with the requirements of Part 2 of Annex III.

7.3. These flaps must extend to the lower part of the mudguard and comply with points 6.3.1 to 6.3.9.

8. Requirements concerning spray-suppression systems fitted with air/water separator spray-suppression devices for axles with steered and non-steered wheels.

8.1. Mudguards

8.1.1. Mudguards must comply with the requirements of point 6.1.1(c).

8.1.2. Mudguards for single or multiple axles where the distance between the tyres on adjacent axles exceeds 300 mm must also comply with point 6.1.1(a).

8.1.3. In the case, of multiple axles where the distance between the tyres on adjacent axles does not exceed 300 mm the mudguards must also conform to the model shown in Figure 7.

8.2. Outer valances

8.2.1. The lower edges of the outer valances must be fitted with air/water separator spray-suppression devices complying with the requirements of Part 3 of Annex III.

8.2.2. In the case of single or multiple axles where the distance between the tyres on adjacent axles exceeds 300 mm, the lower edge of the spray-suppression device fitted to the outer valance must have the following maximum dimensions and radii, starting from the centre of the wheel (Figures 6 and 7 of Annex VI):

(a) Axles fitted with steered wheels or self-steering wheels:	$R_v \leq 1,05 R$
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	from the front edge (towards the front of the vehicle) (tip C at 30°) to the rear edge (towards the rear of the vehicle) (tip A at 100 mm)	
(b)	Axles fitted with non-steered wheels: from the front edge (tip C at 20°) to the rear edge (tip A at 100 mm)	$R_v \leq 1,00 R$

where

R = is the radius of tyre fitted to the vehicle;
 R_v = the radial distance from the lowest edge of the outer valance to the centre of the wheel.

8.2.3. In the case of multiple axles where the distance between the tyres on adjacent axles does not exceed 300 mm, the outer valances located in the inter-axle spaces must follow the path specified in point 8.1.3, and must extend downwards in such a way as not to be more than 100 mm above a horizontal straight line passing through the wheel centres (Figure 7 of Annex VI).

8.2.4. The depth of the outer valance must extend to not less than 45 mm, at all points behind a vertical line passing through the centre of the wheel. This depth may be gradually reduced in front of this line.

8.2.5. No openings enabling spray to emerge are allowed in the outer valances or between the outer valances and the mudguards.

8.3. Rain flaps

8.3.1. Rain flaps must:

(a) comply with point 6.3 (Figure 3 of Annex VI); or

(b) comply with points 6.3.1, 6.3.2, 6.3.5, 6.3.8 and 8.3.2 (Figure 6 of Annex VI).

8.3.2. Spray suppression equipment complying with the specifications set out in Annex IV, must be fitted to the rain flaps referred to in point 8.3.1(b), at least along the full edge.

8.3.2.1. The lower edge of the spray-suppression device must be not more than 200 mm from the ground.

The maximum height of the bottom edge of the rain flap in relation to the ground, may be raised to 300 mm if the manufacturer deems it technically appropriate with regard to the suspension characteristics.

8.3.2.2. The spray-suppression device must be at least 100 mm deep.

8.3.2.3. Apart from the lower part, which includes the spray-suppression device, the rain flap as referred to in point 8.3.1(b) must not bend by more than 100 mm towards the rear under the effect of a force of 3 N per 100 mm of width of the rain flap measured at the intersection of the rain flap with the spray-suppression device in its working position, applied at a distance of 50 mm above the lower edge of the rain flap.

8.3.3. The rain flap must not be more than 200 mm from the rearmost edge of the tyre, measured horizontally.

9. In the case of multiple axles, the spray-suppression system of one axle, which is not the furthest back, may not need to cover the entire width of the tread of the tyre when there is, locally, the possibility of interference between the spray-suppression system and the structure of the axles or of the suspension or of the undercarriage.

- (1) [OJ L 168, 26.6.1978, p. 45.](#)