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To:	Mr Uwe CORSEPIUS, Secretary-General of the Council of the European Union
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Subject:	ANNEXES [...] Commission Delegated Regulation (EU) No .../... of XXX supplementing Regulation (EU) No 167/2013 of the European Parliament and of the Council with regard to vehicle functional safety requirements for the approval of agricultural and forestry vehicles

Delegations will find attached document C(2014) 9198 final ANNEXES 1 TO 14.

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ANNEXES 1 to 14

ANNEXES

[...]

Commission Delegated Regulation (EU) No .../... of XXX

supplementing Regulation (EU) No 167/2013 of the European Parliament and of the Council with regard to vehicle functional safety requirements for the approval of agricultural and forestry vehicles

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ANNEX I
List of applicable UNECE regulations

Regulation Number	Subject	Series of amendments	OJ Reference	Applicability
3	Lighting, light signalling devices and their light sources	Supplement 12 to the 02 series of amendments	L 323, 6.12.2011, p. 1	T, C, R and S
4	Lighting, light signalling devices and their light sources	Supplement 14 to the original version of the Regulation Supplement 15 to the original version of the Regulation	L 31, 31.1.2009, p. 35 L 4, 7.1.2012, p. 17	T, C, R and S
5	Lighting, light signalling devices and their light sources	Incorporating all valid text up to 03 series of amendments	L 162, 29.5.2014, p. 1	T and C
6	Lighting, light signalling devices and their light sources	Supplement 19 to the 01 series of amendments Corrigendum 1 to Supplement 18 Supplement 19 to the 01 series of amendments	L 177, 10.7.2010, p. 40	T, C, R and S
7	Lighting, light signalling devices and their light sources Lighting installation	Supplement 16 to the 02 series of amendments	L 148, 12.6.2010, p. 1	T, C, R and S
10	Electromagnetic compatibility	04 series of amendments Corrigendum 1 to the Revision 4 Supplement 1 to	L 254, 20.9.2012, p. 1	T and C

		the 04 series of amendments		
18	Devices to prevent unauthorised use	Supplement 2 to the 03 series of amendments	L 120, 13.5.2010, p. 29	T and C
19	Lighting, light signalling devices and their light sources	Supplement 2 to the 03 series of amendments	L 177, 10.7.2010, p.113	T and C
21	Interor fittings – doors	Supplement 3 to the 01 series of amendments	L 188, 16.7.2008, p. 32	T and C
23	Lighting, light signalling devices and their light sources	Supplement 17 to the original version of the Regulation	L 4, 17.1.2012, p. 18	T, C, R and S
25	Head restraints	04 series of amendments Corrigendum 2 to Revision 1 of the Regulation	L 215, 14.8.2010, p. 1	T and C
28	Audible warning devices	Supplement 3 to the original version of the Regulation	L 323, 6.12.2011, p. 33	T and C
30	Tyres	Supplement 15 to the 02 series of amendments Supplement 16 to the 02 series of amendments	L 201, 30.7.2008, p. 70 L 307, 23.11.2011, p.1	T, R and S
31	Lighting, light signalling devices and their light sources	Supplement 7 to the 02 series of amendments	L 185, 17.7.2010, p. 15	T and C
37	Lighting, light signalling devices and their light sources	Supplement 34 to the 03 series of amendments	L 297, 13.11.2010, p. 1	T, C and R
38	Lighting, light signalling devices and their light sources	Supplement 15 to the original version of the Regulation Corrigendum 1 to Supplement 12	L 148, 12.6.2010, p. 55	T and C

		Amendments to Regulation 38 incorporating Supplement 15 to the original version of the Regulation	L 4, 7.1.2012, p. 20	
43	Glazing	Supplement 2 to the 01 series of amendments	L 42, 12.02.2014, p. 1	T and C
46	Rear view mirrors	Supplement 4 to the 02 series of amendments Corrigendum 1 to supplement 4	L 177, 10.7.2010, p. 211	T and C
48	Lighting installation	Supplement 6 to the 04 series of amendments 05 series of amendments	L 323, 6.12.2011, p. 46	T, C, R and S
54	Tyres	Supplement 16 to the original version of the Regulation Supplement 17 to the original version of the Regulation	L 183, 11.7.2008, p. 41 L 307 , 23.11.2011, p. 2	T, R and S
55	Mechanical couplings	Supplement 1 to the 01 series of amendments	L 227, 28.8.2010, p. 1	T, C, R and S
62	Devices to prevent unauthorised use	Supplement 2 to the original version of the Regulation	L 89, 27.3.2013, p. 37	T and C
69	Lighting, light signalling devices and their light sources Lighting installation	Supplement 5 to the 01 series of amendments	L 200, 31.7.2010, p. 1	T and C T, C, R and S
73	Lateral protection	01 series of amendments	L 122, 8.5.2012, p.1	R3b and R4B

75	Tyres	Supplement 13 to the Regulation in its original form	L 84, 30.3.2011, p. 46	T, R and S
77	Lighting installation	Supplement 14 to the original version of the Regulation	L 4, 7.1.2012, p.4	T, C, R and S
79	Steering for fast tractors	Supplement 3 to the 01 series of amendments	L 137, 27.5.2008, p. 25	Tb and Cb
81	Rear view mirrors	Supplement 2 to the original version of the Regulation	L 185, 13.7.2012, p.1	T and C with straddle seat and handlebar
87	Lighting, light signalling devices and their light sources	Supplement 14 to the original version of the Regulation Correction 1 to Revision 2 Supplement 15 to the original version of the Regulation	L 164, 30.6.2010, p. 46 L 4, 7.1.2012, p. 24	T and C
89	Maximum design speed, speed governors and speed limitation devices	Supplement 1 to the original version of the Regulation	L 158, 19.6.2007, p. 1	T and C
91	Lighting, light signalling devices and their light sources	Supplement 11 to the original version of the Regulation Supplement 12 to the original version of the Regulation Supplement 13 to the original version of the Regulation	L 164, 30.6.2010, p. 69 L 4, 7.1.2012, p. 27	R and S
98	Lighting, light signalling devices and their light sources	Supplement 4 to the 01 series of amendments	L 176, 14.6.2014, p. 64	T and C

99	Lighting, light signalling devices and their light sources	Supplement 5 to the original version of the Regulation	L 164, 30.6.2010, p. 151	T and C
104	Lighting installation	Amendments incorporating all valid text up to: Supplement 7 to the original version of the Regulation	L 75, 14.3.2014, p. 29	T, C, R and S
106	Tyres	Supplement 8 to the original version of the Regulation	L 257, 30.9.2010, p. 231	T, R and S
112	Lighting, light signalling devices and their light sources	Supplement 12 to the original version of the Regulation	L 230, 31.8.2010, p. 264	T and C
113	Lighting, light signalling devices and their light sources	Amendments incorporating all valid text up to Supplement 3 to the 01 series of amendments to the Regulation	L 176, 14.6.2014, p. 128	T and C
117	Tyres	02 series of amendments Corrigendum 1 to the 02 series of amendments Corrigendum 2 to the 02 series of amendments Corrigendum 3 to the 02 series of amendments	L 307, 23.11.2011, p. 3	T, R and S
119	Lighting, light signalling devices and their light sources	Amendments incorporating all valid text up to Supplement 3 to the 01 series of amendments	L 89, 25.3.2014, p. 101	T and C

122	Heating systems	Corrigendum 2 to the original version of the Regulation Supplement 1 to the original version of the Regulation	L 164, 30.6.2010, p. 231	T and C
123	Adaptive front lighting systems	Incorporating all valid text up to Supplement 4 to the original version of the Regulation	L 222, 24.8.2010, p. 1	T and C
128	Light emitting diode (LED) light sources	Incorporating all valid text up to Supplement 2 to the original version of the Regulation	L 162, 29.5.2014, p. 43	T, C and R

ANNEX II
Requirements on vehicle structure integrity

1. Vehicles shall be designed and constructed in order to be sufficiently robust to withstand their intended use over their normal lifetime, taking into account regular and scheduled maintenance and specific equipment adjustments clearly and unambiguously set out in the operator's manual provided with the vehicle. The vehicle manufacturer shall provide a signed statement to this effect.

2. Vehicle assembly and construction in the assembly plants, in particular the processes relating to the vehicle frame, chassis and body and the drivetrain, shall be covered by a quality assurance system to ensure that essential mechanical connections, such as welds and threaded connections, as well as other relevant material characteristics, are checked and verified as appropriate.

3. The approval authority shall verify the quality assurance system as part of the conformity of production arrangements referred to in Article 28 of Regulation (EU) No 167/2013.

4. The type-approval authority shall verify that in the event of a recall due to a serious safety risk, specific analysis of vehicle structures, components and/or parts by means of engineering calculations, virtual testing methods and/or structural testing can upon request be made available without delay to the approval authority and the European Commission.

5. Vehicle type-approval shall not be granted if there is reason to doubt that the vehicle manufacturer is able to make available the analysis referred to in point 4. This doubt could relate either to the accessibility or the existence of such analysis (e.g. application for type-approval of a limited batch of vehicles from a non-established manufacturer represented by a party unlikely to have any meaningful access to such analysis).

ANNEX III

Requirements on the maximum design speed, speed governors and speed limitation devices

1. Definitions

For the purposes of this Annex:

1.1 'Speed governor' means a device used to measure and regulate the speed of the engine and/or vehicle.

1.2 'Powertrain' means a group of components that generate power and deliver it to the road surface, including the engine, transmission, drive shafts, differentials and drive wheels or tracks.

1.3 'Tampering' means unauthorized modifications which may prejudice functional safety, in particular by increasing vehicle performance, and damage the environment.

1.4 'Speed limitation device' means a device whose primary function is to control the fuel feed to the engine in order to limit the vehicle speed to the specified value.

Requirements

2. Maximum design speed

2.1. For the type-approval tests, the average speed shall be measured on a straight track, which the tractor shall traverse in both directions from a flying start. The soil of the track shall be stabilised; the track shall be flat and at least 100 metres long; however, it may include slopes of not more than 1.5 %.

2.2. During the test, the tractor shall be unladen and in running order without ballast weights or special equipment and the tyre pressures shall be those specified for road use.

2.3. During the test the tractor shall be fitted with new pneumatic tyres having the greatest tyre rolling radius, expressed by the speed radius index, intended by the manufacturer for the tractor.

2.4. The gear ratio used during the test shall be that producing the maximum vehicle speed and the throttle shall be fully open.

2.5. In order to take account of various unavoidable errors due, in particular, to the measuring technique and to the increase in running speed of the engine with a partial load, a measured speed exceeding the value for the maximum design speed by 3 km/h shall be acceptable for the type-approval test. An additional 5% tolerance shall be permitted in order to take into account variations due to tyre size.

2.6. In order for approval authorities may calculate their maximum theoretical speed, the manufacturer shall specify as a guide the gear ratio, the actual forward movement of the powered wheels corresponding to one complete revolution, and the rpm at maximum power output with the throttle fully open and the speed governor, if fitted, adjusted as laid down by the manufacturer. The maximum theoretical speed shall be calculated without the tolerances referred to in point 2.5.

3. Speed governor

3.1. If a speed governor is fitted as standard by the manufacturer, it shall be installed and designed in such a way that the tractor complies with point 2 the above provisions on

maximum design speed.

4. Requirements on speed limitation device and on powertrain and speed limitation device tampering prevention measures (anti-tampering)

4.1 Requirements on speed limitation device

Vehicles of categories T and C, with maximum design speed exceeding 60 km/h, shall be equipped with adjustable speed limitation devices that comply with the requirements set out in this Annex.

4.1.1 Adjustable speed limitation devices shall comply with the requirements for N2 and N3 vehicles set out in points 1 and 2, Part II point 13.2, Part III points 21.2 and 21.3, Annex 5 point 1 and Annex 6 to UNECE Regulation No 89, as referenced in Annex I.

4.2. Anti-tampering of powertrain and speed-limitation device

4.2.1. Purpose and scope

The powertrain tampering prevention measures are aimed at ensuring that a vehicle which meets the environmental and propulsion performance requirements, the vehicle construction requirements as well as the functional safety requirements at type approval remains compliant over its useful life and that adverse changes to the vehicle's powertrain which have negative impacts on functional safety and/or on the environment are discouraged.

4.3. General requirements

4.3.1. The manufacturer shall ensure that the approval authority and technical service are provided with the necessary information and, where appropriate, the necessary vehicles, propulsion systems, components and separate technical units to enable them to verify that the requirements set out in this Annex have been met.

4.3.2. The manufacturer shall declare in the application for type approval its commitment not to market the interchangeable components which could involve an increase in the propulsion performance above that applicable to the relevant variant.

4.4. The manufacturer shall ensure that the approved vehicle complies with the following points on electronic system security limiting the vehicle’s performance.

4.4.1. For vehicles equipped with (an) electrical/electronic device(s) which limit its propulsion performance, the vehicle manufacturer shall provide data and evidence to the technical services to demonstrate that modification or disconnection of the device or its wiring system will not increase the propulsion performance.

4.4.2. Any vehicle equipped with electronic control shall include features to prevent modification, except as permitted by the manufacturer. The manufacturer shall permit modifications if those modifications are necessary for the diagnosis, servicing, inspection, retrofitting or repair of the vehicle.

4.4.3. Any reprogrammable computer codes or operating parameter shall be resistant to tampering.

4.4.4. Computer-coded propulsion operating parameters shall not be changeable without the use of specialized tools and procedures, e.g. soldered or potted computer components, sealed or

soldered computer enclosures.

4.4.5. Any removable calibration memory chips shall be potted, encased in a sealed container or protected by electronic algorithms and shall not be changeable without the use of specialised tools and procedures.

4.4.6. Manufacturers using programmable computer code systems (e.g. electrical erasable programmable read-only memory, EEPROM) shall deter unauthorised reprogramming. Manufacturers shall include enhanced tamper-protection strategies and write-protect features requiring electronic access to an off-site computer maintained by the manufacturer, to which independent operators shall also have adequately protected access.

4.4.7. Stored on-board diagnostic trouble codes in the powertrain or engine control unit(s), that is numeric or alphanumeric identifiers which identify or label a malfunction in them, shall not be erased by disconnection of the on board computer from the vehicle power supply or by disconnection or failure of the vehicle battery or ground.

ANNEX IV
Requirements on steering for fast tractors

1. The requirements set out in sections 2, 5 and 6 and in Annexes 4 and 6 to UNECE Regulation No 79, as referenced in Annex I, for the steering of motor vehicles apply to vehicles of categories Tb and Cb with maximum design speed exceeding 60 km/h.

1.1 The requirements of ISO 10998:2008, Amd 1 2014 apply to the steering of vehicles belonging to categories Tb and Cb with maximum design speed exceeding 40 km/h and not exceeding 60 km/h.

1.2 The steering action of Cb tractors is in accordance with point 3.9 of Annex XXXIII.

2. The requirements on steering effort for the vehicles referred to in point 1 shall be the same as the requirements for vehicles of N2 category set out in section 6 of UNECE Regulation No 79 as referenced in Annex I.

For a vehicle equipped with a straddle seat and handlebars, the same steering effort should apply at the middle of the grip.

ANNEX V
Requirements on steering

1. Definitions

For the purposes of this Annex:

1.1. ‘Steering equipment’ means all the equipment the purpose of which is to alter the direction of movement of the tractor.

The steering equipment may be considered to include the steering control, the steering gear, the steered wheels, and, where applicable, special equipment to produce additional or independent power.

1.2. ‘Steering gear’ means all the components between the steering control and the steered wheels, with the exception of the special equipment defined in point 1.3. The steering gear may be mechanical, hydraulic, pneumatic, electric or a combination of any of these.

1.3. ‘Special equipment’ means the part of the steering equipment by which additional or independent power is produced. Additional or independent power may be produced by any mechanical, hydraulic, pneumatic or electrical system, or by any combination of these (for example by an oil pump, air pump or battery, etc.).

1.4. ‘Assisted steering equipment’ means the equipment in which the power for the deflection of the steered wheels is provided both by the muscular power of the driver and by the special equipment; this includes steering equipment where the steering power is normally provided solely by the special equipment, but which in the event of failure of the special equipment enables the muscular power of the driver to be used for steering.

1.5. ‘Servo-steering equipment’ means the equipment in which the power for the deflection of the steered wheels is provided solely by the special equipment.

1.6. ‘Differential steering’ means a method of steering on wheels or on tracks where the orientation of the tractor is done by creating a different rotational speed between the left and the right hand wheels or track assemblies.

1.7. ‘Steered wheels’ means one of the following:

(a) the wheels the alignment of which may be altered directly or indirectly in relation to that of the tractor in order to obtain a change in the direction of movement of the tractor,

(b) all wheels of articulated tractors,

(c) wheels on the same axle, the speed of which may be varied in order to obtain a change in the direction of movement of the tractor.

Construction, fitting and inspection requirements

2. General requirements

2.1. The steering equipment shall ensure easy and safe handling of the tractor and shall comply with the detailed requirements set out in point 3.

2.2. The steering action of C-category tractors is in accordance with the requirements set out in point 3.9 of Annex XXXIII.

2.3. The requirements set out in point 2.2 are not applicable to C-category tractors with steel tracks equipped with differential steering. The rotational speed difference, as referred to in point 1.6, is either realized by a combination of mechanical components, such as brakes and a differential, or by a separate transmission path to the left and the right hand side, such as separated hydrostatic transmissions. If the steering system is combined with the braking system, the requirements laid down on the basis of Article 17 (2) (b) and (5) of Regulation (EU) No 167/2013 shall apply.

3. Detailed requirements

3.1. Steering control

3.1.1. The steering control shall be easy to use and grip for the foreseeable range of adult operators in terms of variations in their size and strength. It shall be designed in such a way as to permit gradual deflection. The direction of movement of the steering control shall correspond to the desired change in the direction of the tractor.

3.1.2. The steering effort required to achieve a turning circle of 12 m radius, starting from the straight ahead position, shall not exceed 25 daN. In the case of assisted steering equipment that is not connected to other equipment, if the auxiliary power supply fails the steering effort required shall not exceed 60 daN.

3.1.3. In order to check compliance with point 3.1.2, the tractor shall describe a spiral movement at a speed of 10 kilometres per hour, starting from the straight ahead position, on a dry, flat road surface offering good tyre adhesion. The steering effort on the steering control shall be noted until it reaches the position corresponding to the tractor entering a turning circle of 12 m radius. The duration of the manoeuvre (time between the moment when the steering control is first operated and the moment when it reaches the position where the measurements are taken) shall not exceed five seconds in normal cases and eight seconds if the special equipment fails. One manoeuvre shall be made to the left and one to the right.

For the test, the tractor shall be loaded to its technically permissible maximum mass; tyre pressures and mass distribution between the axles shall conform to the manufacturer's instructions. The tracks pressure in particular shall not exceed the value provided for in point 3.3 of Annex XXXIII.

3.2. Steering gear

3.2.1. The steering equipment may not include either electrical or wholly pneumatic steering gear.

3.2.2. The steering gear shall be so designed as to meet any operational requirements. It shall be easily accessible for maintenance and inspection.

3.2.3. In the case of steering gear which is not wholly hydraulic, it shall be possible to drive the tractor even in the event of failure of the hydraulic or pneumatic components of the steering gear.

3.2.4. Steering gear which is operated purely hydraulically and the special equipment shall meet the following requirements:

3.2.4.1. One or more pressure limitation devices shall protect the whole or part of the circuit against excess pressure;

3.2.4.2. The pressure limitation devices shall be set so as not to exceed a pressure T equal to the maximum operating pressure stated by the manufacturer;

3.2.4.3. The characteristics and dimensions of the pipe work shall be such that the pipes withstand four times the pressure T (permitted by the pressure limitation devices), and shall be protected in places and arranged in such a way that the risks of damage by impact or interference are reduced to a minimum, and the risks of damage by rubbing can be considered negligible.

3.3. Steered wheels

3.3.1. All the wheels may be steered wheels.

3.4. Special equipment

3.4.1. The special equipment, used in the types of steering equipment, shall be acceptable in the following circumstances:

3.4.1.1. If the tractor is equipped with assisted steering equipment, it shall be possible to drive it even in the event of failure of the special equipment. If the assisted steering equipment does not have its own source of power, it shall be fitted with a power reservoir. This power reservoir may be replaced by a self-contained device providing power supply to the steering equipment with priority over the other systems which are linked to the common energy source. Without prejudice to the requirements laid down on the basis of Article 17 (2) (b) and (5) of Annex I(3) Regulation (EU) No 167/2013, if there is a hydraulic connection between the hydraulic steering equipment and the hydraulic braking equipment, and if both are supplied from the same energy source, the force required to activate the steering equipment shall not exceed 40 daN if either of the systems should fail. If the source of power is compressed air, the air reservoir shall be protected by a non-return valve.

Where the steering power is provided solely by the special equipment, the assisted steering equipment shall be fitted with a device such that if, in the event of failure of the special equipment, the steering effort exceeds 25 daN, a visual or acoustic signal shall give warning of such failure.

3.4.1.2. If the tractor is fitted with servo-steering equipment and provided that such equipment has a wholly hydraulic steering gear, it shall be possible, should the special device or motor fail, to carry out the two manoeuvres specified in point 3.1.3 using a special additional device. The special additional device may be a compressed air or gas reservoir. An oil pump or compressor may be used as the special additional device if that device is worked by the rotation of the tractor wheels and cannot be disconnected from them. In the event of failure of the special equipment, a visual or acoustic signal shall give warning of such failure.

3.4.1.2.1. If the special device is pneumatic, it shall be fitted with a compressed air reservoir protected by a non-return valve. The capacity of the compressed air reservoir shall be calculated so that at least seven complete turns (from lock to lock) are possible before the reservoir pressure falls to half its operating pressure; the test shall be carried out with the steered wheels off the ground.

4. Manufacturers may choose whether to apply either the requirements set out in this Annex or the requirements set out in Annex IV.

ANNEX VI
Requirements on speedometers

1. Definitions

For the purposes of this Annex:

1.1 'Normal running pressure' means the cold inflation pressure specified by the vehicle manufacturer increased by 0.2 bar.

1.2 'Speedometer' means that part of the speedometer equipment which indicates to the driver the speed of his vehicle at any given moment.

2. Requirements

2.1. All tractors with maximum design speed exceeding 30 km/h shall be equipped with a speedometer according to the requirements set out in this Annex.

2.1.1. Tractors of the categories T4.1 and C4.1 with a maximum design speed not exceeding 30 km/h shall be equipped with a speedometer according to the requirements set out in this Annex.

2.1.2. The speedometer display shall be situated in the driver's direct field of vision and shall be clearly legible both by day and by night. The range of speeds indicated shall be large enough to include the maximum speed given by the manufacturer for the type of vehicle.

2.2. Where the speedometer has a scale, as distinct from a digital display, it shall be clearly legible.

2.2.1. The graduations shall be of 1, 2, 5 or 10 km/h. The values of the speed shall be indicated on the dial as follows:

2.2.1.1. when the highest value on the dial does not exceed 40 km/h, speed values shall be indicated at intervals not exceeding 10 km/h and graduations not exceeding 5 km /h;

2.2.1.2. when the highest value on the dial exceeds 40 km/h, the speed values shall be indicated at intervals not exceeding 20 km/h and graduations not exceeding 5 km /h.

2.2.2. Member States in which vehicle speed is, at the date of entry into force of this Regulation, measured in miles per hour, shall be permitted to require speedometer equipment fitted to vehicles sold in their countries to be marked both in kilometres per hour and in miles per hour, in accordance with Directive 2009/3/EC of the European Parliament and of the Council[1].

In the case of a speedometer manufactured for sale in any Member State where imperial units of measurement are used, the speedometer shall also be marked in mph (miles per hour); the graduations shall be of 1, 2, 5 or 10 mph. The values of the speed shall be indicated on the dial at intervals not exceeding 20 mph.

2.2.3. The indicated speed value intervals need not be uniform.

[1] Directive 2009/3/EC of the European Parliament and of the Council of 11 March 2009 amending Council Directive 80/181/EEC on the approximation of the laws of the Member States relating to units of measurement (OJ L 114, 7.5.2009, p. 10).

2.3. The accuracy of the speedometer equipment shall be tested in accordance with the following procedure:

2.3.1. the vehicle is equipped with one of the types of tyre or track normally fitted; the test shall be repeated for each of the types of speedometer specified by the manufacturer;

2.3.2. the load on the axle driving the speedometer equipment shall correspond to the part of mass in running order undertaken by that axle;

2.3.3. the reference temperature at the speedometer shall be 23 ± 5 °C;

2.3.4. during each test the pressure of the tyres shall be the normal running pressure;

2.3.5. the vehicle is tested at the following three speeds: 20, 30 and 40 km/h, or 80 % of the maximum speed specified by the manufacturer, for fast tractors;

2.3.6. the test instrumentation used for measuring the true vehicle speed shall be accurate to ± 1,0 %;

2.3.6.1. the surface of a test track when used be flat and dry, and shall provide sufficient adhesion.

2.4. The speed indicated shall never be less than the true speed. At the speeds specified for the test in 2.3.5 above and between these speeds, there shall be the following relationship between the speed indicated on the dial of the speedometer (V_1) and the true speed (V_2): $0 \leq V_1 - V_2 \leq (V_2/10) + 4$ km/h.

ANNEX VII
Requirements on the field of vision and windscreen wipers

Vehicles of categories T and C shall comply with the following requirements:

1. ISO 5721-1:2013 on the field of vision forward and the windscreen wipers;

2. The part concerning the vision beside the tractor, in ISO 5721-2: 2014 on the field of vision to the side and to the rear of agricultural tractors.

ANNEX VIII
Requirements on glazing

1. Definitions

For the purposes of this Annex:

1.1 'Driver's eyes reference point' means the position, fixed by convention, of the tractor driver's eyes notionally located at a single point. That point is situated in the plane parallel to the longitudinal median plane of the tractor and passing through the centre of the seat, 700 mm vertically above the line of intersection of that plane and the surface of the seat and 270 mm in the direction of the pelvic support from the vertical plane passing through the front edge of the surface of the seat and perpendicular to the longitudinal median plane of the tractor (Figure 1). The reference point thus determined relates to the seat when unoccupied and fitted in the central position specified by the tractor manufacturer.

1.2 'Safety glazing material requisite for the driver's rearward vision' means all glazing situated behind a plane passing through the driver's eyes reference point perpendicular to the longitudinal median plane of the vehicle through which the driver can view the road when driving or manoeuvring the vehicle.

2. Requirements

2.1. Glazing of vehicles of category T shall comply with the requirements of UNECE Regulation No 43 as referenced in Annex I to this Regulation, except for Annex 21 to that UNECE Regulation.

2.2. Glazing of vehicles of category C shall comply with the same requirements set out for the corresponding vehicles within T category.

2.3. Safety glazing installation on vehicles of category T and C with a maximum design speed exceeding 60 km/h shall comply with the provisions for vehicles of category N in Annex 21 to UNECE Regulation No 43 as referenced in Annex I.

2.4. Safety glazing installation on vehicles of category T and C with a maximum design speed not exceeding 60 km/h.

2.4.1. Safety glazing shall be installed in a way to ensure a high level of safety for the occupants and, in particular, to provide the driver with a high degree of visibility in all use conditions, not only forwards but also rearwards and laterally.

2.4.2. Safety glazing shall be fitted in such a way that, despite the stresses to which the vehicle is submitted under normal operating conditions, it remains in position and continues to afford visibility and safety to the occupants of the vehicle

2.4.3. Safety glazing shall bear the appropriate component type-approval mark specified in paragraph 5.4. of UNECE Regulation No 43, as referenced in Annex I, followed, when required, by one of the additional symbols provided for in paragraph 5.5 of UNECE Regulation No 43 as referenced in Annex I.

2.4.4. Safety glazing for windscreens

2.4.4.1. The regular light transmittance shall not be less than 70%.

2.4.4.2. The windscreen shall be correctly fitted with reference to the driver's eye reference point.

2.4.4.3. Vehicles of categories T and C, with maximum design speed not exceeding 40 km/h, shall be fitted with one of the types of safety glazing material specified in Annex 4, Annex 5, Annex 6, Annex 8 or Annex 10 to UNECE Regulation No 43 as referenced in Annex I.

2.4.4.4. Vehicles of categories T and C, with maximum design speed exceeding 40 km/h, shall be fitted with one of the types of safety glazing material referred to in point 2.4.4.3 with the exception of Annex 5 to UNECE Regulation No 43 as referenced in Annex I.

2.4.5. Safety glazing other than windscreens

2.4.5.1. The safety glazing shall have a regular light transmittance of at least 70%.

2.4.5.2. Plastic safety glazing material requisite for the driver's rearward vision shall bear a symbol A/L or B/L, as specified in paragraphs 5.5.5. and 5.5.7. of UNECE Regulation No 43 as referenced in Annex I, in addition to the component type-approval mark specified in point 2.4.3.

2.4.5.3. Safety glazing material not needed for the driver's rearward vision or driver's vision to the sides shall bear the symbol V specified in paragraph 5.5.2. of UNECE Regulation No 43 as referenced in Annex I, in addition to the component type-approval mark specified in point 2.4.3, if the light transmittance is below 70%.

2.4.5.4. Plastic safety glazing material not needed for the driver's forward or rearward vision shall bear one of the symbols specified in paragraphs 5.5.5., 5.5.6. and 5.5.7. of UNECE Regulation No 43 as referenced in Annex I, in addition to the component type-approval mark specified in point 2.4.3.

2.4.5.5. In the case of plastic safety glazings, the provisions related to abrasion resistance referred to in point 2.4.5.2 do not apply to sunroofs and glazings located in the roof of a vehicle. No abrasion test/symbol is required.

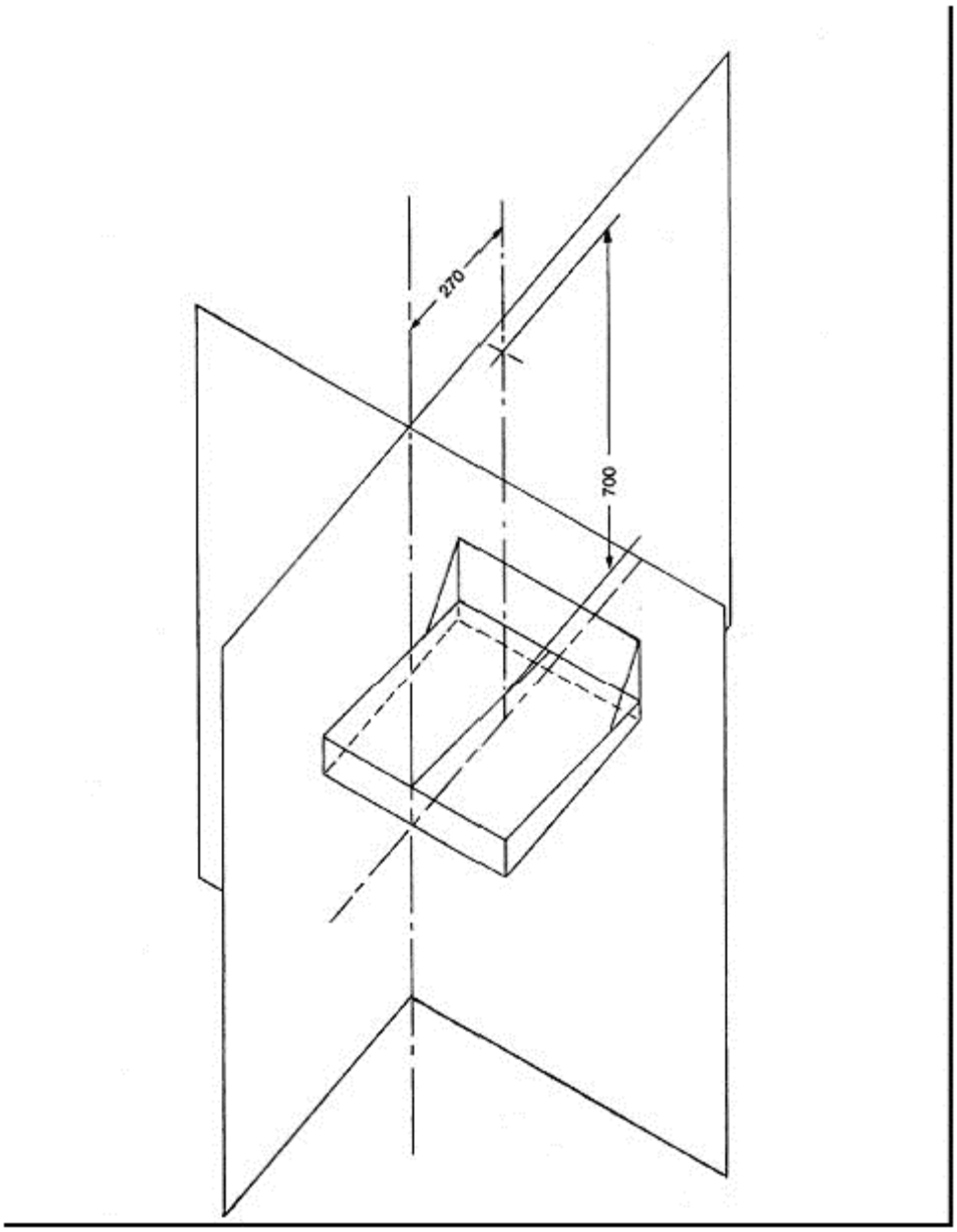


Figure 1: Driver’s eyes reference point

ANNEX IX
Requirements on rear-view mirrors

1. Equipment requirements

All tractors shall be equipped with two exterior rear-view mirrors and optionally with an interior rear-view mirror.

2. General

2.1. Interior rear-view mirrors are grouped in class I. Exterior rear-view mirrors are grouped in class II. Tractors shall be fitted with two rear-view mirrors of class II and optionally with a rear-view mirror of class I, bearing the type-approval mark of UNECE Regulation No 46 as referenced in Annex I, in accordance with Article 34 of Regulation (EU) No 167/2013 and Annex XX to this Regulation.

2.2. Rear-view mirrors shall be fixed in such a way that they remain steady under normal driving conditions.

2.3. Vehicles equipped with a straddle seat and handlebars are required to comply with the requirements set out in UNECE Regulation No 81, as referenced in Annex I, instead of the requirements set out in points 2.1 and 2.2, and points 3 to 6.

2.4. The additional mirrors and rear-view mirrors designed in order to monitor the implements while working in the fields are not necessarily open to component type-approval but shall be located in accordance with the setting requirements contained in points 3.1 to 3.5.

3. Position

3.1. The exterior rear-view mirror of class II shall be so placed that the driver, when sitting on the driving seat in a normal driving position, has a clear view of the part of the road specified in point 5.

3.2. The exterior rear-view mirror shall be visible through the portion of the windscreen that is swept by the windscreen wiper or through the side windows if the tractor is fitted with them.

3.3. The external rear-view mirrors shall not protrude beyond the external bodywork of the tractor or the tractor-trailer combination more than is necessary to obtain the fields of vision specified in point 5.

3.4. Where the bottom edge of an exterior rear-view mirror is less than 2 m above the ground when the tractor is laden, this rear-view mirror shall not project more than 0.20 m beyond the overall width of the tractor or tractor-trailer combination measured without rear-view mirrors.

3.5. Subject to the requirements set out in points 3.3 and 3.4, rear-view mirrors may project beyond the tractor's permissible maximum width.

4. Adjustment

4.1. Any interior rear-view mirror shall be adjustable by the driver from his driving position.

4.2. The driver shall be able to adjust the exterior rear-view mirror without leaving the driving position. The mirror may, however, be locked into position from the outside.

4.3. The requirements set out in point 4.2 do not apply to exterior rear-view mirrors which, after being displaced, are returned automatically to their original position or can be restored to their original position without the use of tools.

5. Fields of vision for rear view mirror of class II

5.1. The field of vision of the left hand or right hand exterior rear-view mirror shall be such that the driver can see to the rear at least that level part of the road, as far as the horizon, which is to the left or to the right, respectively, of the plane parallel to the vertical longitudinal median plane and which passes through the leftmost or rightmost, respectively, point of the overall width of the tractor or tractor-trailer combination.

5.2. Manufacturers may choose whether to apply either the requirements set out in point 5.1 or the requirements of ISO 5721-2 : 2014.

ANNEX X
Requirements on driver information systems

1. Requirements

1.1. 'Virtual terminals' means electronic on-board information systems with display screens to provide an operator with visual information on the performance of the vehicle and its systems, and that allow the operator to monitor and control various functions via a touch screen or keypad.

1.2. Operator controls associated with virtual terminals shall comply with ISO 15077:2008 (Annex B).

1.3. Driver Information Systems shall be designed so as to minimise distraction of the driver whilst conveying the necessary information.

ANNEX XI

Requirements on lighting, light signalling devices and their light sources

1. Lights and light signalling devices, if fitted to vehicles of categories T and C, shall comply with all the relevant requirements set out in UNECE regulations applicable to those vehicles, as referenced in Annex I.

2. Filament lamps, gas discharge lamps and LED for lights and light signalling devices, fitted on vehicles of category R shall comply with all the relevant requirements set out in UNECE Regulations Nos 37, 99 and 128 , respectively, as referenced in Annex I.

3. Lights and light signalling devices, if fitted to vehicles of category R and S, shall comply with all the relevant requirements of the O category vehicles in UNECE regulations, as referenced in Annex I.

ANNEX XII
Requirements on lighting installations

1. Definitions

For the purposes of this Annex:

1.1. ‘Transverse plane’ means a vertical plane perpendicular to the median longitudinal plane of the vehicle;

1.2. ‘Independent lamps’ means lamps having separate lenses, separate light sources, and separate lamp bodies;

1.3. ‘Grouped lamps’ means lamps having separate lenses and separate light sources, but a common lamp body;

1.4. ‘Combined lamps’ means lamps having separate lenses but a common light source and a common lamp body;

1.5. ‘Reciprocally incorporated lamps’ means lamps having separate light sources (or a single light source operating under different conditions), totally or partially common lenses and a common lamp body;

1.6. ‘Variable position lamps’ means lamps installed on the vehicle which can move in relation to the vehicle, without being detached;

1.7. ‘Main-beam headlamp’ means the lamp used to illuminate the road over a long distance ahead of the vehicle;

1.8. ‘Dipped-beam headlamp’ means the lamp used to illuminate the road ahead of the vehicle without causing undue dazzle or discomfort to oncoming drivers and other road-users;

1.9. ‘Concealable lamp’ means a headlamp capable of being partly or completely hidden when not in use. This result may be achieved by means of a movable cover, by displacement of the headlamp or by any other suitable means. The term 'retractable' is used more particularly to describe a concealable lamp the displacement of which enables it to be inserted within the bodywork;

1.10. ‘Front fog-lamp’ means the lamp used to improve the illumination of the road in case of fog, snowfall, rainstorms or dust clouds;

1.11. ‘Reversing lamp’ means the lamp used to illuminate the road to the rear of the vehicle and to warn other road-users that the vehicle is reversing or about to reverse;

1.12. ‘Direction-indicator lamp’ means the lamp used to indicate to other road-users that the driver intends to change direction to the right or to the left;

1.13. ‘Hazard-warning signal’ means the device permitting the simultaneous operation of all of a vehicle´s direction indicator lamps to draw attention to the fact that the vehicle temporarily constitutes a special danger to other road-users;

1.14. ‘Stop lamp’ means the lamp used to indicate to other road-users to the rear of the vehicle that the longitudinal movement of the vehicle is intentionally retarded;

1.15. ‘Rear registration plate lamp’ means the device used to illuminate the space intended to

accommodate the rear registration plate; it may consist of several optical components;

1.16. ‘Front position lamp’ means the lamp used to indicate the presence and the width of the vehicle when the latter is viewed from the front;

1.17. ‘Rear position lamp’ means the lamp used to indicate the presence and the width of the vehicle when the width is viewed from the rear;

1.18. ‘Rear fog-lamp’ means the lamp used to make the vehicle more easily visible from the rear in dense fog;

1.19. ‘Parking lamp’ means the lamp used to draw attention to the presence of a stationary vehicle in a built-up area. In such circumstances, it replaces the front and rear position lamps;

1.20. ‘End-outline marker lamp’ means the lamp fitted to the extreme outer edge as close as possible to the top of the vehicle and intended clearly to indicate the vehicle´s overall width. This signal is intended, for certain vehicles, to complement the vehicle´s front and rear position lamps by drawing particular attention to its bulk;

1.21. ‘Work lamp’ means a device for illuminating a working area or process;

1.22. ‘Retro-reflector’ means a device used to indicate the presence of a vehicle by reflection of light emanating from a light source unconnected with the vehicle, the observer being situated near that source. For the purposes of this Annex, the following are not considered as retro-reflectors:

– retro-reflecting number plates;

– other plates and retro-reflecting signals which shall be used to comply with a Contracting Party's specifications for use as regards certain categories of vehicles or certain methods of operation.

1.23. ‘Side marker lamp’ means a lamp used to indicate the presence of the vehicle when viewed from the side;

1.24. ‘Daytime running lamp’ means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime;

1.25. ‘Cornering lamp’ means a lamp used to provide supplementary illumination of that part of the road which is located near the forward corner of the vehicle at the side towards which the vehicle is going to turn;

1.26. ‘Exterior Courtesy lamp’ means a lamp used to provide supplementary illumination to assist the entry and exit of the vehicle driver and passenger or in loading operations.

1.27. ‘Manoeuvring lamp’ means a lamp used to provide supplementary illumination to the side of the vehicle to assist during slow manoeuvres.

1.28. ‘Adaptive front lighting system’ means a lighting device, type-approved in accordance with UNECE Regulation No. 123, as referenced in Annex I, providing beams with differing characteristics for automatic adaptation to varying conditions of use of the dipped-beam (passing-beam) and, if applicable, the main-beam (driving-beam).

1.29. ‘Illuminating surface’ means the orthogonal projection of the full aperture of the reflector, in the case of the main-beam headlamp with reflector, dipped-beam headlamp with reflector, front fog-lamp with reflector, or in the case of headlamps with an ellipsoidal reflector of the

projection lens, on a transverse plane. If the light emitting surface of the lamp extends over part only of the full aperture of the reflector, the projection of that part only is taken into account.

In the case of a dipped-beam headlamp, the illuminating surface is limited by the apparent trace of the cut-off on to the lens. If the reflector and lens are adjustable relative to one another, the mean adjustment should be used.

1.30. ‘Illuminating surface’ means the orthogonal projection of the lamp in a plane perpendicular to its axis of reference and in contact with the exterior light-emitting surface of the lamp, this projection being bounded by the edges of screens situated in this plane, each allowing only 98% of the total luminous intensity of the light to persist in the direction of the axis of reference in the case of rear position lamp, parking lamp, and of main-beam headlamp, dipped-beam headlamp, front fog-lamp, which are without reflector.

In the case of a light-signalling device whose illuminating surface encloses either totally or partially the illuminating surface of another function or encloses a non-lighted surface, the illuminating surface may be considered to be the light emitting surface itself.

1.31. ‘Illuminating surface’ of a retro-reflector or of a signalling panel or of a signalling foil means, as declared by the applicant during the component approval procedure for the retro-reflectors, the orthogonal projection of a retro-reflector in a plane perpendicular to its axis of reference and delimited by planes contiguous to the declared outermost parts of the retro-reflectors' optical system and parallel to that axis. For the purposes of determining the lower, upper and lateral edges of the device, only horizontal and vertical planes shall be considered.

1.32. ‘Exterior light-emitting surface’ means the part of the exterior surface of the transparent lens that encloses the lighting or light-signalling device and allows it to emit light.

1.33. ‘Apparent surface’ for a defined direction of observation, means the orthogonal projection of either the boundary of the illuminating surface projected on the exterior surface of the lens or the light-emitting surface in a plane perpendicular to the direction of observation and tangential to the most exterior point of the lens.

1.34. ‘Axis of reference’ means the characteristic axis of the light signal determined by the manufacturer of the lamp for use as the direction of reference (H = 0°, V = 0°) for photometric measurements and when fitting the lamp on the vehicle.

1.35. ‘Center of reference’ means the intersection of the axis of reference with the exterior light-emitting surface, specified by the manufacturer of the lamp;

1.36. ‘Angles of geometric visibility’ means the angles which determine the field of the minimum solid angle in which the apparent surface of the lamp is visible. That field of the solid angle is determined by the segments of the sphere of which the center coincides with the center of reference of the lamp and the equator is parallel with the ground. These segments are determined in relation to the axis of reference. The horizontal angles β correspond to the longitude and the vertical angles α to the latitude.

1.37. ‘Extreme outer edge’ on either side of the vehicle means the plane parallel with the median longitudinal plane of the vehicle and coinciding with its lateral outer edge, disregarding the projection:

(1) of tyres near their point of contact with the ground and connections for tyre-pressure gauges and tyre inflating/deflating devices/ducts;

(2) of any anti-skid devices which may be mounted on the wheels;

(3) of rear-view mirrors;

(4) of side direction indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps and side retro-reflectors;

(5) of customs seals affixed to the vehicle and devices for securing and protecting such seals.

1.38. ‘Overall width’ means the distance between the two vertical planes defined in the definition of the extreme outer edge, above.

1.39. ‘A single lamp’ means:

1.39.1. a device or part of a device having one lighting or light-signalling function, one or more light source(s) and one apparent surface in the direction of the reference axis, which may be a continuous surface or composed of two or more distinct parts; or

1.39.2. any assembly of two independent lamps, whether identical or not, having the same function, both approved as type "D" lamp and installed so that:

1.39.2.1. the projection of their apparent surfaces in the direction of the reference axis occupies not less than 60% of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis; or

1.39.2.2. the distance between two adjacent/tangential distinct parts does not exceed 15 mm when measured perpendicularly to the reference axis; or

1.39.3. any assembly of two independent retro-reflectors, whether identical or not, that have been approved separately and are installed in such a way that:

1.39.3.1. the projection of their apparent surfaces in the direction of the reference axis occupies not less 60% of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis; or

1.39.3.2. the distance between two adjacent/tangential distinct parts does not exceed 15 mm when measured perpendicularly to the reference axis.

1.40. ‘Two lamps’ means a single light- emitting surface in the shape of a band or strip if such band or strip is placed symmetrically in relation to the median longitudinal plane of the vehicle, extends on both sides to within at least 0.4 m of the extreme outer edge of the vehicle, and is not less than 0.8 m in length; the illumination of such surface shall be provided by not less than two light sources placed as close as possible to its ends; the light-emitting surface may be constituted by a number of juxtaposed elements on condition that the projections of the several individual light-emitting surfaces on a transverse plane occupy not less than 60% of the area of the smallest rectangle circumscribing the projections of the said individual light-emitting surfaces.

1.41. ‘Distance between two lamps’ which face in the same direction means the distance between the orthogonal projections in a plane perpendicular to the direction in question of the outlines of the two illuminating surfaces.

1.42. ‘Optional’ means that the installation of a light-signalling device is left to the discretion of the manufacturer.

1.43. ‘Operating tell-tale’ means a visual or auditory signal or any equivalent signal indicating that a device has been switched on and is operating correctly.

1.44. ‘Colour of the light emitted from a device' means the colour of the light emitted as specified in UNECE Regulation No. 48 as referenced in Annex I.

1.45. ‘Conspicuity marking’ means a device intended to increase the conspicuity of a vehicle, when viewed from the side or rear or in the case of trailers, additionally from the front, by the reflection of light emanating from a light source not connected to the vehicle, the observer being situated near the source.

1.46. ‘Circuit-closed tell-tale’ means a tell-tale showing that a device has been switched on but not showing whether it is operating correctly or not.

1.47. ‘SMV rear marking plate’, a triangular plate with truncated corners with a characteristic pattern faced with retro-reflective and fluorescent material or devices (class 1); or with retro-reflective materials or devices only (class 2) (see e.g. UNECE Regulation No. 69 as referenced in Annex I).

1.48. ‘Pair’ means the set of lamps of the same function on the left- and righthand side of the vehicle.

1.49. ‘H plane’ means the horizontal plane containing the center of reference of the lamp.

1.50. ‘Lighting function’ means the light emitted by a device to illuminate the road and objects in the direction of vehicle movement.

1.51. ‘Light-signalling function’ means the light emitted or reflected by a device to give to other road users visual information on the presence, identification and/or the change of movement of the vehicle.

1.52. ‘Light source’ means one or more elements for visible radiation, which may be assembled with one or more transparent envelopes and with a base for mechanical and electrical connection.

A light source may also be constituted by the extreme outlet of a light guide, as part of a distributed lighting or light-signalling system not having a built-in outer lens.

1.53. ‘Light emitting surface’ of a lighting device, light-signalling device or a retro-reflector means the surface as declared in the request for approval by the manufacturer of the device on the drawing.

2. Test procedure for EU type-approval

The application for EU type-approval shall be accompanied by the documents referred to in points 2.1 - 2.4 in triplicate and the following particulars:

2.1. A description of the vehicle type with regard to the dimensions and exterior shape of the vehicle and the number and positioning of lighting and light-signalling devices; the vehicle type duly identified shall be specified.

2.2. A list of the devices intended by the manufacturer to form the lighting and signaling equipment; the list may include several types of device for each function; in addition, the list may include in respect of each function the additional annotation 'or equivalent devices'.

2.3. A diagram of the lighting and signaling installation as a whole, showing the position of the various devices on the vehicle.

2.4. A drawing or drawings of each lamp showing the illuminating surface of a lamp or a lighting device or a signalling lamp other than a retro-reflector or a reflex-reflector.

The light emitting surface of a lighting device, light-signalling device or a retro-reflector shall be declared according to one of the following conditions:

2.4.1 In the case where the outer lens is textured, the declared light emitting surface shall be all or part of the exterior surface of the outer lens.

2.4.2 In the case where the outer lens is non-textured the outer lens may be disregarded and the light emitting surface shall be as declared on the drawing.

2.5. An unladen vehicle fitted with a complete set of lighting and signaling equipment and representative of the vehicle type to be approved shall be submitted to the technical service conducting approval tests.

3. Approval

The templates of the documents referred to in points 2.1 – 2.4, to be submitted during the EU type-approval process, shall be those set out in Article 68(a) of Regulation (EU) No 167/2013.

4. Approval number and markings

Each vehicle approved in accordance with the requirements set out in this Annex shall be assigned an approval number and marking, according to the model set out in Article 68(h) of Regulation (EU) No 167/2013.

5. General Specifications

5.1. The lighting and light-signalling devices shall be so fitted that under normal conditions of use, and notwithstanding any vibration to which they may be subjected, they retain the characteristics laid down in points 5.2 – 5.21 and 6 and Appendices 1, 2 and 3and enable the vehicle to comply with the requirements set out in points 5.2, 5.4, 5.5, 5.7, 5.9, 5.10.1, 5.11.1, 5.11.2, 5.11.3.2, 5.17.1.1, 5.18.3 and 6. In particular, it shall not be possible for the adjustment of the lamps to be inadvertently disturbed.

5.2. Vehicles shall be fitted with the permanently connected socket outlet specified in ISO 1724 :2003 (Electrical connections for vehicles with 6 or 12 volt electrical systems applying more specifically to private motor cars and lightweight trailers or caravans), or ISO 1185 : 2003 (Electrical connections between tractors and towed vehicles having 24 volt electrical systems used for international commercial transport purposes) or both when they have a connection for attaching trailed vehicles or mounted machines. In addition, vehicles may be fitted with the supplementary 7-pin connector according to ISO 3732:2003 (Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 12 S (supplementary) for vehicles with 12 V nominal supply voltage).

5.3. The illuminating main-beam headlamps, dipped-beam headlamps and front fog-lamps shall be so installed that correct adjustment of their orientation can easily be carried out.

5.4. For all light-signaling devices, the reference axis of the lamp when fitted to the vehicle shall be parallel with the bearing plane of the vehicle on the road; in addition it shall be perpendicular to the median longitudinal plane of the vehicle in the case of side retro-

reflectors and of side-marker lamps and parallel to that plane in the case of all other signaling devices. In each direction a tolerance of ±3° shall be allowed. In addition, any specific instructions as regards fitting laid down by the manufacturer shall be complied with.

5.5. In the absence of specific instructions, the height and orientation of the lamps shall be verified with the vehicle unladen and placed on a flat horizontal surface.

5.6. In the absence of specific instructions, lamps constituting a pair shall:

5.6.1. Be mounted symmetrically in relation to the median longitudinal plane;

5.6.2. Be symmetrical to one another in relation to the median longitudinal plane;

5.6.3. Satisfy the same colourimetric requirements; and

5.6.4. Have substantially identical photometric characteristics.

5.7. On vehicles whose external shape is asymmetrical, the requirements set out in points 5.6.1 and 5.6.2. shall be satisfied as far as possible. Those requirements shall be regarded as having been met if the distance of the two lamps from the median longitudinal plane and from the bearing plane on the ground is the same.

5.8. Grouped, combined or reciprocally incorporated lamps

5.8.1 Lamps may be grouped, combined or reciprocally incorporated with one another provided that all requirements regarding colour, position, orientation, geometric visibility, electrical connections and other requirements, if any, are fulfilled.

5.8.1.1. The photometric and colourimetric requirements of a lamp shall be fulfilled when all other functions with which this lamp is grouped, combined or reciprocally incorporated are switched OFF.

However, when a front or rear position lamp is reciprocally incorporated with one or more other function(s) which can be activated together with them, the requirements regarding colour of each of these other functions shall be fulfilled when the reciprocally incorporated function(s) and the front or rear position lamps are switched ON.

5.8.1.2. Stop lamps and direction-indicator lamps are not permitted to be reciprocally incorporated.

5.8.1.3. Where stop lamps and direction-indicator lamps are grouped, the following conditions shall be met:

5.8.1.3.1. Any horizontal or vertical straight line passing through the projections of the apparent surfaces of these functions on a plane perpendicular to the reference axis, shall not intersect more than two borderlines separating adjacent areas of different colour;

5.8.1.3.2. Their apparent surfaces in the direction of the reference axis, based upon the areas bounded by the outline of their light emitting surfaces, do not overlap.

5.8.2. Where the apparent surface of a single lamp is composed of two or more distinct parts, it shall comply with the following requirements:

5.8.2.1. Either the total area of the projection of the distinct parts on a plane tangent to the exterior surface of the outer lens and perpendicular to the reference axis shall occupy not less than 60% of the smallest quadrilateral circumscribing the said projection, or the distance between two adjacent/tangential distinct parts shall not exceed 15 mm when measured perpendicularly

to the reference axis. This requirement shall not apply to a retro-reflector.

5.8.2.2. In the case of interdependent lamps, the distance between adjacent apparent surfaces in the direction of the reference axis does not exceed 75 mm when measured perpendicularly to the reference axis.

5.9. The maximum height above the ground shall be measured from the highest point and the minimum height from the lowest point of the apparent surface in the direction of the reference axis.

Where the maximum and minimum heights above the ground clearly meet the requirements of the Regulation, the exact edges of any surface need not be determined.

Lamps shall be installed in such a way that the vehicle complies with applicable legislation concerning its maximum height.

5.9.1. For the purposes of reducing the geometric visibility angles, the position of a lamp with regard to height above the ground, shall be measured from the H plane.

5.9.2. In the case of dipped-beam headlamp, the minimum height in relation to the ground is measured from the lowest point of the effective outlet of the optical system (e.g. reflector, lens, projection lens) independent of its utilization.

5.9.3. The position, as regards width, will be determined from that edge of the apparent surface in the direction of the reference axis which is the furthest from the median longitudinal plane of the vehicle when referred to the overall width, and from the inner edges of the apparent surface in the direction of the reference axis when referred to the distance between lamps.

Where the position, as regards width, clearly complies with the requirements set out in this Regulation, the exact edges of any surface need not be determined.

5.10. In the absence of specific instructions, the photometric characteristics (e.g. intensity, colour, apparent surface, etc.) of a lamp shall not be intentionally varied during the period of activation of the lamp.

5.10.1. Direction-indicator lamps and the vehicle-hazard warning signal shall be flashing lamps.

5.10.2. The photometric characteristics of any lamp may varying relation to the ambient light, as a consequence of the activation of other lamps, or when the lamps is being used to provide another lighting function, provided that any variation in the photometric characteristics is in compliance with the technical provisions for the lamp concerned.

5.11. No red light which could give rise to confusion shall be emitted from a lamp in a forward direction and no white light which could give rise to confusion, shall be emitted from a lamp in a rearward direction. No account shall be taken of lighting devices fitted for the interior lighting of the vehicle. In case of doubt, this requirement shall be verified as follows:

5.11.1. For the visibility of red light towards the front of a vehicle, with the exception of a red rearmost side-marker lamp, there shall be no direct visibility of the apparent surface of a red lamp if viewed by an observer moving within Zone 1 as specified in Appendix 1;

5.11.2. For the visibility of white light towards the rear, with the exception of reversing lamps and white side conspicuity markings fitted to the vehicle, there shall be no direct visibility of the apparent surface of a white lamp if viewed by an observer moving within Zone 2 in a transverse plane situated 25 m behind the vehicle (see Appendix 1);

5.11.3. In their respective planes, the zones 1 and 2 explored by the eye of the observer are bounded:

5.11.3.1. In height, by two horizontal planes 1 m and 2.2 m respectively above the ground;

5.11.3.2. In width, by two vertical planes which, forming to the front and to the rear respectively an angle of 15° outwards from the vehicle's median longitudinal plane, pass through the point or points of contact of vertical planes parallel to the vehicle's median longitudinal plane delimiting the vehicle's overall width; if there are several points of contact, the foremost shall correspond to the forward plane and the rearmost to the rearward plane.

5.12. The electrical connections shall be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched ON and OFF simultaneously.

This condition does not apply:

5.12.1. When front and rear position lamps are switched ON, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps;

5.12.2. To front position lamps when their function is substituted under point 5.13.1.

5.13. The electrical connections shall be such that the main-beam and dipped-beam headlamps and the front fog lamps cannot be switched on unless the lamps referred to in point 5.12. are also switched on. This requirement shall not apply, however, to main-beam or dipped-beam headlamps when their luminous warnings consist of the intermittent lighting up at short intervals of the main-beam headlamp or the intermittent lighting up at short intervals of the dipped-beam headlamp or the alternate lighting up at short intervals of the main-beam and dipped-beam headlamps.

5.13.1. The dipped-beam headlamps and/or the main-beam headlamps and/or the front fog lamps may substitute the function of the front position lamps, provided that:

5.13.1.1. Their electrical connections are such that in case of failure of any of these lighting devices the front position lamps are automatically re-activated; and

5.13.1.2. The substituting lamp/function meets, for the respective position lamp, the requirements set out in points 6.8.1. to 6.8.6., and

5.13.1.3. appropriate evidence demonstrating compliance with the requirements set out in point 5.13.1.2. is provided in the test reports of the substituting lamp.

5.14. The function of the circuit-closed tell-tales may be fulfilled by operating tell-tales.

5.15. The colours of the light emitted by the lamps[2] are the following:

5.15.1. main-beam headlamp: white;

5.15.2. dipped-beam headlamp: white;

5.15.3. front fog lamp: white or selective yellow;

5.15.4. reversing lamp: white;

[2] Measurement of the chromaticity coordinates of the light emitted by the lamps is not part of this Annex.

5.15.5. direction-indicator lamp: amber;

5.15.6. hazard warning signal: amber;

5.15.7. stop lamp: red;

5.15.8. rear registration plate lamp: white;

5.15.9. front position lamp: white;

5.15.10. rear position lamp: red;

5.15.11. rear fog lamp: red;

5.15.12. parking lamp: white in front, red at the rear, amber if reciprocally incorporated in the side direction indicator lamps or in the side-marker lamps;

5.15.13. side-marker lamp: amber; however, the rearmost side-marker lamp can be red if it is grouped or combined or reciprocally incorporated with the rear position lamp, the rear end-outline marker lamp, the rear fog lamp, the stop lamp or is grouped or has part of the light emitting surface in common with the rear retro-reflector;

5.15.14. end-outline marker lamp: white in front, red at the rear;

5.15.15. daytime running lamp: white;

5.15.16. rear retro-reflector, non-triangular: red;

5.15.17. rear retro-reflector, triangular: red;

5.15.18. front retro-reflector, non-triangular: white or colourless;

5.15.19. side retro-reflector, non- triangular: amber; however the rearmost side retro-reflector can be red if it is grouped or has part of the light emitting surface in common with the rear position lamp, the rear end outline marker lamp, the rear fog lamp, the stop-lamp, the red rearmost side-marker lamp or the rear retro-reflector, non- triangular;

5.15.20. cornering lamp: white;

5.15.21. conspicuity marking: white or yellow to the side; red or yellow to the rear;

5.15.22. exterior courtesy lamp: white;

5.15.23. manoeuvring lamp: white.

5.16. Concealable lamps

5.16.1. The concealment of lamps shall be prohibited, with the exception of main-beam headlamps, dipped-beam headlamps, and front fog-lamps.

5.16.2. An illuminating device in the position of use shall remain in that position if the malfunction referred to in point 5.16.2.1 occurs alone or in conjunction with one of the malfunctions described in point 5.16.2.2.

5.16.2.1. The absence of power for manipulating the lamp;

5.16.2.2. A break, impedance, or short-circuit to earth in the electrical circuit, defects in the hydraulic or pneumatic leads, Bowden cables, solenoids or other components controlling or transmitting the energy intended to activate the concealment device.

5.16.3. In the event of any failure affecting the operation of the concealment device(s) the lamps shall remain in the position of use, if already in use, or shall be capable of being moved into the position of use without the aid of tools.

5.16.4. Illuminating devices which are manipulated by power shall be brought into the position of use and switched on by means of a single control, without excluding the possibility of moving them into the position of use without switching them on. However, in the case of grouped- main-beam headlamps and dipped-beam headlamps, the control referred to above is required only to activate the dipped-beam headlamps.

5.16.5. It shall not be possible deliberately, from the driver's seat, to stop the movement of switched-on headlamps before they reach the position of use. If there is a danger of dazzling other road users by the movement of headlamps, they may light up only when they have reached their final position.

5.16.6. At temperatures of -30 °C to +50 °C an illuminating device which is manipulated by power shall be capable of reaching the position of use within three seconds of initial operation of the control.

5.17. Variable position lamps

5.17.1. The position of all lamps may be varied except main-beam headlamps, dipped-beam headlamps and at least one pair of rear reflectors, provided that:

5.17.1.1. These lamps remain attached to the vehicle when their position is altered;

5.17.1.2. These lamps shall be capable of being locked in the position required by traffic conditions. Locking shall be automatic.

5.18. General provisions relating to geometric visibility

5.18.1. There shall be no obstacle on the inside of the angles of geometric visibility to the propagation of light from any part of the apparent surface of the lamp observed from infinity. However, no account is taken of obstacles, if they were already presented when the lamp was type-approved.

5.18.2. If measurements are taken closer to the lamp, the direction of observation shall be shifted parallel to achieve the same accuracy.

5.18.3. If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, proof shall be furnished that the part of the lamp not hidden by obstacles still conforms to the photometric values prescribed for the approval of the device.

5.19. Number of lamps

5.19.1. The number of lamps mounted on the vehicle shall be equal to the number indicated in the individual specifications of this Regulation.

5.20. General provisions relating to the illuminating surface of reversing lamps, hazard-warning signals, rear position lamps, rear fog-lamps, parking lamps, daytime running lamps and of main-beam headlamps, dipped-beam headlamps, front fog-lamps, reversing lamps and cornering lamp, the last five ones being without reflector:

to determine the lower, upper and lateral limits of the illuminating surface only screens with horizontal or vertical edges shall be used to verify the distance to the extreme edges of the vehicle and the height above the ground.

For other applications of the illuminating surface, e.g. distance between two lamps or functions, the shape of the periphery of this illuminating surface shall be used. The screens shall remain parallel, but other orientations are allowed to be used.

5.21. Retro-reflectors shall likewise be regarded as lamps and thus will comply with the requirements of this Annex.

6. Individual specifications

6.1. Main-beam headlamps (UNECE Regulations Nos 98, 112 and 113, as referenced in Annex I)

6.1.1. Presence: Tractors may be equipped with main-beam head lamps. Prohibited on R- and S-category vehicles.

6.1.2. Number: Two or four.

6.1.3. Arrangement: No individual specifications.

6.1.4 Position in:

6.1.4.1. Width: The outer edges of the illuminating surface shall in no case be closer to the extreme outer edge of the vehicles than the outer edges of the illuminating surface of the dipped-beam headlamps.

6.1.4.2. Height: No individual specifications.

6.1.4.3. Length: At the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

6.1.5. Geometric visibility: The visibility of the illuminating surface, including its visibility in areas which do not appear to be illuminated in the direction of observation considered, shall be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5° with the axis of reference of the headlamp.

6.1.6. Orientation: Towards the front.

Apart from the devices necessary to maintain correct adjustment and when there are two pairs of main-beam headlamps, one pair, consisting of headlamps functioning as main-beam headlamp only, may swivel, according to the angle of lock on the steering, about an approximately vertical axis.

6.1.7. Electrical connections: The main-beam headlamp may be switched on either simultaneously or in pairs. For changing over from the dipped to the main-beam at least one pair of main beams shall be switched on. For changing over from the main to the dipped-beam all main-beam headlamps shall be switched off simultaneously.

The dipped beams may remain switched on at the same time as the main beams.

6.1.8. Circuit closed tell-tale: Mandatory.

6.1.9. Other requirements:

6.1.9.1. The aggregate maximum intensity of the main beams which can be switched on simultaneously shall not exceed 430,000 cd, which corresponds to a reference value of 100.

6.1.9.2. This maximum intensity shall be obtained by adding together the individual maximum reference marks which are indicated on the several headlamps. The reference mark "10" shall be given to each of the headlamps marked "R" or "CR".

6.2. Dipped beam headlamps (UNECE Regulations Nos 98, 112 and 113, as referenced in Annex I)

6.2.1. Presence: Tractors shall be equipped with dipped beam headlamps. Dipped beam headlamps are prohibited on R- and S-category vehicles.

6.2.2. Number: Two (or four - see point 6.2.4.2.4).

6.2.3. Arrangement: No individual specifications.

6.2.4. Position in:

6.2.4.1. Width: No individual specifications.

6.2.4.2. Height:

6.2.4.2.1. Minimum 500 mm; this value may be reduced to 350 mm for vehicles with a maximum width not exceeding 1,300 mm.

6.2.4.2.2. Maximum 1,500 mm

6.2.4.2.3. The above value may be increased to 2,500 m where the shape, structure, design or operational conditions of the vehicle prevent compliance with the 1,500 mm value.

6.2.4.2.4. In the case of vehicles equipped for the fitting of portable devices at the front, two dipped-beam headlamps in addition to the lamps positioned according to the requirements of points 6.2.4.2.1 – 6.2.4.2.3 shall be allowed at a height not exceeding 4,000 mm if the electrical connections are such that two pairs of dipped-beam headlamps cannot be switched on at the same time.

6.2.4.5. Length: As near to the front of the vehicle as possible; however, the light emitted shall not in any circumstances cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

6.2.5. Geometric visibility: Defined by angles of geometric visibility α and β.

α = 15° upwards and 10° downwards,

β = 45° outwards and 5° inwards.

Within this field, virtually the whole of the apparent surface of the lamp shall be visible.

The presence of partitions or other items of equipment near the

headlamp shall not give rise to secondary effects causing discomfort to other road users.

6.2.6. Orientation: Towards the front.

6.2.6.1. Vertical orientation:

6.2.6.1.1. If the height of the dipped-beam headlamps is equal to or greater than 500 mm and equal to or less than 1,500 mm, it shall be possible to lower the dipped beam by between 0.5 and 6%;

6.2.6.1.2. The dipped-beam headlamps shall be aligned in such a way that, measured at 15 m from the lamp, the horizontal line separating the lit zone from the unlit zone is situated at a height equivalent to only half the distance between the ground and the center of the lamp.

6.2.6.2. Dipped beam headlamp levelling device (optional)

6.2.6.2.1. A headlamp levelling device may be automatic or manually adjustable.

6.2.6.2.2. Devices which are adjusted manually, either continuously or non-continuously, shall have a stop position at which the lamps can be returned to the initial inclination by means of the usual adjusting screws or similar means.

These manually adjustable devices shall be operable from the driver's seat.

Continually adjustable devices shall have reference marks indicating the loading conditions that require adjustment of the dipped-beam.

6.2.6.2.3. The dipped-beam shall not assume a position in which the dip is less than it was at original adjustment.

6.2.7. Electrical connections: The control for changing over to the dipped beam shall switch off all main-beam headlamps simultaneously.

The dipped-beam headlamps may remain switched on at the same time as the main-beam headlamps.

In the case where the pair of additional dipped-beam headlamps is installed (as in point 6.2.2.), electrical connections shall be such that two pairs of dipped- beam headlamps are never switched on at the same time.

6.2.8. Circuit closed tell-tale: Optional.

6.2.9. Other requirements Dipped-beam headlamps with light source(s) producing the principal dipped beam (as defined in UNECE Regulation No 48, as referenced in Annex I) and having a total objective luminous flux which exceeds 2,000 lumens are prohibited

6.3. Front fog lamps (UNECE Regulation No 19, as referenced in Annex I)

6.3.1. Presence: Optional on tractors. Prohibited on R- and S-category vehicles.

6.3.2. Number: Two.

6.3.3. Arrangement: No individual specifications.

6.3.4. Position in:

6.3.4.1. Width: No individual specifications.

6.3.4.2. Height: No less than 250 mm above the ground. No point on the illuminating surface shall be higher than the highest point on the illuminating surface of the dipped-beam headlamp.

6.3.4.3. Length: As near to the front of the vehicle as possible; however, the light emitted shall not in any circumstances cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

6.3.5. Geometric visibility: Defined by angles of geometric visibility α and β.

α = 5° upwards and downwards;

β = 45° outwards and 5° inwards.

6.3.6. Orientation: Towards the front.

They shall be directed forwards without causing undue dazzle or discomfort to oncoming drivers and other road users.

6.3.7. Electrical connections: It shall be possible to switch the fog lamps on or off independently of the main-beam headlamp and dipped-beam headlamps and vice versa.

6.3.8. Circuit closed tell-tale: Optional.

6.4. Reversing lamps (UNECE Regulation No 23, as referenced in Annex I)

6.4.1. Presence: Optional.

6.4.2. Number: One or two.

6.4.3. Arrangement: No individual specifications.

6.4.4. Position:

6.4.4.1. Width: No individual specifications.

6.4.4.2. Height: Not less than 250 mm and not more than 1,200 mm above the ground.

However, if the shape, structure, design or operational conditions of the vehicle makes it impossible to keep the lamp within 1,200 mm it is allowed to increase the height up to 4,000 mm.

In the latter case the lamp shall be installed with an downwards inclination of at least 3° for a mounting height larger than 2,000 mm and not more than 3,000 mm and at least 6° for a mounting height larger than 3,000 mm and not more than 4,000 mm.

No inclination is needed for mounting height up to 2,000 mm.

6.4.4.3. Length: At the back of the vehicle.

6.4.5. Geometric visibility: Defined by angles of geometric visibility α and β.

α = 15° upwards and 5° downwards;

β = 45° to right and to left if there is only one lamp;

$\beta = 45°$ outwards and 30° inwards if there are two lamps.

6.4.6. Orientation: Rearwards.

6.4.7. Electrical connections: It can only be lit up or remain alight if the reverse gear is engaged and if:

Either the engine is running;

Or one of the devices controlling the starting and stopping of the engine is in such a position that operation of the engine is possible.

6.4.8. Tell-tale: Optional.

6.5. Direction-indicator lamps (UNECE Regulation No 6, as referenced in Annex I).

6.5.1. Presence: Tractors and vehicles of R- and S-category shall be equipped with direction-indicator lamps. Types of indicators fall into categories (1, 1a, 1b, 2a, 2b and 5) the assembly of which on one tractor constitutes an arrangement (A to D).

Arrangement A shall be allowed only on tractors whose overall length does not exceed 4.60 m and in the case of which the distance between the outer edges of the illuminating surfaces is not more than 1.60 m.

Arrangements B, C and D shall apply to all tractors.

For trailers and towed machines category 2 lamps shall be used.

Vehicles may be equipped with additional direction-indicator lamps.

6.5.2. Number: The number of devices shall be such that they can emit signals which correspond to one of the arrangements referred to in point 6.5.3.

6.5.3. Arrangement: The number, position and horizontal visibility of the indicator lamps shall be such that they can give indications corresponding to at least one of the arrangements defined below (see also Appendix 2). The angles of visibility are hatched on the diagrams; the angles shown are minimum values which may be exceeded; all the angles of visibility are measured from the center of the illuminating surface.

6.5.3.1. A Two front direction-indicator lamps (category 1, 1a or 1b),

Two rear direction-indicator lamps (category 2a).

These lamps may be independent, grouped or combined.

B Two front direction-indicator lamps (category 1, 1a or 1b),

Two repeating side direction-indicator lamps (category 5),

Two rear direction-indicator lamps (category 2a).

The front and repeating side lamps may be independent, grouped, or combined.

C Two front direction-indicator lamps (category 1, 1a or 1b),

Two rear direction-indicator lamps (category 2a),

Two repeating side indicator lamps (category 5)

D Two front direction-indicator lamps (category 1, 1a or 1b),

Two rear direction-indicator lamps (category 2a).

6.5.3.2. For trailers and towed machines:

Two rear direction-indicator lamps (category 2).

6.5.4. Position:

6.5.4.1. Width: Except in the case of category 1 direction indicator lamps of arrangement C and for additional direction indicator lamps, the edge of the illuminating surface furthest from the median longitudinal plane of the vehicle shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two illuminating surfaces of a pair of lamps shall be not less than 500 mm.

Where the vertical distance between the rear direction-indicator lamp and the corresponding rear position lamp is not more than 300 mm, the distance between the extreme outer edge of the vehicle and the outer edge of the rear direction-indicator lamp shall not exceed by more than 50 mm the distance between the extreme outer edge of the vehicle and the outer edge of the corresponding rear position lamp.

For front direction-indicator lamps the illuminating surface should be not less than 40 mm from the illuminating surface of the dipped-beam headlamps or front fog-lamps, if any.

A smaller distance is permitted if the luminous intensity in the reference axis of the direction-indicator lamp is equal to at least 400 cd.

6.5.4.2. Height: Above the ground not less than 400 mm and not more than 2,500 mm and up to 4,000 mm for additional direction-indicator lamps.

For vehicles with a maximum width not exceeding 1,300 mm not less than 350 mm above the ground.

6.5.4.3. Length: The distance between the center of reference of illuminating surface of the category 1 indicator (arrangement B), category 5 indicator (arrangement B and C) and the transverse plane which marks the forward boundary of the tractor's overall length normally shall not exceed 1,800 mm. If the structure of the tractor makes it impossible to keep to the minimum angles of visibility, this distance may be increased to 2,600 mm.

6.5.5. Geometric visibility: Horizontal angles: See Appendix 2.

Vertical angles: 15° above and below the horizontal.

The vertical angle below the horizontal may be reduced to 10° in the case of side repeating direction-indicator lamps of arrangements B and C if their height is less than 1,900 mm. The same applies in the case of direction-indicator lamps in category 1 of arrangements B and D.

6.5.6. Orientation: If individual specifications for installations are laid down by the manufacturer of the lamp they shall be observed.

6.5.7. Electrical connections: Direction-indicator lamps shall switch on independently of the other lamps. All direction-indicator lamps on one side of a vehicle shall be switched on and off by means of one control and shall flash in phase.

6.5.8. Operating tell-tale: Tractors shall be equipped with operational tell-tales for all direction-indicator lamps not directly visible to the driver. It may be optical or audible or both.

If it is optical, it shall be a green flashing light which, in the event of the malfunction of any of the direction-indicator lamps other than the repeating side direction-indicator lamps, is either extinguished, or remains alight without flashing, or shows a marked change of frequency.

If it is entirely auditory, it shall be clearly audible and shall show a marked change of frequency in the event of any malfunction.

If a tractor is equipped to tow a trailer, it shall be equipped with a special optical operating tell-tale for the direction indicator lamps on the trailer unless the tell-tale of the drawing vehicle allows the failure of any one of the direction-indicator lamps on the tractor combination thus formed to be detected.

6.5.9. Other requirements: The lamps shall be a flashing lamp flashing 90 ± 30 times per minute. Operation of the light-signal control shall be followed within not more than one second by the appearance of the light and within not more than one and one-half seconds by the first extinction.

If a tractor is authorised to tow a trailer, the control of the direction-indicators on the tractor shall also operate the indicators of the trailer.

In the event of failure, other than a short circuit, of one direction-indicator, the others shall continue to flash but the frequency under this condition may be different from that specified.

6.6. Hazard warning signal

6.6.1. Presence: Mandatory on tractors and R- and S-category vehicles.

6.6.2. Number

6.6.3. Arrangement

6.6.4. Position

6.6.4.1. Width

6.6.4.2. Height

6.6.4.3. Length

6.6.5. Geometric visibility

6.6.6. Orientation

As specified in the corresponding headings of point 6.5.

6.6.7. Electrical connections: The signal shall be operated by means of a separate control enabling all the direction-indicator lamps to function in phase.

6.6.8. Circuit-closed tell-tale: Mandatory. Flashing warning light, which can operate in conjunction with tell-tale(s) specified in point 6.5.8.

6.6.9. Other requirements: As specified in point 6.5.9. If a tractor is equipped to tow a trailer the hazard-warning signal control shall also be capable of activating the direction-indicator lamps on the trailer. The hazard-warning signal shall be able to function even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

6.7. Stop lamps (UNECE Regulation No 7, as referenced in Annex I)

6.7.1. Presence:

S1 or S2 of devices as described in UNECE Regulation No 7: tractors and vehicles of R- and S-categories shall be equipped with such stop lamps.

S3 or S4 of devices as described in UNECE Regulation No 7: tractors and vehicles of R- and S-categories may be equipped with such stop lamps.

6.7.2. Number: Two S1 or S2 category devices and one S3 or S4 category device.

6.7.2.1. Except in the case where a category S3 or S4 device is installed, two optional category S1 or S2 devices may be installed on vehicles.

6.7.2.2. Only, when the median longitudinal plane of the vehicle is not located on a fixed body panel but separates one or two movable parts of the vehicle (e.g. doors), and lacks sufficient space to be equipped with a single device of the S3 or S4 category on the median longitudinal plane above such movable parts, either:

Two devices of the S3 or S4 category type "D" may be installed; or
One device of the S3 or S4 category may be installed offset to the left or to the right of the median longitudinal plane.

6.7.3. Arrangement: No individual specifications.

6.7.4. Position:

6.7.4.1. Width:

S1 or S2 categories: The distance in between the inner edges of the apparent surfaces in the direction of the reference axes shall be not less than 500 mm apart. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1,400 mm.

S3 or S4 categories: For S3 or S4 category devices: the center of reference shall be situated on the median longitudinal plane of the vehicle. However, in the case where the two devices of the S3 or S4 category are installed, according to point 6.7.2., they shall be positioned as close as possible to the median longitudinal plane, one on each side of this plane.

In the case where one S3 or S4 category lamp offset from the median longitudinal plane is permitted according to point 6.7.2., this offset shall not exceed 150 mm from the median longitudinal plane to the center of reference of the lamp.

6.7.4.2. Height:

S1 or S2 categories: Above the ground, not less than 400 mm and not more than

2,500 mm and up to 4,000 mm for optional stop lamps.

S3 or S4 categories: Above the mandatory stop lamps and in the horizontal plane tangential to the lower edge of the apparent surface of a S3 or S4 category device and above the horizontal plane tangential to the upper edge of the apparent surface of S1 or S2 categories devices.

Vehicles may be equipped with two additional devices of category S1 or S2:

Above the ground, not less than 400 mm and not more than 4,000 mm

6.7.4.3. Length:

S1 or S2 categories: At the rear of the vehicle.

S3 or S4 categories: No individual specification.

6.7.5. Geometric visibility: Horizontal angle: 45° outwards and inwards.

Vertical angle: 15° above and below the horizontal.

The vertical angle below the horizontal may be reduced to 10° or 5° where the lamp has its H plane at or below 1,900 mm respectively 950 mm from the ground.

6.7.6. Orientation: Towards the rear of the vehicle.

6.7.7. Electrical connections: Shall light up when the service brake is applied and/or when the vehicle speed is reduced intentionally.

6.7.8. Operating tell-tale: Vehicles may be equipped with tell-tale for stop lamps. If fitted, it shall be a non-flashing warning lamp which comes on in the event of the malfunctioning of the stop lamps.

6.7.9. Other requirements: The luminous intensity of the stop lamps shall be markedly greater than that of the rear position lamps.

6.8. Front position lamps (UNECE Regulation No 7, as referenced in Annex I)

6.8.1. Presence: Mandatory on tractors. Mandatory on R- and S-category vehicles with width exceeding 1.6 m and maximum design speed exceeding 40 km/h.

6.8.2. Number: Two or four (see point 6.8.4.2.).

6.8.3. Arrangement: No individual specifications

6.8.4. Position:

6.8.4.1. Width: That point on the illuminating surface which is farthest from the vehicle´s median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle. The clearance between the respective inner edges of the two illuminating surfaces shall be not less than 500 mm.

6.8.4.2. Height: Above the ground, not less than 400 mm and not more than 2,500 mm

In the case of vehicles equipped for the fitting of portable devices at the front, which may obscure the front position lamps, two additional front position lamps may be fitted at a height not exceeding 4,000 mm.

6.8.4.3. Length: No specifications provided that the lamps are aligned forwards and the angles of geometrical visibility specified in point 6.8.5. are complied with.

6.8.5. Geometric visibility: Horizontal angle: For the two front position lamps: 10° inwards and 80° outwards. However, the angle of 10° inwards may be reduced to 5° if the shape of the bodywork makes it impossible to keep to 10°. For vehicles with any overall width not exceeding 1,400 mm this angle may be reduced to 3° if the shape of the bodywork makes it impossible to keep to 10°.

Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 10° if the height of the lamp above the ground is less than 1,900 mm, and to 5° if this height is less than 750 mm.

6.8.6. Orientation: Towards the front.

6.8.7. Electrical connections: No individual specifications (see point 5.12).

6.8.8. Tell-tale: Mandatory. This tell-tale shall be non flashing. It shall not be required if the instrument panel lighting can only be turned on simultaneously with the front position lamps.

6.9. Rear position lamps (UNECE Regulation No 7, as referenced in Annex I)

6.9.1. Presence: Mandatory on tractors and on R- and S-category vehicles.

6.9.2. Number: Two or more (see points 6.9.4.3 and 6.9.5.1).

6.9.3. Arrangement: No individual specifications. If four rear position lamps according to point 6.9.5.1 are fitted, at least one pair of rear position lamps shall be fixed.

6.9.4. Position:

6.9.4.1. Width: Except as provided in point 6.9.5.1. that point on the illuminating surface which is farthest from the vehicle´s median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle.

The distance between the inner edges of the two illuminating surfaces shall be not less than 500 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,400 mm.

6.9.4.2. Height: Except as provided in point 6.9.5.1., above the ground not less than 400 mm and not more than 2,500 mm.

For vehicles with a maximum width not exceeding 1,300 mm above the ground not less than 250 mm.

6.9.4.3. Length: At the rear of vehicle. Not more than 1,000 mm from the rearmost point of the vehicle.

Parts of the vehicle that extend the rearmost point of the illuminating surface of the rear position lamps by more than 1,000 mm shall be fitted with an additional rear position lamp.

6.9.5. Geometric visibility: Horizontal angle: For the two rear position lamps: either 45° inwards and 80° outwards, or 80° inwards and 45° outwards.

Vertical angle: 15° above and below the horizontal. The angle below the horizontal may be reduced to 10° if the height of the lamp above the ground is less than

1,900 mm, and to 5° if this height is less than 750 mm.

6.9.5.1. If it is impossible to observe the above position and visibility requirements, four rear position lamps may be fitted in accordance with the following installation specifications:

6.9.5.1.1. Two rear position lamps shall keep within the maximum height of 2,500 mm above the ground.

A distance of at least 300 mm between interior edges of the rear position lamps shall be observed, and they shall have a vertical angle of visibility above the horizontal of 15°.

6.9.5.1.2. The other two shall keep within a maximum height of 4,000 mm above the ground and shall be bound by the requirements of point 6.9.4.1.

6.9.5.1.3. The combination of the two pairs shall meet the requirements for geometric visibility as specified in 6.9.5 above.

6.9.6. Orientation: Towards the rear.

6.9.7. Electrical connections: No individual specifications.

6.9.8. Circuit closed tell-tale: Mandatory (see point 5.11). It shall be combined with that of the front position lamps.

6.10. Rear fog lamps (UNECE Regulation No 38, as referenced in Annex I)

6.10.1. Presence: Optional.

6.10.2. Number: One or two.

6.10.3. Arrangement: This shall satisfy the conditions of geometric visibility.

6.10.4. Position:

6.10.4.1. Width: If there is only one rear fog lamp, it shall be on the opposite side of the median longitudinal plane of the vehicle to the direction of traffic prescribed in the country of registration. In all cases the distance between the rear fog-lamp and the stop lamp shall be more than 100 mm.

6.10.4.2. Height: Above the ground, not less than 400 mm and not more than 1,900 mm, or not more than 2,500 mm if the shape of the bodywork makes it impossible to keep within 1,900 mm.

6.10.4.3. Length: At the rear of vehicle

6.10.5. Geometric visibility: Horizontal angle: 25° inwards and outwards.

Vertical angle: 5° above and below the horizontal.

6.10.6. Orientation: Towards the rear.

6.10.7. Electrical connections: These shall be such that the rear fog-lamp can light up only when the dipped-beam headlamps or the front fog-lamps are in use.

If the front fog-lamps exist, the extinguishing of the rear fog-lamp shall be possible independently from that of the front fog-lamps.

6.10.8. Circuit closed tell-tale: Mandatory. An independent, fixed-intensity warning light.

6.11. Parking lamps (UNECE Regulations Nos 77 or 7, as referenced in Annex I)

6.11.1. Presence: Vehicles may be equipped with parking lamps.

6.11.2. Number: Dependent upon the arrangement.

6.11.3. Arrangement: Either two front lamps and two rear lamps, or one lamp on each side.

6.11.4. Position:

6.11.4.1. Width: That point on the illuminating surface which is farthest from the vehicles median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. Furthermore, in the case of a pair of lamps, the lamps shall be on the side of the vehicle.

6.11.4.2. Height: Above the ground, not less than 400 mm and not more than 2,500 mm.

6.11.4.3. Length: No individual specifications.

6.11.5. Geometric visibility: Horizontal angle: 45° outwards, towards the front and towards the rear.

Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 10° if the height of the lamp above the ground is less than 1,500 mm; and to 5° if this height is less than 750 mm.

6.11.6. Orientation: Such that the lamps meet the requirements concerning visibility towards the front and towards the rear.

6.11.7. Electrical connections: The connections shall allow the parking lamp(s) on the same side of the vehicle to be lit independently of any other lamps.

6.11.8. Tell-tale: Vehicles may be equipped with tell-tale for parking lamps. If there is one, it shall not be possible to confuse it with the tell-tale for the position lamps.

6.11.9. Other requirements: The function of this lamp may also be performed by the simultaneous switching on of the front and rear position lamps on one side of the vehicle.

6.12. End-outline marker lamps (UNECE Regulation No 7, as referenced in Annex I)

6.12.1. Presence: Optional on tractors and R- and S-category vehicles exceeding 1.80 m in width. Prohibited on all other vehicles.

6.12.2. Number: Two visible from the front and two visible from the rear.

6.12.3. Arrangement: No individual specifications.

6.12.4. Position:

6.12.4.1. Width: As close as possible to the extreme outer edge of the vehicle.

6.12.4.2. Height: At the greatest height compatible with the required position in width and with symmetry of the lamps.

6.12.4.3. Length: No individual specification.

6.12.5. Geometric visibility: Horizontal angle: 80° outwards.

Vertical angle: 5° above and 20° below the horizontal.

6.12.6. Orientation: Such that the lamps meet the requirements concerning visibility towards the front and towards the rear.

6.12.7. Electrical connections: No individual specifications.

6.12.8. Tell-tale: Optional

6.12.9. Other requirements: Subject to all the other conditions being met, the lamp visible from in front and the lamp visible from the rear, on the same side of the vehicle, may be included in one device. The position of an end-outline marker lamp in relation to the corresponding position lamp shall be such that the distance between the projections on a transverse vertical plane of the points nearest to one another of the illuminating surfaces of the two lamps considered is not less than 200 mm.

6.13. Work lamp(s)

6.13.1. Presence: Optional.

There are no individual specifications for the following items 6.13.2., 6.13.3., 6.13.5. and 6.13.6.

6.13.2. Number

6.13.3. Arrangement

6.13.4. Position: Suitable housing and/or placement of work lamps should be provided, so that they are protected against impacts

6.13.5. Geometric visibility

6.13.6. Orientation

6.13.7. Electrical connections: This lamp shall be operated independently of all other lamps in view of the fact that it does not illuminate the road or act as a signalling device on the road.

6.13.8. Tell-tale: Mandatory.

6.13.9. This lamp shall not be combined or reciprocally incorporated with another lamp.

6.14. Rear retro-reflectors, non-triangular (UNECE Regulation No 3, as referenced in Annex I)

6.14.1. Presence: Mandatory on T- and C-category vehicles. Prohibited on R- and S-category vehicles.

6.14.2. Number: Two or four (see point 6.14.5.1.).

6.14.3. Arrangement: No individual specifications.

6.14.4. Position:

6.14.4.1. Width: Except as provided in point 6.14.5.1., the point on the illuminating surface which is farthest from the vehicle´s median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle. The inner edges of the retro-reflectors shall be not less than 600 mm apart. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

6.14.4.2. Height: Except as provided in point 6.14.5.1, not less than 400 mm and not more than 900 mm above the ground.

For vehicles with a maximum width not exceeding 1,300 mm above the ground not less than 250 mm.

However, the upper limit may be increased to not more than 1,200 mm if it is impossible to keep within the height of 900 mm without having to use fixing devices liable to be easily damaged or bent.

6.14.4.3. Length: No individual specifications.

6.14.5. Geometric visibility: Horizontal angle: 30° inwards and outwards.

Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° if the height of the reflector is less than 750 mm.

6.14.5.1. If it is impossible to observe the above position and visibility requirements, four retro-reflectors may be fitted in accordance with the following installation specifications:

6.14.5.1.1. Two retro-reflectors shall keep within the maximum height of 900 mm above the ground. However, this upper limit may be increased to not more than 1,500 mm where the shape, structure, design or operational conditions of the vehicle comply with the height of 900 mm without having to use fixing devices liable to be easily damaged or bent.

A distance of at least 300 mm between the interior edges of the rear retro-reflectors shall be observed, and they shall have a vertical angle of visibility above the horizontal of 15°.

6.14.5.1.2. The other two shall keep within a maximum height of 2,500 mm above the ground and shall be bound by the requirements of point 6.14.4.1.

6.14.5.1.3. The combination of the two pairs shall meet the requirements for geometric visibility as specified in point 6.14.5.

6.14.6. Orientation: Towards the rear.

6.14.7. Other requirements: The illuminating surface of the retro-reflector may have parts in common with that of any other rear lamp.

6.15. Side retro-reflectors, non-triangular (UNECE Regulation No 3, as referenced in Annex I)

6.15.1. Presence: Mandatory on all tractors the length of which exceeds 6 m. Optional on tractors the length of which does not exceed 6 m. Mandatory on all R- and S-category vehicles.

6.15.2. Number: Such that the requirements for longitudinal positioning are complied with. The performances of these devices shall conform to the requirements concerning Class IA or IB retro reflectors in UNECE Regulation No 3, as referenced in Annex I. Additional retro

reflecting devices and materials (including two retro-reflectors not complying with point 6.15.4.), are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

6.15.3. Arrangement: The reflecting surface shall be mounted in a vertical plane (maximum deviation 10°) parallel to the longitudinal axis of the vehicle.

6.15.4. Position:

6.15.4.1. Width: No individual specification.

6.15.4.2. Height: Not less than 400 mm and not more than 900 mm above the ground.

However, the upper limit may be increased to not more than 1,500 mm if it is impossible to keep within the height of 900 mm without having to use fixing devices liable to be easily damaged or bent.

6.15.4.3. Length: One reflector shall be not more than 3 m from the foremost point of the vehicle, and either the same reflector or a second reflector shall be not more than 3 m from the rearmost point of the vehicle. The distance between two reflectors on the same side of the vehicle shall not exceed 6 m.

6.15.5. Geometric visibility: Horizontal angle: 20° forwards and rearwards.

Vertical angle: 10° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° if the length of the reflector is less than 750 mm.

6.15.6. Orientation: Towards the side.

6.16. Rear registration plate lamp(s) (UNECE Regulation No 4, as referenced in Annex I)

6.16.1. Presence: Mandatory on tractors and R- and S-category vehicles.

6.16.2. Number

6.16.3. Arrangement

6.16.4. Position

6.16.4.1. Width

6.16.4.2. Height

6.16.4.3. Length

6.16.5. Geometric visibility

6.16.6. Orientation

The values and position in points 6.16.2. – 6.16.6. shall be such that the device is able to illuminate the site of the registration plate.

6.16.7. Tell-tale: Vehicles may be equipped with tell-tale for rear registration plate lamp(s). If provided, its function shall be performed by the tell-tale prescribed for the front and rear position lamps.

6.16.8. Electrical connections: The device shall light up only at the same time as the rear position lamps (see point 5.12).

6.17. Front retro-reflectors, non-triangular (UNECE Regulation No 3, as referenced in Annex I)

6.17.1. Presence: Mandatory on vehicles of categories R and S. Optional on tractors..

6.17.2. Number: Two or four.

6.17.3. Arrangement: No special requirement.

6.17.4. Position

6.17.4.1. Width: That point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. On R- and S-category vehicles this distance shall be no more than 150 mm.

The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall be not less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

6.17.4.2. Height: Above the ground, not less than 300 mm and not more than 1,500 mm. If this is not possible due to the design the front reflectors shall be arranges as low as possible.

6.17.4.3. Length: At the front of the vehicle.

6.17.5. Geometric visibility:

Horizontal angle: 30° inwards and outwards.

Vertical angle: 10° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of a retro-reflector less than 750 mm above the ground.

6.17.5.1. If it is impossible to observe the above position and visibility requirements, four front retro reflectors may be fitted in accordance with the following installation specifications:

6.17.5.1.1. If fitted, two reflectors shall keep within the maximum height of 1,200 mm above the ground.

A distance of at least 300 mm between the interior edges of the front retro-reflectors shall be observed, and they shall have a vertical angle of visibility above the horizontal of 15°.

6.17.6. Orientation: Towards the front.

6.17.7. Other requirements: The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the front.

6.18. Side marker lamps (UNECE Regulation No 91, as referenced in Annex I)

6.18.1. Presence: Optional on all vehicles.

6.18.2. Minimum number per side: Such that the rules for longitudinal positioning are complied with.

6.18.3. Arrangement: No individual specifications.

6.18.4. Position:

6.18.4.1. Width: No individual specifications.

6.18.4.2. Height: Above the ground, not less than 250 mm nor more than 2,500 mm.

6.18.4.3. Length: At least one side-marker lamp shall be fitted to the middle third of the vehicle, the foremost side-marker lamp being not further than 3 m from the front. The distance between two adjacent side-marker lamps shall not exceed 3 m. If the structure, design or the operational use of the vehicle makes it impossible to comply with such a requirement, this distance may be increased to 4 m.

The distance between the rearmost side-marker lamp and the rear of the vehicle shall not exceed 1 m.

However, for vehicles the length of which does not exceed 6 m and for chassis-cabs, it is sufficient to have one side-marker lamp fitted within the first third and/or within the last third of the vehicle length.

6.18.5. Geometric visibility

Horizontal angle: 45° to the front and to the rear; however, this value can be reduced to 30°.

Vertical angle: 10° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of a side-marker lamp less than 750 mm above the ground.

6.18.6. Orientation: Towards the side.

6.18.7. Electrical connections: No individual specifications (see point 5.12).

6.18.8. Tell-tale: Optional. If it exists its function shall be carried out by the tell-tale required for the front and rear position lamps.

6.18.9. Other requirements: When the rearmost side-marker lamp is combined with the rear position lamp reciprocally incorporated with the rear fog-lamp or stop lamp, the photometric characteristics of the side-marker lamp may be modified during the illumination of the rear fog lamp or stop lamp.

Rearmost side-marker lamps shall be amber if they flash with the rear direction-indicator lamp.

6.19. Daytime running lamp (UNECE Regulation No 87, as referenced in Annex I)

6.19.1. Presence: Optional on tractors. Prohibited on R- and S-category vehicles.

6.19.2. Number: Two or four (see point 6.19.4.2).

6.19.3. Arrangement: No special requirement.

6.19.4. Position

6.19.4.1. Width: No individual specifications.

6.19.4.2. Height: Above the ground not less than 250 mm not more than 2,500 mm.

In the case of tractors equipped for the fitting of portable devices at the front, two Daytime Running Lamps (DRL) in addition to the lamps mentioned in point 6.19.2 shall be allowed at a height not exceeding 4,000 mm if the electrical connections are such that two pairs of DRL cannot be switched on at the same time.

6.19.4.3. Length: At the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

6.19.5. Geometric visibility

Horizontal: outwards 20° and inwards 20°.

Vertical: upwards 10° and downwards 10°.

6.19.6. Orientation: Towards the front.

6.19.7. Electrical connections

6.19.7.1. The daytime running lamps shall be switched ON automatically when the device which starts and/or stops the engine is in a position which makes it possible for the engine to operate. However, daytime running lamps may remain OFF while the automatic transmission control is in the park or neutral position, while the parking brake is applied or after the propulsion system is activated but the vehicle was not set in motion for the first time.

The daytime running lamps shall switch OFF automatically when the front fog lamps or headlamps are switched ON, except when the latter are used to give intermittent luminous warnings at short intervals.

Furthermore, any of the lamps referred to in point 5.12. may be switched ON when the daytime running lamps are switched ON.

6.19.7.2. If the distance between the front direction-indicator lamp and the daytime running lamp is equal or less than 40 mm, the electrical connections of the daytime running lamp on the relevant side of the vehicle may be such that either it is switched OFF or its luminous intensity is reduced during the entire period (both ON and OFF cycle) of activation of a front direction-indicator lamp.

6.19.7.3. If a direction-indicator lamp is reciprocally incorporated with a daytime running lamp, the electrical connections of the daytime running lamp on the relevant side of the vehicle shall be such that the daytime running lamp is switched OFF during the entire period (both ON and OFF cycle) of activation of the direction-indicator lamp.

6.19.8. Tell-tale: Closed-circuit tell-tale optional.

6.20. Cornering lamp (UNECE Regulation No 119, as referenced in Annex I)

6.20.1. Presence: Optional on tractors. Prohibited on vehicles of categories R and S.

6.20.2. Number: Two or four.

6.20.3. Arrangement: No special requirement.

6.20.4. Position

6.20.4.1. Width: No individual specifications.

6.20.4.2. Length: Not further than 1,000 mm from the front.

6.20.4.3. Height: Above the ground not less than 250 mm and not more than 2,500 mm and up to 3,000 mm for two additional cornering lamps in the case of vehicles equipped for the fitting of portable devices at the front, which may obscure the cornering lamp.

However, no point on the apparent surface in the direction of the reference axis shall be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.

6.20.5. Geometric visibility

Horizontal: 30° to 60° outwards.

Vertical: 10° upwards and downwards.

6.20.6. Orientation: Such that the lamps meet the requirements for geometric visibility.

6.20.7. Electrical connections

The cornering lamps shall be so connected that they cannot be activated unless the main-beam headlamps or the dipped-beam headlamps are switched ON at the same time.

6.20.7.1. The cornering lamp on one side of the vehicle may only be switched ON automatically when the direction-indicators on the same side of the vehicle are switched ON and/or when the steering angle is changed from the straight-ahead position towards the same side of the vehicle.

The cornering lamp shall be switched OFF automatically when the direction-indicator is switched OFF and/or the steering angle has returned in the straight-ahead position.

6.20.7.2. When the reversing lamp is switched ON, both cornering lamps may be switched on simultaneously, independently from the steering wheel or direction-indicator position. In this case, the cornering lamps shall be switched OFF when the reversing lamp is switched OFF.

6.20.8. Tell-tale: None.

6.20.9. Other requirements: The cornering lamps shall not be activated at vehicle speeds above 40 km/h.

6.21. Conspicuity markings (UNECE Regulation No 104, as referenced in Annex I)

6.21.1. Presence: Optional.

6.21.2. Number: According to the presence.

6.21.3. Arrangement: The conspicuity markings shall be as close as practicable to horizontal and vertical, compatible with the shape, structure, design and operational requirements of the vehicle.

6.21.4. Position: No individual specifications.

6.21.5. Geometric visibility: No individual specifications.

6.21.6. Orientation: No individual specifications.

6.22. SMV rear marking plate (UNECE Regulation No 69, as referenced in Annex I)

6.22.1. Presence: Optional on vehicles with a maximum design speed of not more than 40 km/h. Prohibited on all other vehicles.

6.22.2. Number: According to Annex 15 to UNECE Regulation No 69, as referenced in Annex I.

6.22.3. Arrangement: According to Annex 15 to UNECE Regulation No 69, as referenced in Annex I.

6.22.4. Position

Width: According to Annex 15 to UNECE Regulation No 69, as referenced in Annex I.

Height: No individual specifications.

Length: According to Annex 15 to UNECE Regulation No 69, as referenced in Annex I.

6.22.5. Geometric visibility According to Annex 15 to UNECE Regulation No 69, as referenced in Annex I.

6.22.6. Orientation: According to Annex 15 to UNECE Regulation No 69, as referenced in Annex I.

6.23. Exterior courtesy lamp

6.23.1. Presence: Optional on tractors. Prohibited on R- and S-category vehicles.

6.23.2. Number: No individual specifications.

6.23.3. Arrangement: No individual specifications.

6.23.4. Position: No individual specifications.

6.23.5. Geometric visibility: No individual specifications.

6.23.6. Orientation: No individual specifications.

6.23.7. Electrical connections: No individual specifications.

6.23.8. Tell-tale: No individual specifications.

6.23.9. Other requirements: The exterior courtesy lamp shall not be activated unless the vehicle is stationary and one or more of the following conditions is satisfied:

6.23.9.1 the engine is stopped;

6.23.9.2 a driver or passenger door is opened;

6.23.9.3 a load compartment door is opened.

Point 5.11. shall be complied with in all fixed positions of use.

The technical service shall, to the satisfaction of the authority responsible for type-approval, perform a visual test to verify that there is no direct visibility of the apparent surface of the exterior courtesy lamps, if viewed by an observer moving on the boundary of a zone on a transverse plane 10 m from the front of the vehicle, a transverse plane 10 m from the rear of the vehicle , and two longitudinal planes 10 m from each side of the vehicle; these four planes to extend from 1 m to 3 m above and perpendicular to the ground as shown in Annex 14 to UNECE Regulation No 48, as referenced in Annex I.

This requirement shall be verified by a drawing or simulation.

6.24. Manoeuvring lamps (UNECE Regulation No 23, as referenced in Annex I)

6.24.1. Presence: Optional on tractors. Prohibited on R- and S-category vehicles.

6.24.2. Number: One or two (one per side)

6.24.3. Arrangement: No special requirement, however the requirements of point 6.24.9. apply.

6.24.4. Position: No special requirement.

6.24.5. Geometric Visibility: No special requirement.

6.24.6. Orientation: Downwards, however the requirements of point 6.24.9. apply.

6.24.7. Electrical Connections: Manoeuvring lamps shall be so connected that they cannot be activated unless the main-beam headlamps or the dipped-beam headlamps are switched ON at the same time.

The manoeuvring lamp(s) shall be activated automatically for slow manoeuvres up to 10 km/h provided that one of the following conditions is fulfilled:

(a) Prior to the vehicle being set in motion for the first time after each manual activation of the propulsion system; or

(b) Reverse gear is engaged; or

(c) A camera based system which assists parking manoeuvres is activated.

The manoeuvring lamps shall be automatically switched off if the forward speed of the vehicle exceeds 10 km/h and they shall remain switched off until the conditions for activation are met again.

6.24.8. Tell tale: No special requirement

6.24.9. Other requirements

6.24.9.1. The Technical Service shall, to the satisfaction of the authority responsible for type-approval, perform a visual test to verify that there is no direct visibility of the apparent surface of these lamps, if viewed by an observer moving on the boundary of a zone on a transverse plane 10 m from the front of the vehicle, a transverse plane 10 m from the rear of the vehicle , and two

longitudinal planes 10 m from each side of the vehicle; these four planes to extend from 1 m to 3 m above and parallel to the ground.

6.24.9.2. The requirement set out in point 6.24.9.1 shall be verified by a drawing or simulation or deemed be satisfied if the installation conditions comply with paragraph 6.2.3 of UNECE Regulation No 23, as referenced in Annex I.

6.25. Rear retro-reflectors, triangular

6.25.1. Presence: Mandatory on vehicles of categories R and S. Prohibited on tractors.

6.25.2. Number: Two or four (see point 6.25.5.1.).

6.25.3. Arrangement: The apex of the triangle shall be directed upwards.

6.25.4. Position

6.25.4.1. Width: Except as provided in point 6.25.5.1, the point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle. The inner edges of the retro-reflectors shall be not less than 600 mm apart. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

6.25.4.2. Height: Except as provided in point 6.25.5.1, not less than 400 mm and not more than 1,500 mm above the ground.

6.25.4.3. Length: No individual specifications.

6.25.5. Geometric visibility:

Horizontal angle: 30° inwards and outwards.

Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° if the height of the reflector is less than 750 mm.

6.25.5.1. If it is impossible to observe the above position and visibility requirements, four retro-reflectors may be fitted in accordance with the following installation specifications:

6.25.5.1.1. Two retro-reflectors shall keep within the maximum height of 900 mm above the ground. However, this upper limit may be increased to not more than 1,200 mm if it is impossible to keep within the height of 900 mm without having to use fixing devices liable to be easily damaged or bent.

A distance of at least 300 mm between the interior edges of the reflectors shall be observed, and they shall have a vertical angle of visibility above the horizontal of 15°.

6.25.5.1.2. The other two retro-reflectors shall keep within a maximum height of 2,500 mm above the ground and shall comply with point 6.14.4.1.

6.25.6. Orientation: Towards the rear.

6.25.7. Other requirements: The illuminating surface of the retro-reflector may have parts in common with that of any other rear lamp.

6.26. Signalling panels and signalling foils

6.26.1. Presence:

Mandatory on vehicles of category S with a total width of more than 2.55 m.

Optional on vehicles of category S with a total width not exceeding 2.55 m.

6.26.2. Number:

Two or four (Appendix 3).

6.26.3. Arrangement:

The panels or foils shall be arranged in a way that their stripes shall run under 45° outwards and downwards.

6.26.4. Position:

Width:

That point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 100 mm from the extreme outer edge of the vehicle. This value may be increased if the shape of the bodywork makes it impossible to keep within 100 mm.

Height:

No individual specifications.

Length:

No individual specifications.

6.26.5. Geometric visibility:

No individual specifications.

6.26.6. Alignment:

Towards the front and the rear.

Appendix 1

Visibility of lamps

Figure 1

Visibility of a red lamp to the front

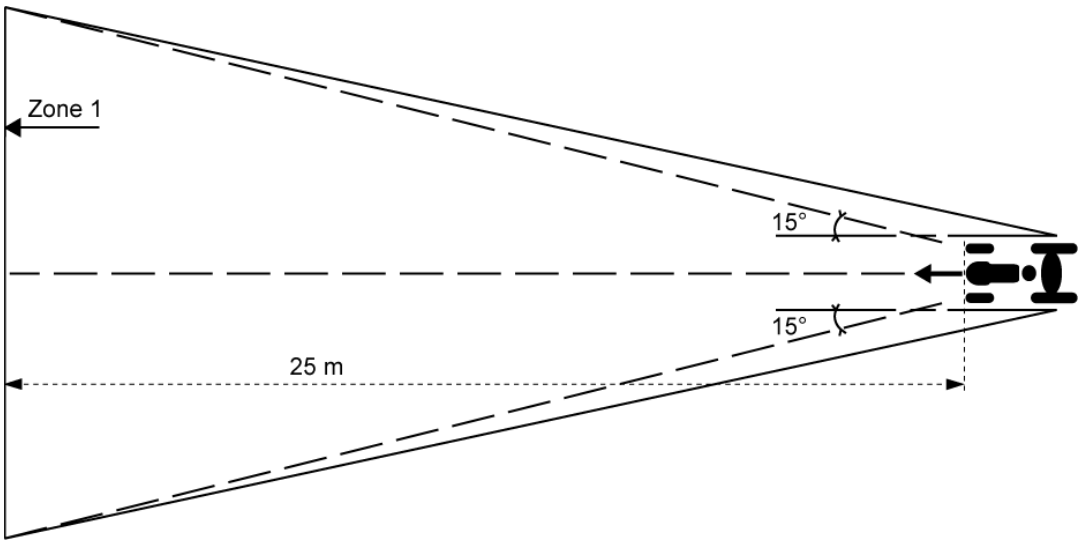
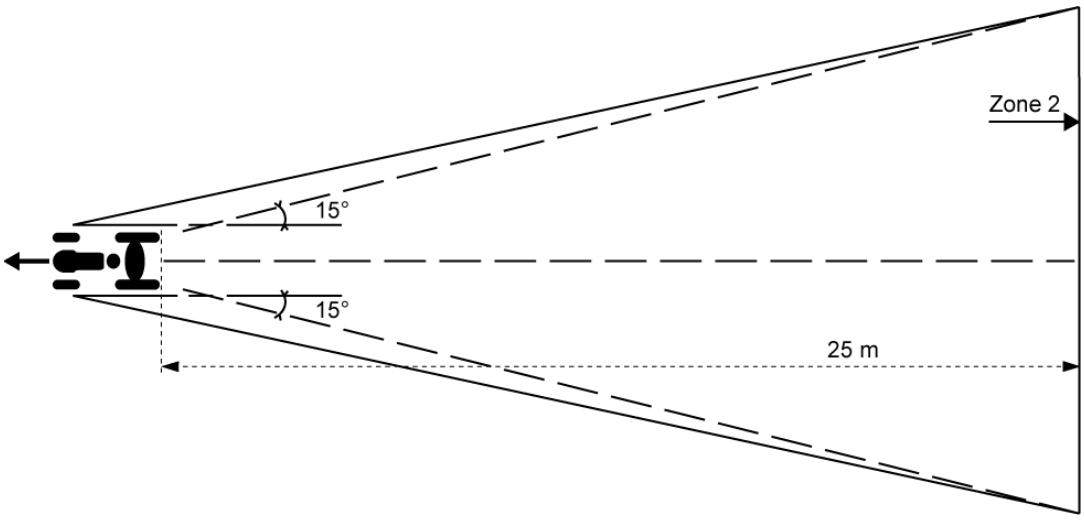


Figure 2

Visibility of a white lamp to the rear

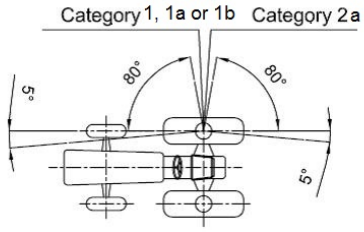


Appendix 2

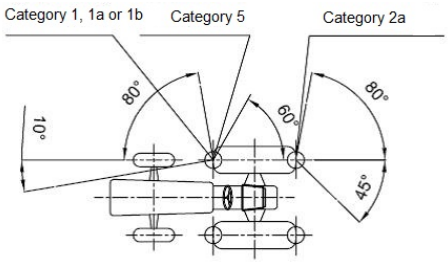
Direction indicator lamps

Geometric visibility (see point 6.5.5.)

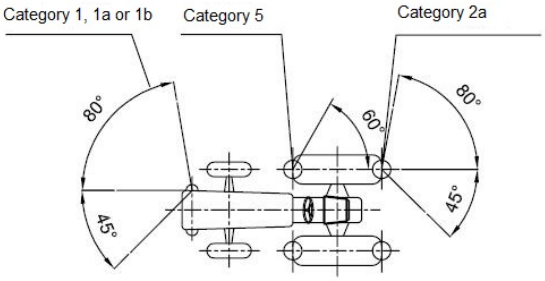
Arrangement A



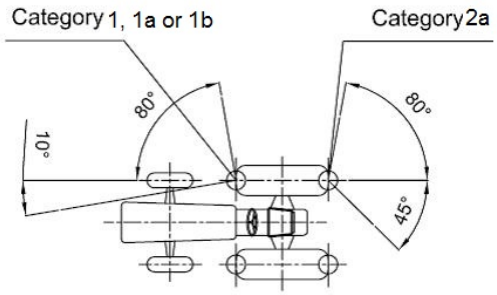
Arrangement B



Arrangement C



Arrangement D



The value 10° given for the inward angle of visibility of the front indicator may be reduced to 3° for vehicles with an overall width not exceeding 1400 mm.

Appendix 3

Dimensions, minimum size of the reflecting surface, colour and photometric minimum requirements and identification and marking of signaling panels and signaling foils for

vehicles of category S with width exceeding 2.55 m

1. Dimensions, number and minimum reflecting surface

1.1. Signalling panels and signaling foils shall have the following dimensions:

Figure 1
Signalling panel or signalling foil

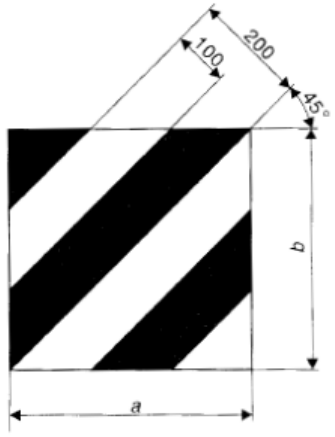


Figure 2

Basic square

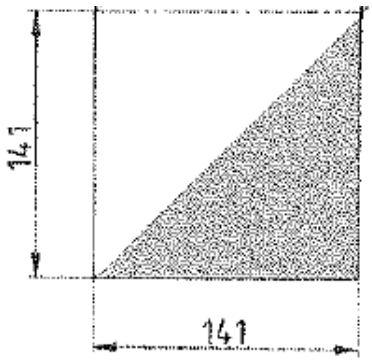


Table 1
Dimensions [mm]

Signalling panel or foil	**a [mm]**	**b [mm]**	**Surface [cm²]**
Form A	423	423	1790
Form B	282	282	795
Form R1	282	423	1193
Form R2	423	282	
Form L1	141	846	1193

Form L2	846	141	
Form K1 Form K2	141 423	423 141	596

Deviations from the specified formats are permitted, if the surface of the unspecified formats contains at least 3 basic squares. The number of signaling panels or foils for each effective direction to the front and the rear are specified in Table 2.

1.2. Table 2
Number of signaling panels or foils for each effective direction

Signalling panel or foil	Number for each effective direction
Form A	2
Form B	2
Form R1 Form R2	2
Form L1 Form L2	2
Form K1 Form K2	4

Signaling panels or foils of Form A may be combined with lamps, if the surface of the boards covered by the lamps does not exceed 150 cm².

2. Colouring and photometric minimum requirements

White according to point 2.29.1 of UNECE Regulation No 48, as referred to in Annex I.

Red according to point 2.29.4 of UNECE Regulation No 48.

The photometric requirements set out in Annex 7 to UNECE Regulation No. 69, as referenced in Annex I, or in Annex 7 to UNECE Regulation No 104, as referenced in Annex I, apply.

Panels or foils of Form B shall comply with Annex 7 to UNECE Regulation No 104, Class C.

3. Identification

Signaling panels which comply with the requirements set out in this Regulation are marked with the number of this Regulation and the name of the manufacturer.

ANNEX XIII
Requirements on vehicle occupant protection, including interior fittings, head restraints, seat belts, vehicle doors

PART 1

1. Definitions

For the purposes of this Annex:

Definitions for the protection of drive components, in accordance with the requirements laid down on the basis of Article 18 (4) of Regulation (EU) 167/2013, are valid for this Annex.

1.1. ‘Interior fittings’ mean the interior parts of the passenger compartment other than the interior rear-view mirrors and include

— the layout of the controls;

— the roof;

— power-operated windows, roof panel and partition systems.

1.2. ‘Level of the instrument panel’ means the line defined by the points of contact of vertical tangents to the instrument panel.

1.3. ‘Power-operated windows’ means windows which are closed by power supply of the vehicle.

1.4. ‘Opening’ is the maximum unobstructed aperture between the upper edge or the leading edge, depending on the closing direction, of a power-operated window or partition or roof panel and the vehicle structure which forms the boundary of the window, partition or roof panel, when viewed from the interior of the vehicle or, in the case of partition system, from the rear part of the passenger compartment.

PART 2

Interior fittings

1. Specifications

1.1. Interior parts of the passenger compartment excluding the side doors

1.1.1. Environment of driving seat and passenger seats, if fitted

1.1.1.1. The safety distance zone A above the SIP of the driving seat and located in front of it, as determined in Figure 1, shall not contain any dangerous roughness or sharp edges, likely to increase the risk of serious injury to the occupants. If parts contained in the safety distance zone A above the SIP, located in front of it, comply with the requirements in points 1.1.2 to 1.1.6., they shall be deemed to also comply with this requirement.

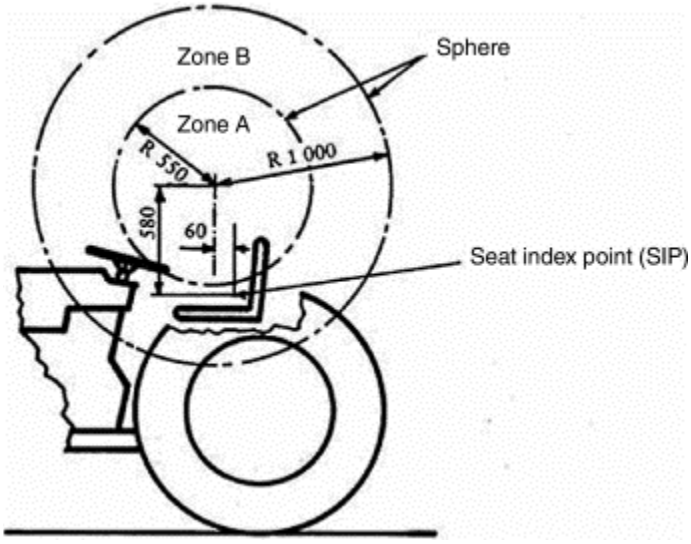


Figure 1

1.1.1.2. The safety distance zone A, whose centre is 670 mm above the centre of the front edge of the front passenger seat, if fitted, and located in front of it, as determined in Figure 2, shall not contain any dangerous roughness or sharp edges, likely to increase the risk of serious injury to the occupants. If parts contained in the safety distance zone A above the SIP, located in front of it, comply with the requirements in points 1.1.2 to 1.1.6., they shall be deemed to also comply with this requirement.

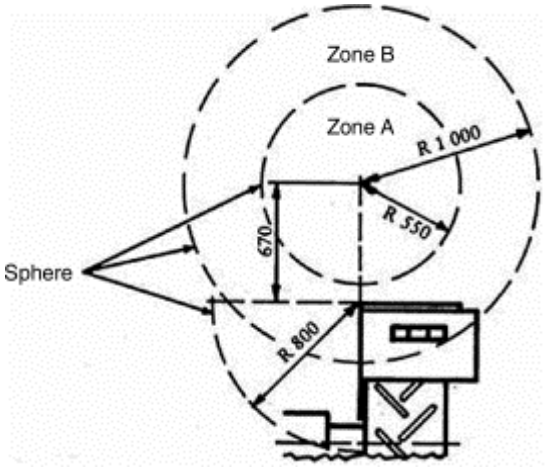


Figure 2

1.1.1.3. In the case of vehicles equipped with steering wheel and bench seats or bucket seats in more than one row, the environment of the rear passenger seats, if fitted, shall comply with the requirements of Annex XVII of the Regulation (EU) No 3/2014.[3]

1.1.2. Parts that are likely to be contacted by the driver or passengers shall have no sharp edges or rough surfaces hazardous to the occupants.

[3] Commission Delegated Regulation (EU) No 3/2014 of 24 October 2013 supplementing Regulation (EU) No 168/2013 of the European Parliament and of the Council with regard to vehicle functional safety requirements for the approval of two- or three-wheel vehicles and quadricycles (OJ L 7, p. 1, 10.01.2014)

1.1.3. For tractors with maximum design speed exceeding 40 km/h, the requirements of points 1.1.3.1. – 1.1.3.4. shall apply in addition to the requirements of points 1.1.1. – 1.1.2., 1.1.5. – 1.1.6. and Parts 3 - 5:

1.1.3.1. Any metal support fittings shall have no protruding edges.

1.1.3.2. The parts that can be contacted by a hemisphere with a diameter of 165 mm, as described in point 3.2.1., when approaching along the radius of zone A in Figure 1, shall be rounded to a radius of curvature of not less than 2.5 mm.

1.1.3.3. Window winders, if fitted, may project 35 mm from the surface of the panel.

1.1.3.4. Requirements of points 1.1.3.1, 1.1.3.2 and 1.1.3.3 do not apply to components located beyond the steering wheel, as referenced from the apex of a cone, this apex being the centre of zone A in Figure 1, and the rim of the steering wheel being the generatrix of that cone.

1.1.4. For tractors with maximum design speed exceeding 60 km/h, the requirements of points 1.1.4.1. – 1.1.4.6. shall apply in addition to the requirements of points 1.1.1. – 1.1.3.4., 1.1.5. – 1.1.6. and Parts 3 - 5:

1.1.4.1. The lower edge of the instrument panel shall be rounded to a radius of curvature of not less than 19 mm.

1.1.4.2. Switches, pull-knobs, etc, made of rigid material, which, measured in accordance with the method described in 3 from 3.2 mm to 9.5 mm from the panel, shall have a cross-sectional area of not less than 2 cm^2, measured 2.5 mm from the point projecting furthest, and shall have rounded edges with a radius of curvature of not less than 2.5 mm.

1.1.4.3. If these components project by more than 9.5 mm from the surface of the instrument panel, they shall be designed and constructed with a cross-section of not less than 6.50 cm^2 in area situated not more than 6.5 mm from the point of maximum projection.

1.1.4.4. Components mounted on the roof, if fitted, but which are not part of the roof structure, such as grab handles, lights and ventilation openings, etc., shall have a radius of curvature of not less than 3.2 mm and, in addition, the width of the projecting parts shall not be less than the amount of their downward projection.

1.1.4.5. In the case of a projection consisting of a component made of non-rigid material of less than 60 shore A hardness mounted on a rigid support, the requirements of points 1.1.4.2. - 1.1.4.4. shall apply only to the rigid support.

1.1.4.6. The requirements set out in this section shall apply to fittings not mentioned in points 1.1.2 – 1.1.6. which, in accordance with the requirements set out in points 1.1.1. to 1.1.6. and according to their location in the vehicle, are capable of being contacted by the occupants. If such parts are made of a material softer than 60 shore A hardness and mounted on one or more rigid supports, the requirements in question shall apply only to those rigid supports.

1.1.5. Shelves and other similar items, if fitted, shall be so designed and constructed that their supports in no case have protruding edges.

1.1.6. Other items of equipment in the vehicle not covered by the preceding points such as seat slide rails, equipment for regulating the horizontal or vertical part of the seat, devices for retracting safety belts, etc. shall not be subject to any of these provisions if they are situated below a horizontal plane passing through the seat index point of each seat, even though the occupant is

likely to come into contact with such items.

2. Test procedure for the EU type-approval

2.1.1. The application for EU component type-approval shall be accompanied by the following samples that shall be submitted to the technical service responsible for conducting the component type-approval tests:

2.1.2. at the manufacturer's discretion, either a vehicle representative of the vehicle type to be approved or the part(s) of the vehicle regarded as essential for the checks and tests prescribed by this Regulation; and

2.1.3. at the request of the aforesaid technical service, certain components and certain samples of the materials used.

3. Method of measuring projections

3.1. To determine the amount by which an item projects in relation to the panel on which it is mounted, a 165 mm sphere shall be moved along and be kept in contact with the component under consideration, starting from the initial position of contact with the component under consideration. The projection's value is the largest of all possible variations «y», the variation measured from the centre of the sphere perpendicular to the panel.

If the panels and components, etc., are covered with materials softer than 50 Shore A hardness, the procedure for the measuring of projections described above shall apply only after the removal of such materials.

The projection of switches, pull-knobs, etc., situated in the reference area shall be measured by using the test apparatus and procedure described below:

3.2. Apparatus

3.2.1. The measuring apparatus for projections shall consist of a hemispherical headform 165 mm in diameter, in which there is a sliding ram of 50 mm diameter.

3.2.2. Relative positions of the flat end of the ram and the edge of the headform shall be shown on a graduated scale, on which a mobile index shall register the maximum measurement achieved when the apparatus is moved away from the item tested. A minimum distance of 30 mm shall be measurable; the measuring scale shall be graduated in half-millimeters to make possible an indication of the extent of the projections in question.

3.2.3. Gauging procedure:

3.2.3.1. The apparatus shall be placed on a flat surface so that its axis is perpendicular to that surface. When the flat end of the ram contacts the surface, the scale shall be set at zero.

3.2.3.2. A 10 mm strut shall be inserted between the flat end of the ram and the retaining surface; a check shall be made to ensure that the mobile index records this measurement.

3.2.4. The apparatus for measuring projections is illustrated in Figure 3.

3.3. Test procedure

3.3.1. A cavity shall be formed in the headform by pulling back the ram and the mobile index shall be placed against the ram.

3.3.2. The apparatus shall be applied to the projection to be measured so that the headform contacts the maximum surrounding surface area, with a force not exceeding 2 daN.

3.3.3. The ram shall be pushed forward until it makes contact with the projection to be measured and the amount of the projection shall be observed on the scale.

3.3.4. The headform shall be adjusted to obtain maximum projection. The amount of the projection shall be recorded.

3.3.5. If two or more controls are situated sufficiently close for the ram or the headform to contact them simultaneously, they shall be treated as follows:

3.3.5.1. Multiple controls, all of which can be contained in the headform cavity, shall be regarded as forming a single projection.

3.3.5.2. If other controls prevent normal testing by contacting the headform, they shall be removed and the test shall be conducted without them. They may subsequently be re-installed and tested in their turn with other controls that have been removed to facilitate the procedure.

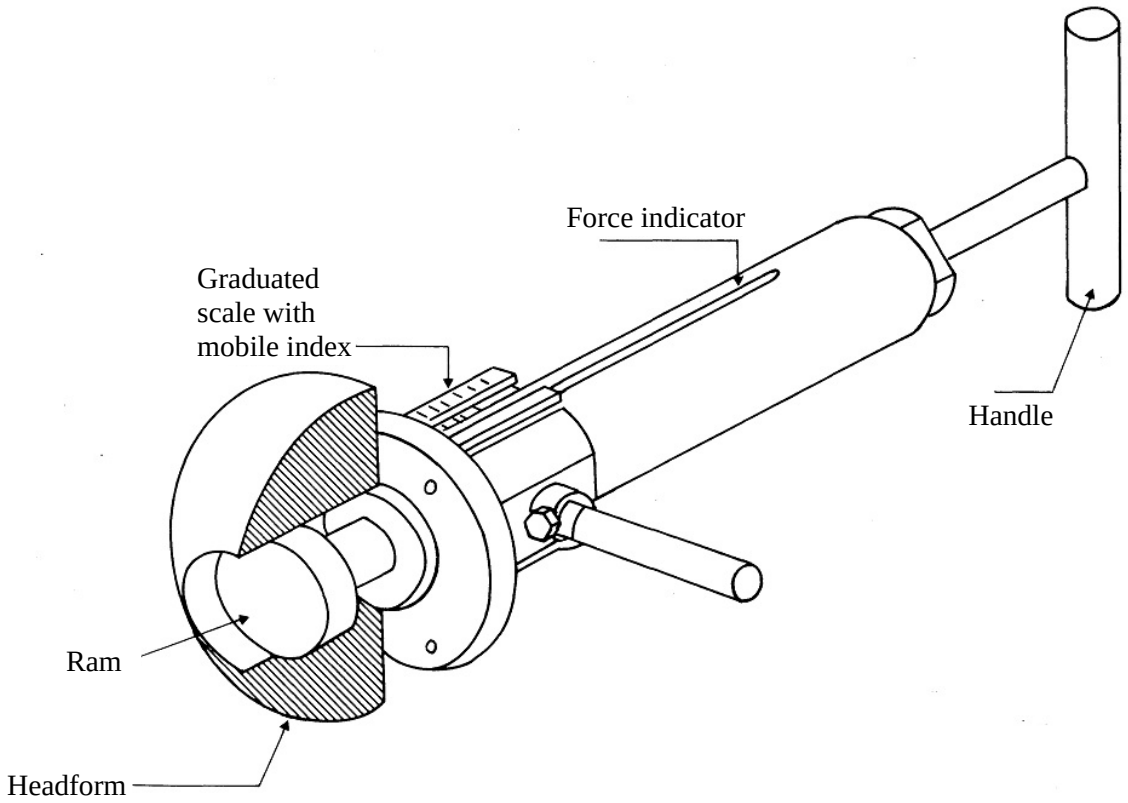


Figure 3

Apparatus for measuring projections

4. Apparatus and procedure for application of point 1.1.1.

Those parts (switches, pull-knobs etc.) which can be contacted by using the apparatus and procedure described below shall be considered as being likely to be contacted by the knees of an occupant:

4.1. Apparatus

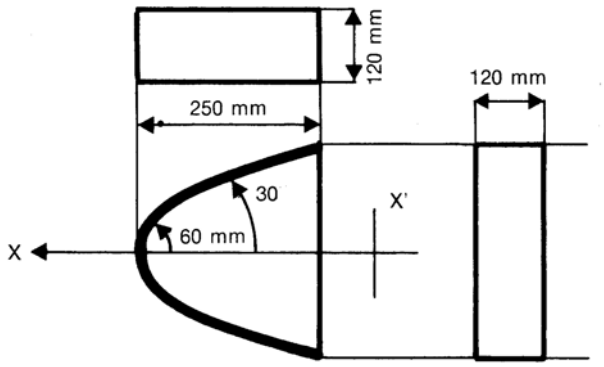


Diagram of apparatus

4.2. Procedure

The apparatus may be placed in any position below the instrument panel so that:

– the plane XX' remains parallel to the median longitudinal plane of the vehicle

– the axis X can be rotated above and below the horizontal through angles up to 30°.

In carrying out the test referred to in this point, all materials of less than 60 shore A hardness shall be removed.

PART 3

Head restraints, if fitted

Head restraints, if fitted shall comply with the provisions of UNECE Regulation No 25, as referenced in Annex I.

PART 4

Seat belts

The requirements laid down on the basis of Article 18(2)(j) and (4) of Regulation (EU) No 167/2013 shall apply.

PART 5

Vehicle doors, if fitted

Vehicle doors, with powered windows and powered roof hatches, if fitted, shall comply with paragraphs 5.8.1 to 5.8.5 of UNECE Regulation No 21, as referenced in Annex I.

ANNEX XIV
Requirements on vehicle exterior and accessories

1. Definitions

For the purposes of this Annex:

1.1. 'External surface' means the outside of the vehicle including wheels, tracks, doors, bumpers, bonnet, access means, tanks.

1.2. 'Radius of curvature' means the radius of the arc of a circle which comes closest to the rounded form of the component under consideration.

1.3 'Extreme outer edge' of the vehicle means, in relation to the sides of the vehicle, the plane parallel to the median longitudinal plane of the vehicle coinciding with its outer lateral edge, and, in relation to the front and rear ends, the perpendicular transverse plane of the vehicle coinciding with its outer front and rear edges, account not being taken of the projection:

- of tyres near their point of contact with the ground, and connections for tyre pressure gauges;

- of any anti-skid devices which may be mounted on the wheels;

- of rear-view mirrors;

- of side direction indicator lamps, end outline marker lamps, front and rear position (side) lamps and parking lamps.

2. Scope

2.1 This Annex shall apply to those parts, of the external surface which, with the vehicle in the laden condition, equipped with tyres of the highest diameter or set of tracks of the highest vertical dimension, for which it is approved, with all doors, windows and access lids etc., in the closed position, are either:

2.1.1. at the sides and at a height of less than 0.75 m, as well as at the entire wheels and set of tracks (tyres, rims, ballast masses, wheel hubs and axles), the parts forming the extreme outer edge in each vertical plane perpendicular to the length axis of the vehicle, with the exemption of those parts with distance greater than 200 mm from each of the left and right side extreme outer edge of the vehicle and towards its length axis, when the vehicle is equipped with the tyres or set of tracks for which it is approved, giving the narrowest track width;

or

2.1.2. at the sides and at a height between 0.75 and 2 m, all parts, except:

2.1.2.1. the parts that cannot be contacted by a sphere with a diameter of 100 mm, when approaching horizontally in each vertical plane perpendicular to the length axis of the vehicle; the displacement of the sphere shall not exceed 200 mm, starting from each of the left and right side extreme outer edge of the vehicle and towards its length axis, when the vehicle is equipped with the tyres or set of tracks for which it is approved, giving the narrowest track width;

2.1.2.2. the entire wheels and set of tracks (tyres, rims, ballast masses, wheel hubs and axles).

2.2. The purpose of these provisions is to reduce the risk or seriousness of bodily injury to a person hit by the exterior of the vehicle or brushing against it in the event of a collision. This is valid both when the vehicle is stationary and in motion.

2.3. This Annex does not apply to exterior rear-view mirrors.

2.4. This Annex do not apply to the metallic tracks of vehicles of category C.

3. Requirements

3.1. The external surface of the vehicle shall not exhibit, directed outwards, any pointed or sharp parts, rough surfaces, 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.

3.2. The external surfaces on each side of the vehicle shall not exhibit, directed outwards, any parts likely to catch on pedestrians, cyclists or motor cyclists.

3.3. No protruding part of the external surface shall have a radius of curvature less than 2.5 mm. This requirement shall not apply to parts of the external surface which protrude less than 5 mm, but the outward facing angles of such parts shall be blunted, save where such parts protrude less than 1.5 mm.

3.4. Protruding parts of the external surface, made of a material of hardness not exceeding 60 shore A, may have a radius of curvature less than 2.5 mm. The hardness measurement by the Shore A procedure can be replaced by a hardness value declaration from the manufacturer of the component.

3.5. Vehicles equipped with hydro-pneumatic, hydraulic or pneumatic suspension or a device for automatic levelling according to load shall be tested with the vehicle in the most adverse normal running condition specified by the manufacturer.

3.6. Exposed ground or crop engaging tools and material distribution devices on vehicles of category R & S that have sharp edges or teeth when folded in road transport mode and that are already covered by Directive 2006/42/EC are exempted from complying with points 3.1 to 3.5. For exposed areas of any other part of vehicles of category R & S, points 3.1 to 3.5 shall apply.