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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

(Text with EEA relevance)

(OJ L 7, 10.1.2014, p. 1)

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►**C1** Corrigendum, OJ L 123, 16.5.2017, p. 50 (2016/1824)
►**C2** Corrigendum, OJ L 144, 8.6.2018, p. 7 (2016/1824)

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CHAPTER I

SUBJECT MATTER AND DEFINITIONS

Article 1

Subject matter

This Regulation establishes the detailed technical requirements and test procedures regarding functional safety for the approval and market surveillance of L-category vehicles and the systems, components and separate technical units intended for such vehicles in accordance with Regulation (EU) No 168/2013 and sets out a list of UNECE regulations and amendments thereto.

Article 2

Definitions

The definitions of Regulation (EU) No 168/2013 shall apply. In addition, the following definitions shall apply:

(1) ‘audible warning device’ means a device emitting an acoustic signal intended to give warning of the presence of, or a manoeuvre by, a vehicle in a dangerous road traffic situation, consisting of one or more sound emission orifices that are excited by a single power source or of several components each emitting an acoustic signal and operating simultaneously as a result of being actuated by a single control;

(2) ‘type of electrical audible warning device’ means audible warning devices not essentially differing among themselves, particularly in respect of the following aspects: trade mark or name, operating principle, type of power supply (direct current, alternating current, compressed air), outer shape of the casing, shape and dimensions of the diaphragm(s), shape or type of the sound emission orifice(s), nominal sound frequencies, nominal supply voltage and, in the case of warning devices supplied direct by an external source of compressed air, the nominal operating pressure;

(3) ‘type of mechanical audible warning device’ means audible warning devices not essentially differing among themselves, particularly in respect of the following aspects: trade mark or name, operating principle, type of actuation, outer shape and size of the bell and the internal construction;

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(4) ‘type of vehicle with regard to the audible warning’ means vehicles which do not differ in such essential respects as: the number of audible warning devices fitted to the vehicle, the type(s) of audible warning device(s) fitted to the vehicle, the mountings used to fit the audible warning device(s) to the vehicle, the position and orientation of the audible warning device(s) on the vehicle, the rigidity of the parts of the structure on which the audible warning device(s) is/are fitted and the shape and materials of the bodywork forming the part of the vehicle which may affect the level of the sound emitted by the audible warning device(s) and which may have a masking effect;

(5) ‘bodywork’ means the external structure of the motor vehicle which comprises of fenders, doors, pillars, side walls, roof, floor, front bulkhead, rear bulkhead and/or other external panels;

(6) ‘type of vehicle with regard to braking’ means vehicles which do not differ in such essential respects as the maximum mass, the distribution of mass between the axles, the maximum vehicle design speed, the tyre sizes and wheel dimensions, as well as the design characteristics of the braking system and its components;

(7) ‘type of vehicle with regard to electrical safety’ means vehicles which do not differ in such essential respects as the location of conducting parts and components of the entire electrical system installed in the vehicle, the installation of the electric powertrain and the galvanically connected high voltage bus as well as the nature and type of electric powertrain and the galvanically connected high voltage components;

(8) ‘active driving possible mode’ means the vehicle mode when application of the electric acceleration position sensor, activation of an equivalent control or release of the brake system will cause the electric powertrain to propel the vehicle;

(9) ‘barrier’ means the part providing protection against direct contact to the live parts from any direction of access;

(10) ‘conductive connection’ means the connection using connectors to an external power supply when the rechargeable energy storage system (REESS) is charged;

(11) ‘REESS’ means the rechargeable electric energy storage system that provides energy for electric propulsion;

(12) ‘coupling system for charging the REESS’ means the electrical circuit used for charging the REESS from an external electric power supply including the vehicle inlet;

(13) ‘direct contact’ means the contact of persons with live parts;

(14) ‘electrical chassis’ means a set made of conductive parts electrically linked together, whose potential is taken as reference;

(15) ‘electrical circuit’ means an assembly of connected live parts which is designed to be electrically energised in normal operation;

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(16) ‘electric energy conversion system’ means a system that generates and provides electric energy for electric propulsion;

(17) ‘electric powertrain’ means the electrical circuit which includes the traction motor(s), and includes the REESS, the electric energy conversion system, the electronic converters, the associated wiring harness and connectors, and the coupling system for charging the REESS;

(18) ‘electronic converter’ means a device capable of controlling and/or converting electric power for electric propulsion;

(19) ‘enclosure’ means the part enclosing the internal units and providing protection against direct contact from any direction of access;

(20) ‘exposed conductive part’ means the conductive part which can be touched under the provisions of the protection degree IPXXB, and which becomes electrically energised under isolation failure conditions;

(21) ‘external electric power supply’ means an alternating current (AC) or direct current (DC) electric power supply outside of the vehicle;

(22) ‘high voltage’ means the classification of an electric component or circuit, if its working voltage is > 60 V and ≤ 1 500 V DC or > 30 V and ≤ 1 000 V AC root mean square (rms);

(23) ‘high voltage bus’ means the electrical circuit, including the coupling system for charging the REESS that operates on high voltage;

(24) ‘indirect contact’ means the contact of persons with exposed conductive parts;

(25) ‘live parts’ means the conductive part(s) intended to be electrically energised in normal use;

(26) ‘luggage compartment’ means the space in the vehicle for luggage accommodation, bounded by the roof, bonnet, trunk lid or rear door and floor and side walls, as well as by the barrier and enclosure provided for protecting the powertrain from direct contact with live parts, being separated from the passenger compartment by the front or rear bulkhead;

(27) ‘on-board isolation resistance monitoring system’ means the device which monitors the isolation resistance between the high voltage buses and the electrical chassis;

(28) ‘open type traction battery’ means a liquid type battery requiring refilling with water and generating hydrogen gas released to the atmosphere;

(29) ‘passenger compartment’ means the space for occupant accommodation, bounded by the roof, floor, side walls, doors, window glass, front bulkhead and rear bulkhead, or rear gate, as well as by the barriers and enclosures provided for protecting the powertrain from direct contact with live parts;

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(30) ‘protection degree’ means the protection provided by a barrier or enclosure related to the contact with live parts by a test probe, such as a jointed test finger (IPXXB) or a test wire access probe (IPXXD);

(31) ‘service disconnect’ means the device for deactivation of the electrical circuit for the purpose of servicing or checking electrical components such as the REESS and fuel cell stack;

(32) ‘solid insulator’ means the insulation coating of wiring harnesses insulating live parts against direct contact from any direction of access, covers insulating live parts of connectors, as well as varnish or paint applied for the purpose of insulation;

(33) ‘working voltage’ means the highest value of an electrical circuit voltage root-mean-square (rms) as specified by the vehicle manufacturer for each separate and galvanically isolated circuit, which may occur between any conductive parts in open circuit conditions or under normal operating condition;

(34) ‘type of vehicle with regard to endurance’ means vehicles which do not differ in such essential respects as the overall design characteristics as well as the vehicle and component manufacturing and assembly facilities as well as their quality control and assurance procedures;

(35) ‘type of vehicle with regard to front and rear protective structure’ means vehicles which do not differ in such essential respects as the shape and location of structures, parts and components located at the front and rear of the vehicle;

(36) ‘projection’ means the dimension of an edge as determined in accordance with paragraph 2 of Annex 3 to UNECE regulation No 26 ([1]);

(37) ‘floor line’ means the line as defined in paragraph 2.4 of UNECE regulation No 26;

(38) ‘vehicle structure’ means parts of the vehicle, including bodywork, components, fenders, brackets, linkage, tyres, wheels, wheel guards and glazing, comprised of material with a hardness of at least 60 Shore (A);

(39) ‘type of vehicle with regard to glazing, windscreen wipers and washers, and defrosting and demisting systems’ means vehicles which do not differ in such essential respects as the shape, size, thickness and characteristics of the windscreen and its mounting, the characteristics of the wiper and washer system and the characteristics of the defrosting and demisting systems;

(40) ‘windscreen wiper system’ means the system consisting of a device for wiping the outer face of the windscreen, together with the accessories and controls necessary for starting and stopping the device;

(41) ‘wiper field’ means the area(s) on the windscreen wiped by the wiper blade(s) when the wiper system is operating under normal conditions;

([1]) OJ L 215, 14.8.2010, p. 27.

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(42) ‘windscreen washer system’ means the system consisting of devices for storing, transferring and aiming fluid towards the outer face of the windscreen, together with the controls necessary for starting and stopping the device;

(43) ‘washer control’ means the device by which the windscreen washer system is manually activated and deactivated;

(44) ‘washer pump’ means a device for transferring fluid from the washer system storage reservoir to the outer face of the windscreen;

(45) ‘nozzle’ means a device which serves to direct fluid onto the windscreen;

(46) ‘fully primed (system)’ means a system which has been activated normally for a period of time and where fluid has been transferred through the pump and tubing, and has exited the nozzle(s);

(47) ‘cleaned area’ means the previously soiled area which does not have any traces of drops and remaining dirt after it has dried completely;

(48) ‘vision area A’ means test area A as defined in paragraph 2.2 of Annex 18 to UNECE regulation 43 ([1]);

(49) ‘vehicle master control switch’ means the device by which the vehicle’s on-board electronics system is brought from being switched off, as is the case when a vehicle is parked without the driver being present, to normal operation mode;

(50) ‘type of vehicle with regard to identification of controls, tell-tales and indicators’ means vehicles which do not differ in such essential respects as the number, location and design characteristics of controls, tell-tales and indicators, and the tolerances of the speedometer’s measuring mechanism, technical constant of the speedometer, range of speeds displayed, overall transmission ratio, including any reduction drives, to the speedometer and the minimum and maximum tyre size designations;

(51) ‘control’ means any part of the vehicle or component directly actuated by the driver which causes a change in the state or operation of the vehicle or one of the parts thereof;

(52) ‘tell-tale’ means an optical signal which indicates the actuation of a device, correct or defective functioning or condition, or failure to function;

(53) ‘indicator’ means a device providing information on the proper functioning or state of a system or part of a system, such as the level or temperature of a fluid;

(54) ‘speedometer’ means a device indicating to the driver the speed of the vehicle at any given moment;

(55) ‘odometer’ means a device that indicates the distance travelled by a vehicle;

(56) ‘symbol’ means a diagram from which to identify a control, a tell-tale or an indicator;

([1]) OJ L 230, 31.8.2010, p. 119.

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(57) ‘common space’ means a specific area on which more than one tell-tale, indicator, symbol or other information may be displayed;

(58) ‘type of vehicle with regard to installation of lighting’ means vehicles which do not differ in such essential respects as the dimensions and outer shape of the vehicle, as well as the number, location and design characteristics of the installed lighting devices and light-signalling devices;

(59) ‘lighting device’ means a type-approved lamp or type-approved retro-reflector;

(60) ‘light-signalling device’ means a lighting device which may be used for signalling;

(61) ‘single (lighting device)’ means a lighting device or part of a device, having one function and one illuminating surface and one or more light sources; it may also mean any assembly of two independent or grouped lighting devices, whether identical or not, having the same function, if they are installed in such a way that the projections of the light-emitting surfaces of the lighting devices on a given transverse plane occupy not less than 60 % of the smallest rectangle circumscribing the projections of the said light-emitting surfaces;

(62) ‘light-emitting surface’ of a lighting device means all or part of the exterior surface of the translucent material, as stated in the component type-approval documentation; this may include or entirely consist of the illuminating surface and may also include the area which is completely circumscribed by the lighting device;

(63) ‘illuminating surface’ of a lighting device means the surface as defined in paragraph 2.7 of UNECE regulation No 53 ([1]);

(64) ‘independent (lighting device)’ means a lighting device having a separate illuminating surface, light source and lamp body;

(65) ‘grouped (lighting devices)’ means lighting devices having separate illuminating surfaces and light sources, but a common lamp body;

(66) ‘combined (lighting devices)’ means lighting devices having separate illuminating surfaces but a common light source and a common lamp body;

(67) ‘reciprocally incorporated (lighting devices)’ means lighting devices having separate light sources or a single light source operating under different conditions (e.g. optical, mechanical or electrical differences), totally or partially common illuminating surfaces and a common lamp body;

(68) ‘driving-beam headlamp’ means a device used to illuminate the road over a long distance ahead of the vehicle (main beam);

([1]) OJ L 166, 18.6.2013, p. 55.

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(69) ‘passing-beam headlamp’ means a device used to illuminate the road ahead of the vehicle without causing undue dazzle or discomfort to oncoming drivers or other road users (dipped beam);

(70) ‘front position lamp’ means a device used to indicate the presence of the vehicle when viewed from the front;

(71) ‘daytime running lamp’ means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime;

(72) ‘front fog lamp’ means a device used to improve the illumination of the road in case of fog, snowfall, rainstorms or dust clouds;

(73) ‘direction indicator lamp’ means a device used to indicate to other road users that the driver intends to change direction to the right or the left;

(74) ‘hazard warning signal’ means 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;

(75) ‘stop lamp’ means a device used to indicate to other road users to the rear of the vehicle that the latter’s driver is applying the service brake;

(76) ‘rear position lamp’ means a device used to indicate the presence of the vehicle when viewed from the rear;

(77) ‘rear fog lamp’ means a device used to render the vehicle more readily visible from the rear in the event of fog, snowfall, rainstorms or dust clouds;

(78) ‘reversing lamp’ means a device 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;

(79) ‘rear registration plate lamp’ means a device used to illuminate the space intended to accommodate the rear registration plate that consists of one or several optical elements;

(80) ‘retro-reflector’ means a device used to indicate the presence of a vehicle by the reflection of light emanating from a light source not connected to the vehicle, the observer being situated near that source, excluding retro-reflecting registration plates or speed limitation plates;

(81) ‘rear retro-reflector’ means a retro-reflector device used to indicate the presence of the vehicle when viewed from the rear;

(82) ‘side retro-reflector’ means a retro-reflector device used to indicate the presence of the vehicle when viewed from the side;

(83) ‘side marker lamp’ means a device used to indicate the presence of the vehicle when viewed from the side;

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(84) ‘reference axis’ means the characteristic axis of a device as stated in the component type-approval documentation for use as the direction of reference (H = 0°, V = 0°) for angles of field for photometric measurements and when fitting the lamp on the vehicle;

(85) ‘reference centre’ means the intersection of the reference axis with the light-emitting surface, the centre of reference being specified by the manufacturer of the lighting device;

(86) ‘geometric visibility’ means the angles which determine the square field in which the light-emitting surface of the lighting device is completely visible when the relevant angles (α vertical and β horizontal) are measured at the outward contour of the apparent surface and the lamp is observed from afar. However, if any obstacles is located within this field and partly obscuring the light-emitting surface, it may be accepted where it is proven that, even with such obstructions, the photometric values prescribed for the type-approval of the lighting device as component are complied with;

(87) ‘longitudinal median plane of the vehicle’ means the plane of symmetry of the vehicle or, if the vehicle is not symmetrical, the vertical longitudinal plane passing through the middle of the vehicle axles;

(88) ‘operating tell-tale’ means a visual, auditory or any other equivalent signal indicating that a lighting-device has been switched on and whether or not it is operating correctly;

(89) ‘closed-circuit tell-tale’ means a tell-tale indicating that a device has been switched on, but not indicating whether it is operating correctly or not;

(90) ‘type of vehicle with regard to rearward visibility’ means vehicles which do not differ in such essential respects as the dimensions and external shape of the vehicle as well as the number, location and design characteristics of the installed devices for indirect vision;

(91) ‘type of vehicle with regard to roll-over protection structure’ means vehicles which do not differ in such essential respects as the structure on the vehicle, the essential purpose of which is to mitigate or avoid risk of severe injury to the vehicle’s occupants resulting from a roll-over of the vehicle during normal use;

(92) ‘zone of clearance’ means the space occupied by a 50th percentile male manikin represented by the Hybrid III anthropomorphic test device in normal seating position on all seating positions;

(93) ‘type of vehicle with regard to safety belt anchorages and safety belts’ means vehicles which do not differ in such essential respects as the main vehicle construction and design characteristics as well as that of the safety belt anchorages and the number, location and configuration of fitted safety belts;

(94) ‘adjustment system’ means the device enabling the parts of the seat to be adjusted in order to achieve a seating position that is adapted to the occupant’s morphology, including longitudinal, vertical and/or angular adjustments;

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(95) ‘displacement system’ means an adjustment and locking system including a folding seatback fitted to seats in front of other seats, enabling passengers to access and exit from such rear seats when there are no doors adjacent to that rear seating row;

(96) ‘saddle’ means a seating position where the rider or passenger sits astride;

(97) ‘seat’ means a seating position which is not a saddle and which has a seat back offering support for the driver’s or passenger’s back;

(98) ‘seat back’ means a structural element behind the seating position’s R-point at a height of more than 450 mm measured from the vertical plane passing through the R-point against which the back of a seated person can rest completely;

(99) ‘50th percentile male manikin’ means a physical anthropomorphic test device possessing specified dimensions and masses or a virtual model, both representing the body of an average male human;

(100) ‘actual safety belt anchorage’ means a point of the vehicle structure or the seat structure or any other part of the vehicle to which a safety belt assembly is to be physically mounted;

(101) ‘effective safety belt anchorage’ means a clearly defined point in the vehicle which has sufficiently rigid properties as to change the routing, course and direction of a safety belt which is worn by the vehicle occupant and comprises of such point which is closest to that portion of the belt which is in actual and direct contact with the wearer;

(102) ‘front seating position’ means a single foremost seating position, which may be grouped in a row of several other seating positions;

(103) ‘rear seating position’ means a single seating position located fully behind the line of a front seating position and which may be grouped in a row of several seating positions;

(104) ‘torso reference line’ means the torso line as determined by the vehicle manufacturer for each seating position and established in accordance with Annex 3 to UNECE regulation No 17 ([1]);

(105) ‘torso angle’ means the angle between the vertical and the torso line;

(106) ‘design position’ means the position into which a device such as a seat can be adjusted so that all relevant settings correspond as closely as possible to a specified position;

(107) ‘ISOFIX’ means a system for the connection of child restraint systems to vehicles which has two vehicle rigid anchorages, two corresponding rigid attachments on the child restraint system and a means of limiting the pitch rotation of the child restraint system;

([1]) OJ L 230, 31.8.2010, p. 81.

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(108) ‘type of vehicle with regard to seating positions’ means vehicles which do not differ in such essential respects as the shape, location and number of seats or saddles;

(109) ‘5th percentile adult female manikin’ means a physical anthropomorphic test device possessing specified dimensions and masses or a virtual model, both representing the body of a small female human;

(110) ‘type of vehicle with regard to steer-ability, cornering properties and turn-ability’ means vehicles which do not differ in such essential respects as the design characteristics of the steering mechanism, reversing device and locking differentials, if such devices are fitted to the vehicle;

(111) ‘turning circle’ means the circle within which is located the projections onto the ground plane of all the points of the vehicle, excluding rear-view mirrors, when the vehicle is driven in a circle;

(112) ‘unusual vibration’ means a vibration which differs substantially from a normal and constant vibration, characterised by one or more unintended sharp increases of the amplitude of the vibration and leading to increased steering forces that are not constant and not predictable in nature;

(113) ‘type of vehicle with regard to the installation of tyres’ means vehicles which do not differ in such essential respects as the types of tyre, minimum and maximum tyre size designations, wheel dimensions and off-sets as well as speed and load capabilities suitable for fitment, and the characteristics of the fitted wheel guards;

(114) ‘wheel off-set’ means the distance from the hub abutment face to the centre line of the rim;

(115) ‘temporary-use spare unit’ means a unit with a tyre different from those to be fitted to the vehicle for normal driving conditions, but intended only for temporary use under restricted driving conditions;

(116) ‘maximum load rating’ means the mass which a tyre can carry when operated in conformity with requirements governing utilisation specified by the tyre manufacturer, expressed as a load capacity index number;

(117) ‘load capacity index’ means a number linked to the maximum load rating of the tyre and relating to the definition in paragraph 2.26 of UNECE regulation No 75 ([1]), paragraph 2.28 of UNECE regulation No 30 ([2]), paragraph 2.27 of UNECE regulation No 54 ([3]) and paragraph 2.28 of UNECE regulation No 106 ([4]);

([1]) OJ L 84, 30.3.2011, p. 46.
([2]) OJ L 307, 23.11.2011, p. 1.
([3]) OJ L 307, 23.11.2011, p. 2.
([4]) OJ L 257, 30.9.2010, p. 231.

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(118) ‘speed category symbol’ means the symbol defined in paragraph 2.28 of UNECE regulation No 75, paragraph 2.29 of UNECE regulation No 30, paragraph 2.28 of UNECE regulation No 54 and paragraph 2.29 of UNECE regulation No 106;

(119) ‘type of vehicle with regard to maximum speed limitation plate and its location on the vehicle’ means vehicles which do not differ in such essential respects as the maximum design vehicle speed and the material, orientation, and design characteristics of the maximum speed limitation plate;

(120) ‘virtually flat surface’ means a surface of solid material, with a radius of curvature of at least 5 000 mm;

(121) ‘vehicle type with regard to interior fittings and doors’ means vehicles which do not differ in such essential respects as the design characteristics of the vehicle’s interior fittings, number and location of seats and doors;

(122) ‘level of the instrument panel’ means the line defined by the points of contact of vertical tangents to the instrument panel or at the level of the horizontal plane coinciding with the R-point of the seating position of the driver where the latter is located higher than a tangent contact point in question;

(123) ‘contactable edges’ means edges which can be contacted by the surface of a testing apparatus and can consist of structures, elements or components located anywhere in the vehicle, including but not limited to the passenger compartment floor, sides, doors, windows, roof, roof pillars, roof ribs, sun visors, instrument panel, steering control, seats, head restraints, safety belts, levers, knobs, covers, compartments and lights;

(124) ‘door’ means any structure or material which has to be opened, displaced, folded, unzipped, slid away or manipulated in any other way in order for a person to enter or leave the vehicle;

(125) ‘door centre’ means the dimensional location in a vertical plane parallel to the longitudinal median plane of the vehicle which coincides with the centre of gravity of the door;

(126) ‘vehicle type with regard to maximum continuous rated or net power and/or vehicle speed limitation by design’ means vehicles which do not differ in such essential respects as the maximum continuous power output of the electric motor(s) and/or engine, the vehicle maximum design speed and the design characteristics of devices and methodology employed to effectively limit the vehicle’s achievable maximum speed and/or power output;

(127) ‘vehicle type with regard to structural integrity’ means vehicles which do not differ in such essential respects as the design characteristics of the mechanical connections, such as welds and threaded connections, as well as the frame, chassis and/or body of the vehicle and the manner in which it is secured.

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CHAPTER II

OBLIGATIONS OF MANUFACTURERS

Article 3

Fitting and demonstration requirements related to functional safety

1. Manufacturers shall equip L-category vehicles with systems, components and separate technical units affecting functional safety that are designed, constructed and assembled so as to enable the vehicle in normal use and maintained according to the prescriptions of the manufacturer to comply with the detailed technical requirements and testing procedures. In accordance with Articles 6 to 22, manufacturers shall demonstrate by means of physical demonstration testing to the approval authority that the L-category vehicles made available on the market, registered or entering into service in the Union comply with the functional safety requirements of Articles 18, 20, 22 and 54 to Regulation (EU) No 168/2013 and comply with the detailed technical requirements and test procedures laid down in this Regulation.

2. ►**M1** Manufacturers of parts and equipment ◄ shall demonstrate that spare parts and equipment that are made available on the market or are entering into service in the Union are approved in accordance with the requirements of Regulation (EU) No 168/2013, as specified by the detailed technical requirements and test procedures referred to in this Regulation. An approved L-category vehicle equipped with such a spare part or equipment shall meet the same functional safety test requirements and performance limit values as a vehicle equipped with an original part or equipment satisfying endurance requirements up to and including those set out in Article 22(2) of Regulation (EU) No 168/2013.

3. Manufacturers shall submit to the approval authority a description of the measures taken to prevent tampering with, and modification of, the powertrain management system, including the functional safety control computers.

Article 4

Application of UNECE regulations

1. The UNECE regulations and amendments thereto set out in Annex I to this Regulation shall apply to type approval.

2. References to vehicle categories L_1, L_2, L_3, L_4, L_5, L_6 and L_7 in the UNECE regulations shall be understood as references to vehicle categories L1e, L2e, L3e, L4e, L5e, L6e and L7e respectively under this Regulation, including any sub-categories.

3. Vehicles with a maximum design vehicle speed of ≤ 25 km/h shall meet all the relevant requirements of UNECE regulations applying to vehicles with a maximum vehicle design speed of > 25 km/h.

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Article 5

Technical specifications on functional safety requirements and test procedures

1. The functional safety performance test procedures shall be performed in accordance with the test requirements laid down in this Regulation.

2. The test procedures shall be carried out or witnessed by the approval authority or, if authorised by the approval authority, by the technical service.

3. The measurement methods and test results shall be reported to the approval authority in the test report format set out in Article 72(g) of Regulation (EU) No 168/2013.

Article 6

Requirements applying to audible warning devices

The test procedures and performance requirements applying to audible warning devices referred to in Annex II (B1) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with Annex II to this Regulation.

Article 7

Requirements applying to braking, including anti-lock and combined braking systems if fitted

The test procedures and performance requirements applying to braking, including anti-lock and combined braking systems if fitted, referred to in Annex II (B2) and Annex VIII to Regulation (EU) No 168/2013, shall be conducted and verified in accordance with the requirements laid down in Annex III to this Regulation.

Article 8

Requirements applying to electrical safety

The test procedures and performance requirements applying to electrical safety referred to in Annex II (B3) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex IV to this Regulation.

Article 9

Requirements applying to the manufacturers' declaration regarding endurance testing of functional safety critical systems, parts and equipment

The manufacturer's declaration regarding endurance testing of functional safety systems, parts and equipment referred to in Annex II (B4) to Regulation (EU) No 168/2013 shall comply with the requirements laid down in Annex V to this Regulation.

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Article 10

Requirements applying to front and rear protective structures

The test procedures and performance requirements applying to front and rear protective structures referred to in Annex II (B5) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex VI to this Regulation.

Article 11

Requirements applying to glazing, windscreen wipers and washers, and defrosting and demisting systems

The test procedures and performance requirements applying to glazing, windscreen wipers and washers, and defrosting and demisting systems referred to in Annex II (B6) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex VII to this Regulation.

Article 12

Requirements applying to driver-operated controls including identification of controls, tell-tales and indicators

The test procedures and performance requirements applying to driver-operated controls including identification of controls, tell-tales and indicators referred to in Annex II (B7) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex VIII to this Regulation.

Article 13

Requirements applying to the installation of lighting and light signalling devices, including automatic switching of lighting

The test procedures and performance requirements applying to the installation of lighting and light signalling devices, including automatic switching of lighting referred to in Annex II (B8) and Annex VIII to Regulation (EU) No 168/2013, shall be conducted and verified in accordance with the requirements laid down in Annex IX to this Regulation.

Article 14

Requirements applying to rearward visibility

The test procedures and measurements in order to test the relevant requirements applying to rearward visibility referred to in Annex II (B9) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex X to this Regulation.

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Article 15

Requirements applying to the roll-over protective structure

The test procedures and performance requirements applying to the roll-over protective structure referred to in Annex II (B10) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XI to this Regulation.

Article 16

Requirements applying to safety belt anchorages and safety belts

The test procedures and performance requirements applying to safety belt anchorages and safety belts referred to in Annex II (B11) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XII to this Regulation.

Article 17

Requirements applying to seating positions (saddles and seats)

The test procedures and performance requirements applying to seating positions (saddles and seats) referred to in Annex II (B12) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XIII to this Regulation.

Article 18

Requirements applying to steer-ability, cornering properties and turn-ability

The test procedures and performance requirements applying to steer-ability, cornering properties and turn-ability referred to in Annex II (B13) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XIV to this Regulation.

Article 19

Requirements applying to the installation of tyres

The test procedures and performance requirements applying to the installation of tyres referred to in Annex II (B14) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XV to this Regulation.

Article 20

Requirements applying to the maximum vehicle speed limitation plate and its location on the vehicle

The test procedures and performance requirements applying to the maximum vehicle speed limitation plate and its location on L-category

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vehicles referred to in Annex II (B15) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XVI to this Regulation.

Article 21

Requirements applying to vehicle occupant protection, including interior fittings and vehicle doors

The test procedures and performance requirements applying to vehicle occupant protection, including interior fittings and vehicle doors referred to in Annex II (B16) to Regulation (EU) No 168/2013, shall be conducted and verified in accordance with the requirements laid down in Annex XVII to this Regulation.

Article 22

Requirements applying to maximum continuous rated and/or net power and/or vehicle speed limitation by design

The test procedures and performance requirements applying to the limitation by design of maximum continuous total rated and/or net power and/or vehicle speed of L-category vehicles referred to in Annex II (B17) to Regulation (EU) No 168/2013 shall be conducted and verified in accordance with the requirements laid down in Annex XVIII to this Regulation.

Article 23

Requirements applying to vehicle structure integrity

The requirements applying to vehicle structure integrity referred to in Annex II (B18) and Annex VIII to Regulation (EU) No 168/2013 shall be complied with in accordance with the requirements laid down in Annex XIX to this Regulation.

CHAPTER III

OBLIGATIONS OF THE MEMBER STATES

Article 24

Type-approval of vehicles, systems, components and separate technical units

In accordance with Article 22 of Regulation (EU) No 168/2013 and with effect from the dates laid down in its Annex IV, national authorities shall, in the case of new vehicles that do not comply with Regulation (EU) No 168/2013 and the provisions of this Regulation, consider certificates of conformity to be no longer valid for the purposes of Article 43(1) of Regulation (EU) No 168/2013 and shall, on grounds relating to functional safety, prohibit the making available on the market, registration, or entry into service of such vehicles.

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CHAPTER IV

FINAL PROVISIONS

Article 25

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 1 January 2016.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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LIST OF ANNEXES

Annex number	Annex title
I	List of UNECE regulations which apply on a compulsory basis
II	Test procedures and performance requirements applying to audible warning devices
III	Requirements applying to braking, including anti-lock and combined braking systems
IV	Requirements regarding electrical safety
V	Requirements applying to manufacturers' declaration regarding endurance testing of functional safety critical systems, parts and equipment
VI	Requirements applying to front and rear protective structures
VII	Requirements applying to glazing, windscreen wipers and washers, and defrosting and demisting systems
VIII	Requirements applying to driver-operated controls including identification of controls, tell-tales and indicators
IX	Requirements applying to installation of lighting and light signalling devices, including automatic switching of lighting
X	Requirements regarding rearward visibility
XI	Requirements applying to roll-over protective structure (ROPS)
XII	Requirements applying to safety belt anchorages and safety belts
XIII	Requirements applying to seating positions (saddles and seats)
XIV	Requirements regarding steer-ability, cornering properties and turn-ability
XV	Requirements regarding the installation of tyres
XVI	Requirements applying to the vehicle maximum speed limitation plate and its location on the vehicle
XVII	Requirements regarding vehicle occupant protection, including interior fittings and vehicle doors
XVIII	Requirements regarding maximum continuous rated or net power and/or maximum vehicle speed limitation by design
XIX	Requirements regarding vehicle structure integrity

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ANNEX I

List of UNECE regulations which apply on a compulsory basis

UNECE regulation No	Subject	Series of amendments	OJ reference	Applicability
1	Headlamps for motor vehicles (R2, HS1)	02	OJ L 177, 10.7.2010, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
3	Retro-reflectors	Supplement 12 to the 02 series of amendments	OJ L 323, 6.12.2011, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
6	Direction indicators	Supplement 25 to the 01 series of amendments	OJ L 213, 18.7.2014, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
7	Front and rear position lamps and stop lamps	Supplement 23 to the 02 series of amendments	OJ L 285, 30.9.2014, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
8	Head lamps for motor vehicles (H1, H2, H3, HB3, HB4, H7, H8, H9, H11, HIR1, HIR2)	05	OJ L 177, 10.7.2010, p. 71.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
16	Safety belts, restraint systems and child restraint systems	Supplement 5 to the 06 series of amendments	OJ L 304, 20.11.2015, p. 1.	L2e, L4e, L5e, L6e and L7e
19	Front fog lamps	Supplement 6 to the 04 series of amendments	OJ L 250, 22.8.2014, p. 1.	L3e, L4e, L5e and L7e
20	Headlamps for motor vehicles (H4)	03	OJ L 177, 10.7.2010, p. 170.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
28	Audible warning devices	Supplement 3 to the 00 series of amendments	OJ L 323, 6.12.2011, p. 33.	L3e, L4e and L5e
37	Filament bulbs	Supplement 42 to the 03 series of amendments	OJ L 213, 18.7.2014, p. 36.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
38	Rear fog lamps	Supplement 15 to the 00 series of amendments	OJ L 4, 7.1.2012, p. 20.	L3e, L4e, L5e and L7e
39	Uniform provisions concerning the approval of vehicles with regard to the speedometer equipment including its installation	Supplement 5 to the original version of the Regulation	OJ L 120, 13.5.2010, p. 40.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
43	Safety glazing	Supplement 2 to the 01 series of amendments	OJ L 42, 12.2.2014, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
46	Devices for indirect vision (rear-view mirrors)	Supplement 1 to the 04 series of amendments	OJ L 237, 8.8.2014, p. 24.	L2e, L5e, L6e and L7e
50	Lighting components for vehicles of category L	Supplement 16 to the 00 series of amendments	OJ L 97, 29.3.2014, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
53	Installation of lighting (motorcycle)	Supplement 14 to the 01 series of amendments	OJ L 166, 18.6.2013, p. 55.	L3e

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UNECE regulation No	Subject	Series of amendments	OJ reference	Applicability
56	Headlamps for mopeds and vehicles treated as such	01	OJ L 89, 25.3.2014, p. 1.	L1e, L2e and L6e
57	Headlamps for motorcycles and vehicles treated as such	02	OJ L 130, 1.5.2014, p. 45.	L3e, L4e, L5e and L7e
60	Identification of controls tell-tales and indicators	Supplement 4 to the 00 series of amendments	OJ L 297, 15.10.2014, p. 23.	L1e and L3e
72	Headlamps for motorcycles and vehicles treated as such (HS1)	01	OJ L 75, 14.3.2014, p. 1.	L3e, L4e, L5e and L7e
74	Installation of lighting (moped)	►C2 Supplement 7 to the 01 series of amendments ◄	OJ L 166, 18.6.2013, p. 88.	L1e
75	Tyres	Supplement 13 to the 01 series of amendments	OJ L 84, 30.3.2011, p. 46.	L1e, L2e, L3e, L4e and L5e
78	Braking, including anti-lock and combined brake systems	Corrigendum 2 to the 03 series of amendments	OJ L 24, 30.1.2015, p. 30.	L1e, L2e, L3e, L4e and L5e
81	Rear-view mirrors	Supplement 2 to the 00 series of amendments	OJ L 185, 13.7.2012, p. 1.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
82	Headlamps for mopeds and vehicles treated as such (HS2)	01	OJ L 89, 25.3.2014, p. 92.	L1e, L2e and L6e
87	Daytime running lamps	Supplement 15 to the 00 series of amendments	OJ L 4, 7.1.2012, p. 24.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
90	Replacement brake lining assemblies and drum brake linings	02	OJ L 185, 13.7.2012, p. 24.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
98	Headlamps with gas-discharge light sources	Supplement 4 to the 01 series of amendments	OJ L 176, 14.6.2014, p. 64.	L3e
99	Gas-discharge light sources	Supplement 9 to the 00 series of amendments	OJ L 285, 30.9.2014, p. 35.	L3e
112	Headlamps with asymmetrical beams	Supplement 4 to the 01 series of amendments	OJ L 250, 22.8.2014, p. 67.	L1e, L2e, L3e, L4e, L5e, L6e and L7e
113	Headlamps with symmetrical beams	Supplement 3 to the 01 series of amendments	OJ L 176, 14.6.2014, p. 128.	L1e, L2e, L3e, L4e, L5e, L6e and L7e

Explanatory note: The fact that a component is included in this list does not make its installation mandatory. For certain components, however, mandatory installation requirements are laid down in other annexes to this Regulation.

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ANNEX II

Test procedures and performance requirements applying to audible warning devices

PART 1

Requirements applying to the component type-approval of a type of mechanical or electrical audible warning device intended to be fitted to vehicles of categories L1e, L2e and L6e

1. General requirements

1.1. Electrical audible warning devices shall emit a continuous, uniform sound and their sound spectrum shall not vary perceptibly during operation. In the case of warning devices supplied with an alternating current, this requirement applies solely at constant generator speed, that speed lying within the range specified in point 2.3.2.

1.2. Electrical audible warning devices shall have sound characteristics (spectral distribution of the sound energy, sound pressure level) and mechanical characteristics such that, in the order stated, they pass the tests specified in points 2 to 3.4.

1.3. Electrical audible warning devices may incorporate a feature enabling the device to operate at a significantly lower sound pressure level volume.

1.4. Mechanical audible warning devices shall be equipped with a thumb-operated lever, either of the puller bell type geared to rapidly rotate two loosely-slung metal discs inside the bell housing, or of the single stroke bell type.

2. Sound level measurements

2.1. Audible warning devices shall preferably be tested in an anechoic environment. They may alternatively be tested in a semi-anechoic chamber or in a cleared outside space. In this case, precautions shall be taken to avoid reflections off the ground in the measuring area, e.g. by providing a number of absorbent screens. It shall be checked that the spherical distortion is no more than 1 dB(A) within a hemisphere of a radius of at least 5 m up to the maximum frequency to be measured, this mainly being in the direction of measurement and at the height of the device and microphone. The ambient noise shall be at least 10 dB(A) lower than the sound pressure levels to be measured.

The device submitted for testing and the microphone shall be at the same height, which shall be between 1,15 and 1,25 m. The line of maximum sensitivity of the microphone shall coincide with the direction in which the sound level of the warning device is at its highest level.

The microphone shall be positioned such that its diaphragm is at a distance of 2 ± 0,01 m from the exit plane of the sound emitted by the device. In the case of devices with several exits, this distance shall be determined in relation to the exit plane closest to the microphone.

2.2. The measurements of the sound pressure level shall involve the use of a class-1 precision sound-level meter meeting the requirements of IEC publication No 651, first edition (1979).

All measurements shall be carried out using the ‘rapid’ time constant. The (A) weighting curve shall be used to measure the overall sound pressure levels.

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The Fourier transform of the sound signal shall be used in measuring the emitted-sound spectrum. Alternatively, third-octave filters meeting the requirements set out in IEC publication No 225, first edition (1966), may be used, in which case the sound pressure level within the 2 500 Hz centre-octave frequency band shall be determined by adding the quadratic means of the sound pressures in the third-octave bands of centre frequencies of 2 000, 2 500 and 3 150 Hz.

In all cases, only the Fourier transform method may be regarded as a reference method.

2.3. The electrical audible warning device shall be supplied with one of the following voltages, as appropriate:

2.3.1. In the case of audible warning devices receiving direct current, a test voltage of 6,5, 13,0 or 26,0 V, measured at the output side of the electricity source and corresponding to a nominal voltage of 6, 12 or 24 V respectively.

2.3.2. Where an audible warning device receives direct current which has to be supplied by an electrical generator of the type normally used with this type of device, the acoustic characteristics of the device shall be recorded at alternator speeds corresponding to 50 %, 75 % and 100 % of the maximum speed stated by the manufacturer of the alternator for continuous operation. The alternator shall be subject to no other electrical load during the test. The endurance test described in points 3 to 3.4 shall be carried out at a speed stated by the manufacturer of the equipment and selected from the range referred to above.

2.3.3. If a rectified current is used for the test on an audible warning device receiving direct current, the unsmoothed component of the voltage at its terminals, measured from peak to peak during operation of the warning device, shall not exceed 0,1 V.

2.3.4. The resistance of the electrical conductor for audible warning devices receiving direct current, including the resistance of the terminals and contacts, shall lie as close as possible to 0,05 Ω for a nominal voltage of 6 V, 0,10 Ω for a nominal voltage of 12 V and 0,20 Ω for a nominal voltage of 24 V.

2.4. The mechanical audible warning device shall be tested as follows:

2.4.1. The device to be tested shall be operated by a person or other external means, pushing the operating lever as recommended by the manufacturer. The presence of any operator shall have no noticeable influence on the test results. One measurement sequence consists of ten consecutive operations over the operating lever's full travel within 4 ± 0,5 s. Five sequences shall be carried out, each interrupted by a pause. The complete operation shall be carried out five times.

2.4.2. The A-weighted sound level shall be recorded for each of the 25 measurement sequences, shall be within 2,0 dB(A) and is averaged for the calculation of the final result.

2.5. The audible warning device shall be rigidly mounted, using the part or parts intended for that purpose by its manufacturer, on a support of a mass at least 10 times greater than that of the warning device to be tested and at least 30 kg. The support shall be arranged in such a way that the reflections off its walls and the vibrations have no significant effect on the results of the measurements.

2.6. Under the conditions set out above, the A-weighted sound level shall not exceed 115 dB(A) in case of electric audible warning devices and 95 dB(A) in case of mechanical audible warning devices.

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2.7. The sound pressure level within the 1 800 to 3 550 Hz frequency band of electric audible warning devices shall be higher than that of any frequency component above 3 550 Hz, and in any case at least 90 dB(A). The sound pressure level of mechanical audible warning devices shall be at least 80 dB(A).

2.8. The characteristics set out in points 2.6 to 2.7 shall also be displayed by any audible warning device that has been subjected to the endurance test provided for in points 3 to 3.4.

2.8.1. Any variation in voltage shall be between 115 % and 95 % of the rated value in the case of electrical audible warning devices receiving direct current, or between 50 % and 100 % of the maximum alternator speed stated by the manufacturer of the alternator for continuous operation in the case of electrical audible warning devices receiving alternating current.

2.9. The time lag between actuation and the moment when the sound reaches the minimum value as required in points 2.6 to 2.7 shall not exceed 0,2 seconds measured at an ambient temperature of 293 ± 5 K (20 ± 5 °C). This requirement applies, in particular, to pneumatic or electro-pneumatic warning devices.

2.10. Under the power supply conditions laid down by their manufacturers, pneumatic or electro-pneumatic warning devices shall yield the same acoustic performance as those required for normal electric audible warning devices.

2.11. The minimum value as required in points 2.6 to 2.7 shall be obtained for each component of a multi-tone device which may emit sound independently. The maximum overall sound level shall be achieved with all of the component parts operating at the same time.

3. Endurance test

3.1. The ambient temperature shall lie between 288 K and 303 K (15 °C and 30 °C).

3.2. The electrical audible warning device shall be supplied with the nominal voltage at the conductor resistance specified in points 2.3.1 to 2.3.4, while in compliance with point 2.8.1, and be operated 10 000 times at a rate of one second of being activated followed by four seconds of not being activated. During the test, the audible warning device shall be exposed to a forced wind or draught with a speed of 10 m/s ± 2 m/s.

3.2.1. If a test is conducted within an insulated chamber, that chamber shall be of sufficient volume to ensure normal dissipation of the heat given off by the warning device during the endurance test.

3.3. When half of the total number of operations required has been completed, the electrical audible warning device may be reset if the characteristics of the sound level have altered since before the test. When the total number of operations required has been completed, the audible warning device may again be reset and shall subsequently meet the requirements of the tests specified in point 2.8.

3.4. Four units of a type of mechanical audible warning device shall be subjected to the durability test. Each device shall be in new condition and shall not be lubricated during the test. It shall be activated 30 000 times over the full travel of the operating lever at a rate of 100 ± 5 operations per minute. The four devices shall then be subjected to a salt spray test according to EN ISO 9227:2012. Three out of the four units shall meet the requirements of the tests specified in point 2.8.

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PART 2

Requirements for the approval of a type of vehicle with regard to the audible warning

1. Fitting requirements

1.1. Vehicles of categories L1e-B, L2e and L6e shall be fitted with at least one electrical audible warning device which has been component type-approved pursuant to this Regulation or UNECE regulation No 28 ([1]).

1.2. Vehicles of category L1e-B with a maximum design vehicle speed ≤ 25 km/h and a maximum continuous rated or net power ≤ 500 W may alternatively be fitted with a mechanical audible warning device which has been component type-approved pursuant to this Regulation, in which case the requirements of points 2.1.1 to 2.1.7 are not applicable.

1.3. Vehicles of categories L3e, L4e and L5e shall meet all the relevant fitting requirements of UNECE regulation No 28.

1.3.1. In the absence of specific instructions, the term 'motor cycles' in that regulation shall be construed as referring to vehicles of categories L3e, L4e and L5e.

1.4. Vehicles of category L7e shall meet all the relevant fitting requirements of UNECE regulation No 28, as prescribed for vehicle category L5e.

1.5. In the absence of specific requirements in UNECE regulation No 28 and as provided in point 1.3 of Part 1, audible warning or additional devices installed on vehicles which are propelled by means of one or more electric motors may incorporate a feature enabling the device to be intermittently activated in such a way that it operates at a significantly lower sound pressure level than required for audible warning devices, emitting a continuous, uniform sound with a sound spectrum that does not vary perceptibly during operation, with the aim to for instance alert pedestrians about the vehicle approaching.

2. Performance requirements of installed electric audible warning devices.

2.1. For vehicles of categories L1e-B, L2e and L6e:

2.1.1 The test voltage shall be as laid down in points 2.3 to 2.3.2 in Part 1.

2.1.2. The sound pressure levels shall be measured under the conditions laid down in point 2.2 in Part 1.

2.1.3. The A-weighted sound pressure level emitted by the audible warning device(s) shall be measured at a distance of 7,0 m in front of the vehicle, the latter being placed on an open site, on ground as smooth as practicable and, if fitted with audible warning devices supplied with direct current, with its engine stopped.

2.1.4. The microphone of the measuring instrument shall be placed in the mean longitudinal plane of the vehicle.

([1]) OJ L 323, 6.12.2011, p. 33.

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2.1.5. The sound pressure level of the background noise and wind noise shall be at least 10 dB(A) below the sound to be measured.

2.1.6. The maximum sound pressure level shall be sought within the range of 0,5 and 1,5 m above the ground.

2.1.7. When measured under the conditions in points 2.1.1 to 2.1.5, the maximum sound level value as determined in point 2.1.6 shall be between 75 dB(A) and 112 dB(A).

2.2. Vehicles of categories L3e, L4e and L5e shall meet all the relevant performance requirements of UNECE regulation No 28.

2.2.1. In the absence of specific instructions, the term ‘motor cycles’ in that regulation shall be construed as referring to vehicles of categories L3e, L4e and L5e.

2.3. Vehicles of category L7e shall meet all the relevant performance requirements of UNECE regulation No 28, as prescribed for vehicle category L5e.

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ANNEX III

Requirements applying to braking, including anti-lock and combined braking systems

1. Requirements for the approval of a type of vehicle with regard to braking

1.1. Vehicles of categories L1e, L2e, L3e, L4e and L5e shall meet all the relevant requirements of UNECE regulation No 78.

1.1.1. Notwithstanding the requirements laid down in point 1.1, the provisions of points 1.1.1.1 to 1.1.1.3 apply for vehicles of category L1e with a mass in running order ≤ 35 kg which are equipped as follows:

1.1.1.1. In braking devices where the transmission is hydraulic, receptacles containing the reserve fluid shall be exempted from the requirements regarding ease of fluid-level checking of the UNECE regulation mentioned above.

1.1.1.2. For rim brakes, for the purposes of the special provisions relating to testing with wet brakes in the UNECE regulation mentioned above, the water shall be directed onto the part of the wheel rim providing the friction, with the nozzles positioned 10 to 30 mm to the rear of the brake blocks.

1.1.1.3. For vehicles with wheel rims widths of 45 mm or less (code 1.75), as regards braking performance with the front brake only when laden to its technically permissible maximum mass, the stopping distance or corresponding mean fully developed deceleration (MFDD) shall be as prescribed in the UNECE regulation mentioned above. If this requirement cannot be achieved because of limited adhesion between tyre and road surface, the stopping distance $S \leq 0{,}1 + V^2/115$ with corresponding mean fully developed deceleration 4,4 m/s^2 shall be applied for a test on a vehicle laden to its technically permissible maximum mass using both braking devices simultaneously.

1.1.2. For the approval of a type of vehicle, the provisions set out in Annex VIII to Regulation (EU) No 168/2013 on the mandatory fitting of advanced brake systems shall apply.

1.2. Vehicles of category L6e shall meet all the relevant requirements of UNECE regulation No 78, as prescribed for vehicle category L2e.

1.3. Vehicles of category L7e shall meet all the relevant requirements of UNECE regulation No 78, as prescribed for vehicle category L5e.

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ANNEX IV

Requirements regarding electrical safety

1. Requirements for the approval of a type of vehicle with regard to electrical safety

1.1. Vehicles which are propelled by means of one or more electric motors, including pure and hybrid electric vehicles, shall fulfil the requirements of this Annex.

2. General requirements concerning the protection against electrical shock and electrical safety applying to high voltage buses under conditions where they are not connected to external high voltage power supplies.

2.1. The protection against direct contact with live parts shall comply with the requirements set out below. The protections provided (e.g. solid insulator, barrier, enclosure) shall not be able of being opened, disassembled or removed without the use of tools.

The protection against access to live parts shall be tested in accordance with the provisions laid down in Appendix 3 — Protection against direct contacts of parts under voltage.

2.1.1. For protection of live parts inside the enclosed driving and passenger compartment as well as luggage compartment the protection degree IPXXD shall be met.

2.1.2. For protection of live parts in areas other than the enclosed driving and passenger compartment or luggage compartment, the protection degree IPXXB shall be met.

2.1.3. For protection of live parts of vehicles where no enclosed driving and passenger compartment is present, the protection degree IPXXD shall be met by the entire vehicle.

2.1.4. Connectors (including vehicle inlet) are deemed to meet the requirements if:

— they also comply with the protection degree IPXXB when separated without the use of tools;

— they are located underneath the vehicle floor and are provided with a locking mechanism (e.g. screw locking, bayonet locking);

— they are provided with a locking mechanism and other components shall first be removed with the use of tools in order to separate the connector; or

— the voltage of the live parts becomes ≤ DC 60 V or ≤ AC 30 V (rms) within one second after the connector is separated.

2.1.5. In case a service disconnect can be opened, disassembled or removed without the use of tools, the protection degree IPXXB shall be met under all these conditions.

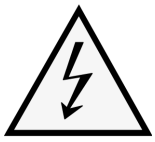
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2.1.6. Specific marking requirements

2.1.6.1. In the case of a REESS having high voltage capability, the symbol shown in Figure 4-1 shall be placed on or near the REESS. The symbol background shall be yellow, the bordering and the arrow shall be black.

Figure 4-1

Marking of high voltage equipment



2.1.6.2. The symbol shall in addition be placed on all enclosures and barriers, which when removed expose live parts of high voltage circuits. This provision is optional for connectors for high voltage buses and does not apply to any of the following cases:

— Where barriers or enclosures cannot be physically accessed, opened, or removed unless other vehicle components are removed with the use of tools; or

— Where barriers or enclosures are located underneath the vehicle floor.

2.1.6.3. Cables for high voltage buses which are not located fully within enclosures shall be identified by having an outer covering with the colour orange.

2.2. The protection against indirect contact with live parts shall comply with the requirements set out below.

2.2.1. Concerning protection against electrical shock which could arise from indirect contact, the exposed conductive parts, such as the conductive barrier and enclosure, shall be securely galvanically connected to the electrical chassis for instance by connections with electrical wire, ground cable, welds or by connections using bolts so that no dangerous electric potential can exist.

2.2.2. The resistance between all exposed conductive parts and the electrical chassis shall be lower than 0,1 Ω when there is current flow of at least 0,2 A. This requirement is deemed as satisfied if the galvanic connection has been established by welding.

2.2.3. In the case of vehicles intended to be connected to a grounded external electric power supply through a conductive connection, a device enabling the galvanic connection of the electrical chassis to the earth ground shall be provided.

The device shall enable connection to the earth ground before external voltage is supplied to the vehicle and shall retain this connection until after the exterior voltage is removed from the vehicle.

Compliance with these requirements may be demonstrated by using the connector specified by the vehicle manufacturer or by other analysis.

2.2.3.1. A galvanic connection of the electrical chassis to the earth ground does not need to be provided in the following cases:

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— the vehicle can only use a dedicated charger that is protected when any single isolation fault arises;

— the vehicle's whole metallic body is protected when any single isolation fault arises; or

— the vehicle cannot be charged without completely removing the traction battery pack from the vehicle.

2.3. Isolation resistance shall comply with the requirements set out below.

2.3.1. Concerning electric power trains consisting of separate DC or AC-buses:

If AC buses and DC buses are galvanically isolated from each other, isolation resistance between all high voltage busses and the electrical chassis shall have a minimum value of 100 Ω/V of the working voltage for DC buses, and a minimum value of 500 Ω/V of the working voltage for AC buses.

The measurements shall be conducted in accordance with the provisions laid down in Appendix 1 — Isolation resistance measurement method.

2.3.2. Concerning electric power train consisting of combined DC- and AC-buses:

If AC high voltage buses and DC high voltage buses are galvanically connected isolation resistance between all high voltage busses and the electrical chassis shall have a minimum value of 500 Ω/V of the working voltage.

However, if all AC high voltage buses are protected by one of the two following measures, isolation resistance between the high voltage bus and the electrical chassis shall have a minimum value of 100 Ω/V of the working voltage:

— double or more layers of solid insulators, barriers or enclosures that meet the requirements of points 2.1 to 2.1.6.3 independently, for example wiring harness; or

— mechanically robust protections that have sufficient durability over vehicle service life such as motor housings, electronic converter cases or connectors;

The isolation resistance between the high voltage bus and the electrical chassis may be demonstrated by calculation, measurement or a combination of both.

The measurement shall be conducted according to Appendix 1 — Isolation resistance measurement method.

2.3.3. Concerning Fuel cell vehicles:

If the minimum isolation resistance requirement cannot be maintained over time, then protection shall be achieved by any of the following:

— double or more layers of solid insulators, barriers or enclosures that meet the requirements of points 2.1 to 2.1.6.3 independently; or

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— on-board isolation resistance monitoring system together with a warning to the driver if the isolation resistance drops below the minimum required value. The isolation resistance between the high voltage bus of the coupling system for charging the REESS, which is not energised besides during charging the REESS, and the electrical chassis need not be monitored.

The correct functioning of the on-board isolation resistance monitoring system shall be tested as described in Appendix 2 — Confirmation method for function of on-board isolation resistance monitoring system.

2.3.4. Isolation resistance requirements for the coupling system for charging the REESS.

The vehicle inlet or the recharge cable when permanently connected to the vehicle, intended to be conductively connected to the grounded external AC power supply and the electrical circuit that is galvanically connected to the vehicle inlet/recharge cable during charging of the REESS, shall have an isolation resistance between the high voltage bus and the electrical chassis of at least 1,0 MΩ when the charger coupler is disconnected. During the measurement, the traction battery may be disconnected.

3. Requirements concerning the REESS

3.1. Protection in case of excessive current.

The REESS shall not overheat in case of excessive current or, if the REESS is prone to overheating due to excessive current, it shall be equipped with one or more protective devices such as fuses, circuit breakers and/or main contactors.

When applicable, the vehicle manufacturer shall supply relevant data and analysis proving that overheating from excessive current is prevented without the use of protective devices.

3.2. Prevention of accumulation of gas.

Places for containing open type traction battery that may produce hydrogen gas shall be provided with a ventilation fan or a ventilation duct or any other suitable means to prevent the accumulation of hydrogen gas. Vehicles with open type framework that do not allow accumulation of hydrogen gas at such places are not required to have a ventilation fan or a ventilation duct.

3.3. Protection against electrolyte spills.

Electrolyte shall not spill from the vehicle when the vehicle is tilted in any direction, leaned left or right against the ground or even when the REESS is put upside-down.

In case electrolyte is spilled from the REESS or its components due to other reasons, it shall not reach the driver nor any person on or around the vehicle during normal conditions of use, parked condition (i.e. also when the vehicle is parked on a slope) or any other normal functional operation.

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3.4. Accidental or unintentional detachment.

The REESS and its components shall be installed in the vehicle in such a way so as to preclude the possibility of inadvertent or unintentional detachment or ejection of the REESS.

The REESS and its components shall not be ejected when the vehicle is tilted in any direction, leaned left or right against the ground or even when the REESS is put upside-down

4. In-use safety requirements

4.1. Propulsion system power-on and power-off procedure

4.1.1. At the start-up, including system power-on, in order to select the active driving possible mode, at least two deliberate and distinctive actions shall be performed by the driver.

4.1.2. At least a momentary indication shall be given to the rider when the vehicle is switched in active driving possible mode, however, this provision does not apply under conditions where an internal combustion engine provides directly or indirectly the vehicle's propulsion power.

4.1.3. When leaving the vehicle, the rider shall be informed by a signal (e.g. optical or audible signal) if the vehicle is still in the active driving possible mode.

▼M1

4.1.4. If the on-board REESS can be externally charged by the driver, vehicle movement by its own propulsion system shall be impossible as long as the connector of the external electric power supply is physically connected to the vehicle inlet. For vehicles of category L1e with a mass in running order ≤ 35 kg vehicle movement by its own propulsion system shall be inhibited as long as the connector of the battery charger is physically connected to the external electric power supply. Compliance with this requirement shall be demonstrated by using the connector or battery charger specified by the vehicle manufacturer. In case of permanently connected charge cables, the requirement above is deemed to be met when use of the charge cable obviously prevents the use of the vehicle (e.g. cable is always routed over operator controls, rider's saddle, driver's seat, handle bar or steering wheel, or the seat covering the cable storage space needs to remain in open position).

▼B

4.1.5. If a vehicle is equipped with a drive direction control unit (i.e. reversing device) the state of this unit shall be identified to the rider.

4.1.6. It is permitted that only one action is required to deactivate the active driving possible mode or to complete the power-off procedure.

4.2. Driving with reduced power

4.2.1. Indication of reduced power

If the electric propulsion system is equipped with a means to automatically reduce the vehicle propulsion power (e.g. powertrain malfunction operating mode), significant reductions shall be indicated to the rider.

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4.2.2. Indication of low energy content of REESS

If the state of charge in the REESS has a significant impact on vehicle driving performance (i.e. acceleration and drivability, to be evaluated by the Technical Service together with the vehicle manufacturer), a low energy content shall be indicated to the rider by an obvious device (e.g. a visual or audible signal). The indication used for point 4.2.1 shall not be used for this purpose.

▼M1

4.3. Driving backwards

It shall not be possible to activate the vehicle reverse control function in an uncontrolled manner whilst the vehicle is in forward motion, insofar as such activation could cause a sudden and strong deceleration or wheel lock. However, it may be possible for the vehicle reverse control function to be activated in such a way that it may slow down the vehicle gradually.

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4.4. Determination of hydrogen emissions

4.4.1. This verification shall be carried out on all vehicle types equipped with open type traction batteries and all requirements shall be met.

4.4.2. Vehicles shall be equipped with on-board chargers. The tests shall be conducted following the method described in Annex 7 to UNECE regulation No 100 ([1]). The hydrogen sampling and analysis shall be the ones as prescribed, however, other analysis methods may be used provided that it can be demonstrated that these give equivalent results.

4.4.3. During a normal charge procedure under the conditions given in Annex 7 to UNECE regulation No 100, hydrogen emissions shall be < 125 g measured over 5 hours, or below $(25 \times t_2)$ (g) during t_2 (h).

4.4.4. During a charge carried out by an on-board charger presenting a failure (conditions given in Annex 7 to UNECE regulation No 100), hydrogen emissions shall be below 42 g. Furthermore the on-board charger shall limit this possible failure to 30 minutes.

4.4.5. All the operations linked to the REESS charging shall be controlled automatically, included the stop for charging.

4.4.6. It shall not be possible to manually override the charging phases.

4.4.7. Normal operations of connection and disconnection to the mains or power cuts shall not affect the control system of the charging phases.

4.4.8. Charging failures that can lead to a malfunction of the on-board charger during subsequent charging procedures shall be permanently signalled to the driver or clearly indicated to the operator about to commence a charging procedure.

4.4.9. Detailed instructions concerning the charging procedure and a statement of conformity to the requirements as set out in points 4.4.1 to 4.4.8 shall be included in the vehicle's instruction manual.

4.4.10. Test results obtained from other vehicle types common to those within the same family, in accordance with the provisions laid down in Appendix 2 of Annex 7 to regulation No 100, may be applied.

([1]) OJ L 57, 2.3.2011, p. 54.

▼B

Appendix 1

Isolation resistance measurement method for vehicle based test

1. General

The isolation resistance for each high voltage bus of the vehicle shall be measured or shall be determined by calculation using measurement values from each part or component unit of a high voltage bus (hereinafter referred to as the 'divided measurement').

2. Measurement method

The isolation resistance measurement shall be conducted by selecting an appropriate measurement method from among those listed in points 2.1 to 2.2, depending on the electrical charge of the live parts or the isolation resistance, etc.

The range of the electrical circuit to be measured shall be clarified in advance, using electrical circuit diagrams, etc.

Moreover, modification necessary for measuring the isolation resistance may be carried out, such as removal of the cover in order to reach the live parts, drawing of measurement lines, change in software, etc.

In cases where the measured values are not stable due to the operation of the on-board isolation resistance monitoring system, etc., necessary modification for conducting the measurement may be carried out, such as stopping of the operation of the device concerned or removing it. Furthermore, when the device is removed, it shall be proven, using drawings, etc., that it will not change the isolation resistance between the live parts and the electrical chassis.

Utmost care shall be exercised as to short circuit, electric shock, etc., for this confirmation might require direct operations of the high-voltage circuit.

2.1. Measurement method using voltage from off-vehicle sources

2.1.1. Measurement instrument

An isolation resistance test instrument capable of applying a DC voltage higher than the working voltage of the high voltage bus shall be used.

2.1.2. Measurement method

An insulator resistance test instrument shall be connected between the live parts and the electrical chassis. Then, the isolation resistance shall be measured by applying a DC voltage at least half of the working voltage of the high voltage bus.

If the system has several voltage ranges (e.g. because of boost converter) in galvanically connected circuit and some of the components cannot withstand the working voltage of the entire circuit, the isolation resistance between those components and the electrical chassis can be measured separately by applying at least half of their own working voltage with those component disconnected.

2.2. Measurement method using the vehicle's own REESS as DC voltage source

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2.2.1. Test vehicle conditions

The high voltage-bus shall be energised by the vehicle's own REESS and/or energy conversion system and the voltage level of the REESS and/or energy conversion system throughout the test shall be at least the nominal operating voltage as specified by the vehicle manufacturer.

2.2.2. Measurement instrument

The voltmeter used in this test shall measure DC values and shall have an internal resistance of at least 10 MΩ.

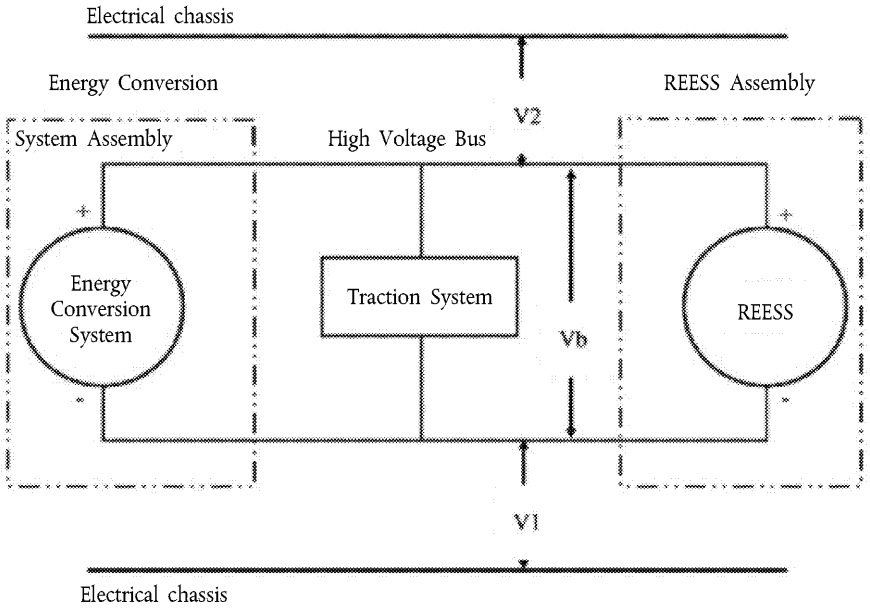
2.2.3. Measurement method

2.2.3.1. First step

The voltage is measured as shown in Figure 4-Ap1-1 and the high voltage bus voltage (Vb) is recorded. Vb shall be equal to or greater than the nominal operating voltage of the REESS and/or energy conversion system as specified by the vehicle manufacturer.

Figure 4-Ap1-1

Measurement of Vb, V1, V2



2.2.3.2. Second step

Measure and record the voltage (V1) between the negative side of the high voltage bus and the electrical chassis (see Figure 4-Ap1-1).

2.2.3.3. Third step

Measure and record the voltage (V2) between the positive side of the high voltage bus and the electrical chassis (see Figure 4-Ap1-1).

2.2.3.4. Fourth step

If V1 is greater than or equal to V2, insert a standard known resistance (Ro) between the negative side of the high voltage bus and the electrical chassis. With Ro installed, measure the voltage (V1') between the negative side of the high voltage bus and the electrical chassis (see Figure 4-Ap1-2).

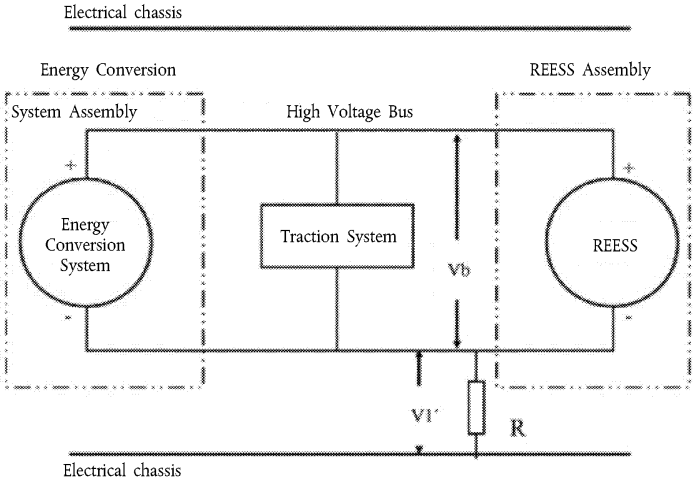
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Calculate the electrical isolation (Ri) according to the following formula:

$$Ri = Ro^{*}(Vb/V1' - Vb/V1) \text{ or } Ri = Ro^{*}Vb^{*}(1/V1' - 1/V1)$$

Figure 4-Ap1-2

Measurement of V1'



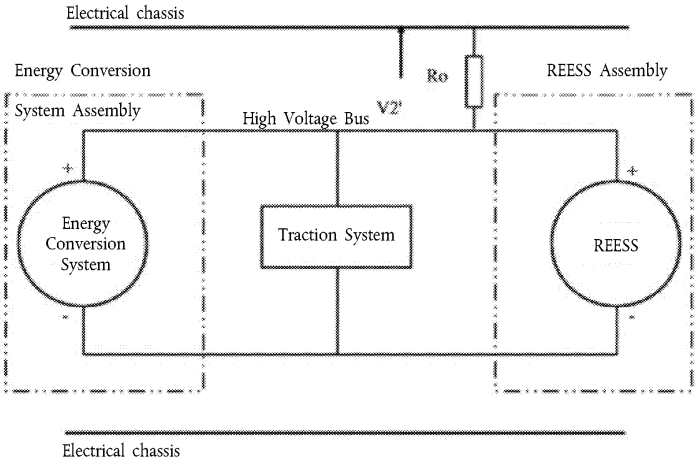
If V2 is greater than V1, insert a standard known resistance (Ro) between the positive side of the high voltage bus and the electrical chassis. With Ro installed, measure the voltage (V2') between the positive side of the high voltage bus and the electrical chassis (see Figure 4-Ap1-3). Calculate the electrical isolation (Ri) according to the formula shown. Divide this electrical isolation value (in Ω) by the nominal operating voltage of the high voltage bus (in V).

Calculate the electrical isolation (Ri) according to the following formula:

$$Ri = Ro^{*}(Vb/V2' - Vb/V2) \text{ or } Ri = Ro^{*}Vb^{*}(1/V2' - 1/V2)$$

Figure 4-Ap1-3

Measurement of V2'



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2.2.3.5. Fifth step

The electrical isolation value Ri (in Ω) divided by the working voltage of the high voltage bus (in volts) results in the isolation resistance (in Ω/V).

Note: The standard known resistance Ro (in Ω) should be the value of the minimum required isolation resistance (in Ω/V) multiplied by the working voltage of the vehicle plus/minus 20 per cent (in V). Ro is not required to be precisely this value since the equations are valid for any Ro; however, a Ro value in this range should provide good resolution for the voltage measurements.

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Appendix 2

Confirmation method for function of on-board isolation resistance monitoring system

1. The function of the on-board isolation resistance monitoring system shall be confirmed by the following method:

   Insert a resistor that does not cause the isolation resistance between the terminal being monitored and the electrical chassis to drop below the minimum required isolation resistance value. The warning shall be activated.

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Appendix 3

Protection against direct contacts of parts under voltage

1. Access probes

Access probes to verify the protection of persons against access to live parts are given in Table 4-Ap3-1.

2. Test conditions

The access probe is pushed against any openings of the enclosure with the force specified in Table 4-Ap3-1. If it partly or fully penetrates, it is placed in every possible position, but in no case shall the stop face fully penetrate through the opening.

Internal barriers are considered part of the enclosure

A low-voltage supply of ≥ 40 V and ≤ 50 V in series with a suitable lamp shall be connected, if necessary, between the probe and live parts inside the barrier or enclosure.

The signal-circuit method shall also be applied to the moving live parts of high voltage equipment.

Internal moving parts may be operated or otherwise repositioned slowly, where this is possible.

3. Acceptance conditions

The access probe shall not touch live parts.

If this requirement is verified by a signal circuit between the probe and live parts, the lamp shall not light up.

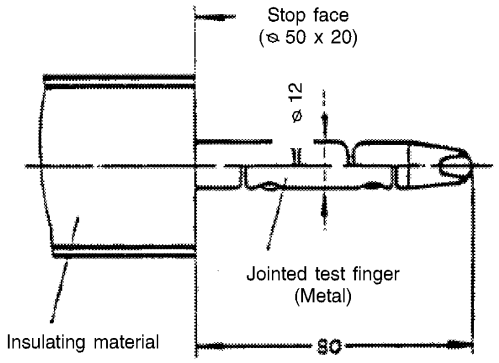
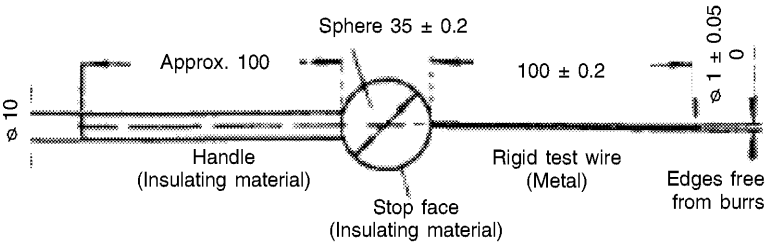
In the case of the test for IPXXB, the jointed test finger may penetrate to its 80 mm length, but the stop face (diameter 50 mm x 20 mm) shall not pass through the opening. Starting from the straight position, both joints of the test finger shall be successively bent through an angle of up to 90 degree with respect to the axis of the adjoining section of the finger and shall be placed in every possible position.

In case of the tests for IPXXD, the access probe may penetrate to its full length, but the stop face shall not fully penetrate through the opening.

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Table 4-Ap3-1

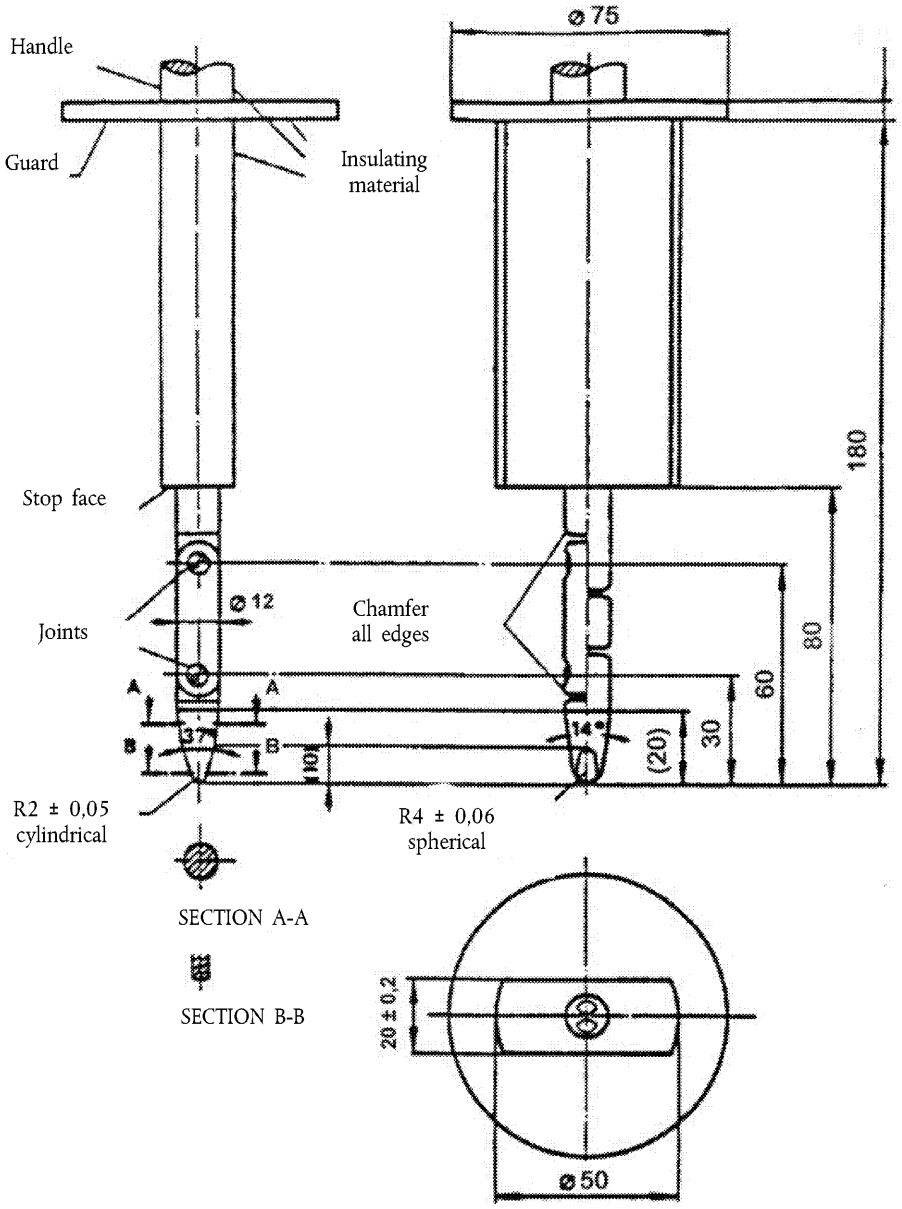
Access probes for the tests for protection of persons against access to hazardous parts

First numeral	Addit. letter	Access probe	Test force
2	B	Jointed test finger See Figure 4-Ap3-1 below for full dimensions  	10 N ± 10 %
4, 5, 6	D	Test wire 1,0 mm diameter 100 mm long  	1 N ± 10 %

▼B

Figure 4-Ap3-1

Jointed test finger



▼B

ANNEX V

Requirements applying to manufacturers' declaration regarding endurance testing of functional safety critical systems, parts and equipment

1. Requirements for the approval of a type of vehicle with regard to endurance testing

1.1. For the purpose of the statement in conformity with Article 22(2) of, and Annex VIII to, Regulation (EU) No 168/2013:

Vehicles and their systems, parts and equipment critical for functional safety shall be capable of withstanding use under normal conditions and when serviced in accordance with the manufacturer's recommendations, taking into account regular and scheduled maintenance and specific equipment adjustments carried out as per the clear and unambiguous instructions provided by the vehicle manufacturer in the instruction manual provided with the vehicle.

The normal use of a vehicle shall cover five years after first registration and a total distance travelled equal to 1,5 times the distance as specified in Annex VII to Regulation (EU) No 168/2013 in direct relation to the vehicle category in question and the emission stage (i.e. Euro level) according to which the vehicle is to be type-approved, however, the required distance shall not exceed 60 000 km for any vehicle category. Normal use does not include use under harsh conditions (e.g. extreme cold or heat) and road conditions inflicting damage to the vehicle due to its state of repair.

1.2. Type-approved tyres, replaceable light sources of lighting components and other consumable items are excluded from the endurance requirements.

1.3. The vehicle manufacturer is not obliged to surrender information such as a file containing proprietary information pertaining to company data concerning endurance testing procedures and other related internal practices.

1.4. The manufacturer's statement is without prejudice to its warranty obligations towards the owner of the vehicle.

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ANNEX VI

Requirements applying to front and rear protective structures

1. Requirements for the approval of a type of vehicle with regard to front and rear protective structures

1.1. If the requirements of UNECE regulation No 26 as regards the external projections have been applied to the entire vehicle, as provided through the relevant provisions of Annex II(C)(7) to Regulation (EU) 168/2013, the requirements of this Annex are deemed met.

1.2. If the requirements of UNECE regulation No 26 as regards the external projections have not been applied, or have been applied only partly to the vehicle as permitted through the relevant provisions of Annex II(C)(7) to Regulation (EU) 168/2013, the following requirements shall be met:

1.2.1. Vehicles of which the relevant front structure has been fully assessed in accordance with UNECE regulation No 26 are deemed to comply with the requirements on front protective structures.

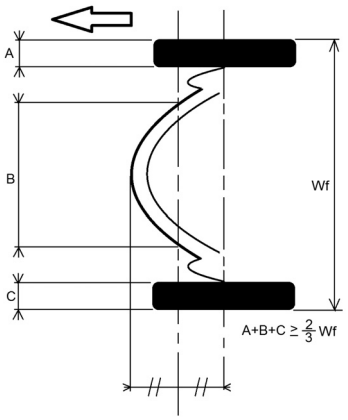
1.2.2. Vehicles with a single front wheel and of which the external projections forward of the front axle have been assessed by means of the testing device in accordance with the relevant provisions of Annex II(C)(7) to Regulation (EU) 168/2013, are deemed to comply with the requirements on front protective structures.

1.2.3. Vehicles with more than one front wheel and of which the relevant front structure has not been fully assessed in accordance with UNECE regulation No 26 shall meet the following requirements:

1.2.3.1. At least two thirds of the maximum width of the forward section of the vehicle, measured at the location of the front axle or in front of it, shall consist of vehicle structure forward of the transverse line which is halfway between the front axle and the foremost point of the vehicle (i.e. the relevant structure, see Figure 6-1). The location, in terms of height, of this structure is relevant only above the floor line and below 2,0 m.

Figure 6-1

Relevant structure of the forward section of the vehicle



Note: in this example the front tyres fall within the assessment zone and the respective widths are included in the overall compliant relevant structure.

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1.2.3.2. None of the vehicle structure forward of the line described in point 1.2.3.1 shall have pointed or sharp parts or projections which are directed outwards and which are likely to catch or significantly increase the severity of injuries or chance of lacerations to vulnerable road users in the event of a collision while the vehicle is being driven forward. The structure shall in any case exhibit no edges which can be contacted by a 100 mm sphere and which have a radius of curvature of less than 2,5 mm. Edges may however be blunted where their projection is less than 5,0 mm and there are no specific requirements for edges with a projection of less than 1,5 mm.

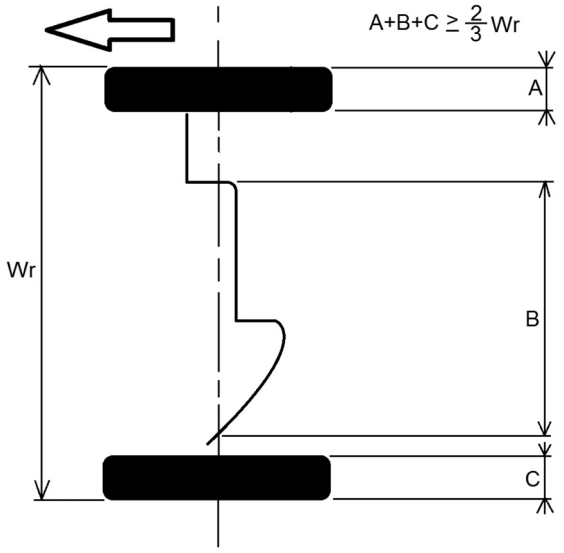
1.2.4. Vehicles which are not equipped with a device for reversing are exempted from the requirements on rear protective structures in points 1.2.5 to 1.2.6.2.1.

1.2.5. Vehicles which are equipped with a device for reversing and of which the relevant rear structure has been fully assessed in accordance with UNECE regulation No 26 are deemed to comply with the requirements applying to rear protective structures.

1.2.6. Vehicles which are equipped with a device for reversing and of which the relevant rear vehicle structure has not been fully assessed in accordance with UNECE regulation No 26 shall meet the following requirements:

1.2.6.1. At least two thirds of the width of the vehicle, as measured at the rear axle, shall consist of vehicle structure (i.e. the relevant structure, see Figure 6-2). The location, in terms of height, of this structure is relevant only above the floor line and below 2,0 m.

Figure 6.2



1.2.6.2. None of the structure rearward of the rear axle shall have pointed or sharp parts or projections which are directed outwards and which are likely to catch or significantly increase the severity of injuries or chance of lacerations to vulnerable road users in the event of a collision while the vehicle is being driven rearward. The structure shall in any case exhibit no edges which can be contacted by a 100 mm sphere and which have a radius of curvature of less than 2,5 mm. Edges may however be blunted where their projection is less than 5,0 mm and there are no specific requirements for edges with a projection of less than 1,5 mm.

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1.2.6.2.1. In case of vehicles of categories L2e-U, L5e-B, L6e-BU and L7e-CU, the edges which can be contacted by a 100 mm sphere shall at least be blunted when their projection is 1,5 mm or more.

1.3. If the material hardness is measured upon request of the technical service, the measurement shall be taken with the material as installed on the vehicle. Where it is impossible to carry out such a measurement correctly, the technical service may accept alternative assessment methods.

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ANNEX VII

Requirements applying to glazing, windscreen wipers and washers, and defrosting and demisting systems

PART 1

Requirements for the approval of a type of vehicle with regard to glazing

1. Fitting requirements.

1.1. Vehicles shall be fitted only with safety glazing.

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1.1.1. All safety glazing fitted to the vehicle shall be type-approved in accordance with UNECE regulation No 43 ([1]).

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

1.1.3. Plastic windscreens which are fitted to vehicles without bodywork and which are not supported at the top are not deemed to be safety glazing and are exempted from the requirements laid down in this Annex.

1.1.3.1. By way of derogation to Article 2(5) and for the purpose of this Annex, a vehicle is deemed to have bodywork if there are structural elements such as A-pillars or a rigid frame around the windscreen, in combination with other possible elements such as side doors, side windows and/or a roof creating an enclosed or partly enclosed compartment and the technical service shall provide clear justification for the judgment criteria in the test report.

2. Specific provisions

2.1. Vehicles of category L shall meet all the relevant requirements set out in Annex 21 to UNECE regulation No 43, as prescribed for vehicle category M_1.

2.1.1. Points 4.2.1.2 and 4.2.2.2 of Annex 21 to UNECE regulation No 43 shall not apply. Instead, flexible-plastic glazing bearing the approval mark ‘IX’ may be fitted as safety glazing other than windscreens.

2.1.2. Rigid plastic safety glazing, provided that it is type-approved and bears the approval mark ‘VIII /A/L’ or ‘X /A/L’, may be fitted as a windscreen on vehicles of categories L1e, L2e, L3e, L4e and L5e.

2.1.3. Vehicles of categories L5e-B, L6e-B and L7e-C shall be fitted with a windscreen forming a part of the enclosed driving and passenger compartment.

PART 2

Requirements for the approval of a type of vehicle with regard to windscreen wipers and washers

1. Fitting requirements

1.1. All vehicles fitted with a windscreen made from safety glazing shall be equipped with a windscreen wiper system that can function when the vehicle master control switch has been activated, without any action by

([1]) OJ L 42, 12.2.2014, p. 1.

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the driver other than switching on the operating control for starting and stopping the windscreen wiper system.

1.1.1. The windscreen wiper system shall consist of one or more wiper arms with wiper blades that are easily replaceable and can be cleaned manually. Wiper arms shall be fitted in such a way that they can be folded away from the windscreen.

1.1.2. The windscreen wiper field shall cover at least 90 % of vision area A, as determined in accordance with Appendix 1.

1.1.2.1. The windscreen wiper field shall meet the requirements when the system is operating at a sweep frequency corresponding to point 1.1.3. The windscreen wiper field shall be assessed under the conditions set out in points 2.1.10 to 2.1.10.3.

1.1.3. The windscreen wiper shall have a sweep frequency of at least 40 cycles per minute, to be attained under the conditions specified in points 2.1.1 to 2.1.6 and 2.1.8.

1.1.4. The windscreen wiper system shall be capable of operating for two minutes on a dry windscreen without deterioration of performance.

1.1.4.1. The performance of the windscreen wiper system on a dry windscreen shall be tested under the conditions set out in point 2.1.11.

1.1.5. The windscreen wiper system shall be capable of withstanding stalling for at least 15 seconds. The use of automatic circuit protection devices is allowed, provided that no action is required for possible resetting other than operation of the windscreen wiper operating control.

1.1.5.1. The capability of withstanding stalling shall be tested under the conditions set out in point 2.1.7.

1.2. All vehicles fitted with a windscreen made from safety glazing shall be fitted with a windscreen washer system that can function when the vehicle master control switch has been activated and is capable of withstanding the loads and pressures resulting when the nozzles are plugged and the system is actuated according to the procedure set out in points 2.2.1.1 to 2.2.1.1.2.

1.2.1. The performance of the windscreen washer system shall not be adversely affected by exposure to the temperature cycles referred to in points 2.2.1 to 2.2.3.1.

1.2.2. The windscreen washer system shall be capable of spraying fluid onto the target area of the windscreen without any trace of leakage, disconnection of any tubing and malfunctioning of any nozzle, at normal conditions when subjected to ambient temperatures between 255 K and 333 K (– 18 °C and 60 °C). In addition, when the nozzles are blocked, the system shall show no signs of leakage and disconnection of any tubing.

1.2.3. The windscreen washer system shall be capable of delivering sufficient fluid to clear at least 60 % of vision area A, as determined in accordance with Appendix 1, under the conditions set out in points 2.2.5 to 2.2.5.4.

1.2.4. The windscreen washer system shall be capable of being activated manually by means of the washer control. In addition, activation and deactivation of the system may be coordinated and combined with any other vehicle system.

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1.2.5. The capacity of the reservoir containing the liquid shall not be less than 1,0 litre.

1.2.6. A windscreen washer system which has been approved as a separate technical unit in accordance with Commission Regulation (EU) No 1008/2010 ([1]) may be installed, provided that the provisions of point 2.2.6 are complied with.

2. Test procedure

2.1. Windscreen wiper system test conditions.

2.1.1. The tests described below shall be carried out under the conditions stated in points 2.1.2 to 2.1.5 unless specified otherwise.

2.1.2. The ambient temperature shall be between 278 K and 313 K (5 °C and 40 °C).

2.1.3 The windscreen shall be kept constantly wet.

2.1.4. Electric windscreen wiper systems shall meet the following additional conditions:

2.1.4.1. All batteries shall be fully charged at the start of the test.

2.1.4.2. The engine, if fitted, shall run at a speed not exceeding 30 % of the speed corresponding to its maximum power output. However, if this is proven not to be practicable due to specific engine control strategies, for instance in the case of electric hybrid vehicles, a realistic scenario shall be determined, taking into account the engine speeds and periodical or complete absence of a running engine during normal driving conditions. If the windscreen wiper system can meet the requirements without a running engine, the engine does not have to run at all.

2.1.4.3. The passing beam headlamps shall be switched on.

2.1.4.4. All fitted heating, ventilation, defrosting and demisting systems (regardless of their location in the vehicle) shall be operating at maximum electrical consumption.

2.1.5. Compressed air or vacuum operated windscreen wiper systems shall be capable of functioning continuously at the prescribed sweep frequencies whatever the engine speed and engine load or minimum and maximum battery charge levels specified by the manufacturer for normal operation.

2.1.6. The sweep frequency of the windscreen wiper system shall comply with the requirements of point 1.1.3 after a preliminary operating time of 20 minutes on a wet windshield.

2.1.7. The requirements of point 1.1.5 shall be satisfied when the wiper arms are restrained in a position corresponding to half a cycle, for a period of 15 seconds with the windscreen wiper control set at the maximum sweep frequency.

2.1.8. The outer face of the windscreen shall be thoroughly degreased by means of methylated spirit or an equivalent degreasing agent. After drying, a solution of ammonia of not less than 3 % and not more than 10 % shall be applied. The surface shall be allowed to dry again and then be wiped with a dry cotton cloth.

([1]) OJ L 292, 10.11.2010, p. 2.

▼B

2.1.9. A coating of the test mixture, complying with the specifications laid down in Appendix 2, shall be applied uniformly to the outer surface of the windscreen and allowed to dry.

2.1.9.1. Where the outer face of the windscreen has been prepared in accordance with points 2.1.8 and 2.1.9, the windscreen washer system may be used during the relevant tests.

2.1.10. The wiper field of the windscreen wiper system, as prescribed in point 1.1.2, shall be determined as follows:

2.1.10.1. The outer face of the windscreen shall be treated in accordance with points 2.1.8 and 2.1.9.

2.1.10.2. In order to verify that the requirements of point 1.1.2 are met, the windscreen wiper system shall be activated, taking into account point 2.1.9.1, and a trace of the wiper field shall be made and compared with a trace of vision area A, as determined in accordance with Appendix 1.

2.1.10.3. The technical service may agree to an alternative test procedure (e.g. virtual testing) to verify that the requirements of point 1.1.2 are met.

2.1.11. The requirements of point 1.1.4 shall be satisfied under the conditions of point 2.1.2. The vehicle shall be prepared for operation under the conditions set out in points 2.1.4 to 2.1.5. During the test, the wiper system shall operate normally, but at the maximum sweep frequency. The wiper field does not have to be observed.

2.2. Windscreen washer system test conditions.

2.2.1. Test No 1: The windscreen washer system shall be filled with water, fully primed and placed in an ambient temperature of 293 ± 2 K (20 ± 2 °C) for a minimum of four hours. The water shall be stabilised at this temperature.

2.2.1.1. All nozzle outlets shall be plugged and the windscreen washer control shall be actuated six times in one minute, each time for at least three seconds.

2.2.1.1.1 If the windscreen washer system is powered by the muscular energy of the driver, the force applied shall be 11,0 to 13,5 daN if a hand-operated washer pump is used, or 40,0 to 44,5 daN if a foot-operated washer pump is used.

2.2.1.1.2. Where electric washer pumps are used, the test voltage shall not be less than the rated voltage and not more than the rated voltage plus 2 Volt.

2.2.1.2. The performance of the windscreen washer system at the end of the test shall be in compliance with point 1.2.2.

2.2.2. Test No 2. The windscreen washer system shall be filled with water, fully primed, and placed in an ambient temperature of 255 ± 3 K (– 18 ± 3 °C) for a minimum of four hours, ensuring that all the water contained in the device is frozen. The device is then exposed to an ambient temperature of 293 ± 2 K (20 ± 2 °C) until the ice has completely melted.

2.2.2.1. The performance of the windscreen washer system shall then be verified by actuating the system in accordance with points 2.2.1.1 to 2.2.1.2.

▼B

2.2.3. Test No 3. The windscreen washer system shall be filled with water of a temperature of 333 ± 3 K (60 ± 3 °C).

2.2.3.1. The performance of the windscreen washer system shall then be verified by actuating the system in accordance with points 2.2.1.1 to 2.2.1.2.

2.2.4. The windscreen washer system tests set out in points 2.2.1 to 2.2.3.1 shall be carried out in sequence on the same windscreen washer system. The system may be tested either as installed on the vehicle type for which EC type-approval is sought, or separately.

2.2.5. Test No 4: Windscreen washer system capability test

2.2.5.1. The windscreen washer system shall be filled with water and fully primed. With the vehicle stationary and no significant wind effect, the nozzle(s) may, if possible, be adjusted so as to point towards the target area on the outer face of the windscreen.

2.2.5.2. The outer face of the windscreen shall be treated as prescribed in points 2.1.8 and 2.1.9.

2.2.5.3. The windscreen washer system shall be actuated according to the manufacturer's instructions, taking into account points 2.2.1.1.1 and 2.2.1.1.2. The total duration of the test shall not exceed 10 complete cycles of automatic operation of the windscreen wiper system operating at the maximum sweep frequency.

2.2.5.4. In order to verify that the requirements of point 1.2.3 are met, a trace of the relevant cleaned area shall be made and compared with a trace of vision area A, as determined in accordance with Appendix 1. If it is clear to the observer that the requirements are met, the traces do not have to be prepared.

2.2.6. Where a type-approved separate technical unit is installed on the vehicle, in accordance with point 1.2.6, only the test set out in points 2.2.5 to 2.2.5.4 needs to be carried out on the windscreen washer system.

▼B

Appendix 1 to Part 2

Procedure for determining vision areas on windscreens of vehicles

Vision area A is established in accordance with Annex 18 to UNECE regulation 43.

▼B

Appendix 2 to Part 2

Specifications of the mixture for testing the windscreen wiper and washer systems

The test mixture referred to in point 2.1.9 of Part 2 shall comply with Appendix 4 to Annex III to Regulation (EU) No 1008/2010.

▼B

Appendix 3 to Part 2

Procedure for verification of the R-point or seating reference point

The R-point or seating reference point is established in accordance with Annex 3 to UNECE regulation No 17.

▼B

Appendix 4 to Part 2

Procedure for determining primary reference marks in the three-dimensional reference system

The dimensional relationships between primary reference marks on drawings and their position on the vehicle are established in accordance with Annex 4 to UNECE regulation No 125 ([1]).

([1]) OJ L 200, 31.7.2010, p. 38.

▼B

PART 3

Requirements for the approval of a type of vehicle with regard to defrosting and demisting systems

1. Fitting requirements

1.1. All vehicles fitted with a windscreen made from safety glazing, except vehicles of categories L2e and L6e as well as any vehicles not fitted with side doors capable of covering the door aperture by at least 75 %, either as standard or optional equipment, shall be equipped with a system for removing frost and ice from the exterior glazed surface of the windscreen and removing mist from the interior glazed surface of the windscreen. The windscreen defrosting and demisting system shall be effective enough to ensure adequate visibility through the windscreen in cold weather.

1.1.1. Vehicles with a maximum power not exceeding 15 kW shall meet all the relevant requirements of UNECE regulation No 122 ([1]), as prescribed for vehicle category M_1.

1.1.2. Vehicles with a maximum power exceeding 15 kW shall meet all the relevant requirements of Commission Regulation (EU) No 672/2010 ([2]), as prescribed for vehicle category M_1.

1.2. However, if the windscreen is fitted in such a way that no vehicle structure attached to the windscreen extends rearwards for more than 100 mm, with any detachable or retractable door or roof installed and in the closed position, the defrosting and demisting system is not required.

([1]) OJ L 164, 30.6.2010, p. 231.
([2]) OJ L 196, 28.7.2010, p. 5.

▼B

ANNEX VIII

Requirements applying to driver-operated controls including identification of controls, tell-tales and indicators

1. Requirements for the approval of a type of vehicle with regard to identification of controls, tell-tales and indicators

1.1. Identification of controls, tell-tales and indicators

1.1.1. Vehicles of categories L1e-B and L3e shall meet all the relevant requirements of UNECE regulation No 60 except those in Annex 3 to that regulation. The requirements of points 1.1.1.1 and 1.1.1.2 shall also be taken into account.

▼M1

1.1.1.1. It shall be ensured that no deviations in the shape and orientation of the provided symbols are permitted, notably that any customised appearance of the provided symbols shall be prohibited.

1.1.1.2. Small irregularities concerning line thickness, the marking application and other relevant production tolerances shall be accepted, as provided in paragraph 4 of ISO 2575:2010/Amd1:2011 (design principles).

▼B

1.1.2. Vehicles of category L4e shall meet all the relevant requirements in points 1.1.1 to 1.1.1.2 for vehicle category L3e.

1.1.3. Vehicles of categories L2e, L5e, L6e and L7e shall meet the requirements of point 2 to 2.2.1.6 or, alternatively, the relevant requirements of UNECE regulation No 121 ([1]), as prescribed for vehicle category M_1.

1.2. Speedometer and odometer

1.2.1. Vehicles with a maximum design vehicle speed exceeding 25 km/h shall be fitted with a speedometer as well as an odometer.

1.2.1.1. Vehicles of categories L1e, L2e, L3e, L4e and L5e fitted with a speedometer shall meet all the relevant requirements of UNECE regulation No 39.

1.2.1.2. Vehicles of category L6e fitted with a speedometer shall, in the absence of specific requirements for vehicles of that category, meet all the relevant requirements of UNECE regulation No 39, as prescribed for vehicle category L2e.

1.2.1.3. Vehicles of category L7e fitted with a speedometer shall, in the absence of specific requirements for vehicles of that category, meet all the relevant requirements of UNECE regulation No 39, as prescribed for vehicle category L5e.

1.2.2. Explanatory notes to UNECE regulation No 39

1.2.2.1. The technical service may accept an increased temperature range of 296 ± 15 K (23 ± 15 °C) instead of the range stated in point 5.2.3 of UNECE regulation No 39 if it can be demonstrated that the speedometer equipment is not sensitive to such temperature variations (e.g. with digital displays).

([1]) OJ L 177, 10.7.2010, p. 290.

▼B

2. Specific requirements

2.1. Controls, tell-tales and indicators fitted to the vehicle and listed in point 2.1.10 shall comply with the requirements regarding location, identification, colour and illumination. For functions for which no symbol is provided in this Regulation, the manufacturer may use a symbol following the appropriate ISO 6727:2012 or 2575:2010/Amd1:2011 standards. Where no ISO symbol is available, the manufacturer may use a symbol of its own conception. In any case, such symbol shall not cause confusion with any prescribed symbol.

2.1.1. The symbols shall stand out clearly against the background.

2.1.1.1. Contrasting colours shall be used to comply with the requirements of point 2.1.1.

2.1.2. The symbols shall be placed on the control or control tell-tale to be identified, or in immediate proximity thereof. Where this is not possible, the symbol and control or tell-tale shall be joined by a continuous dash that is as short as possible.

▼M1

2.1.3. It shall be ensured that no deviations in the shape and orientation of the provided symbols are permitted, notably that any customised appearance of the provided symbols shall be prohibited.

Small irregularities concerning line thickness, the marking application and other relevant production tolerances shall be accepted, as provided in paragraph 4 of ISO 2575:2010/Amd1:2011 (design principles).

▼B

2.1.4. If necessary for clarity, supplementary symbols may be used in conjunction with any symbol as specified, provided that they do not cause confusion with any symbol specified in this Regulation.

2.1.5. At the manufacturer's discretion, any control or indicator as well as their identifications may be capable of being illuminated at any time.

2.1.6. A tell-tale shall not emit light except when identifying the malfunction or vehicle condition it is designed to indicate or during a functional check (e.g. bulb check).

2.1.7. Means shall be provided to ensure that tell-tales and their identification are visible and recognisable under all driving conditions.

2.1.7.1. When illuminated, tell-tales and their associated identifying symbols shall be perfectly visible and recognisable under all ambient lighting conditions.

2.1.8. When used for optical tell-tales, the following colours shall have the meanings indicated:

— red: danger to persons or very serious damage to equipment is immediate or imminent,

— yellow: outside normal operating limits, vehicle system malfunction, damage to vehicle likely, or other condition which may produce hazard in the longer term (caution),

— green: safety, normal operating condition (except if blue or yellow is required).

▼B

The mandatory colours are given in point 2.1.10. It shall be verified that no inappropriate colour is used for tell-tales even if fitted cumulatively (e.g. red for normal cruise control operation or for ‘sport’ mode).

2.1.9. If colour coding is used to identify the limits of the adjustment range of a temperature function (e.g. passenger compartment heating system), the hot limit shall be identified by the colour red and the cold limit by the colour blue. If the status or limit of a function is shown by an indicator separated from and not adjacent to the control for that function, both the control and the indicator shall be independently identified with the appropriate symbol.

2.1.10. Designation and identification of symbols:

Figure 8-1

Driving beam (main-beam) headlamp (control / tell-tale)

Tell-tale colour: blue

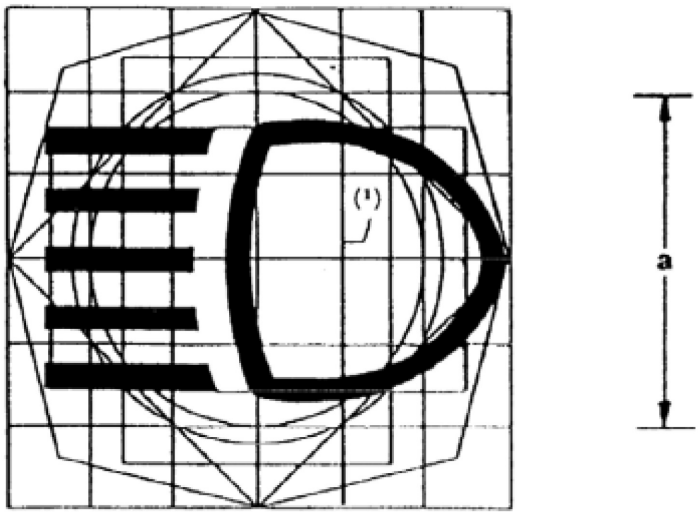
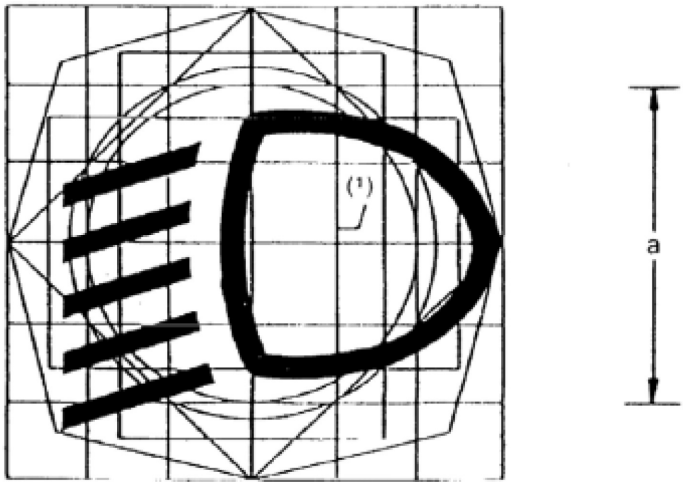


Figure 8-2

Passing beam (dipped-beam) headlamp (control / tell-tale)

Tell-tale colour: green

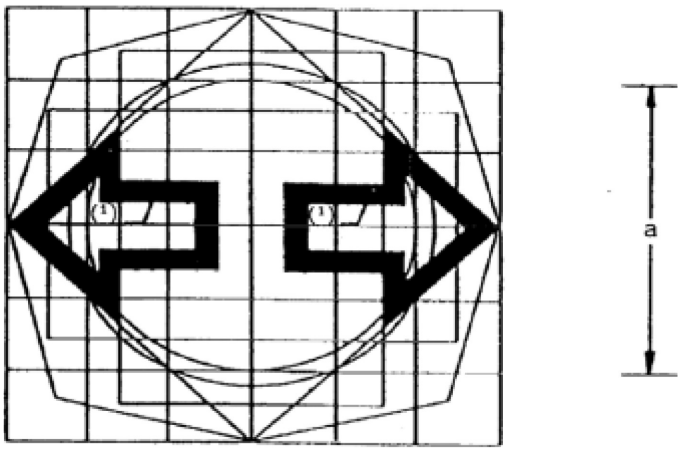


▼B

Figure 8-3

Direction indicator (control / tell-tale)

Tell-tale colour: green



Note: if there are separate tell-tales for the left and right direction indicators, the two arrows may also be used independently.

Figure 8-4

Hazard warning signal (control / tell-tale)

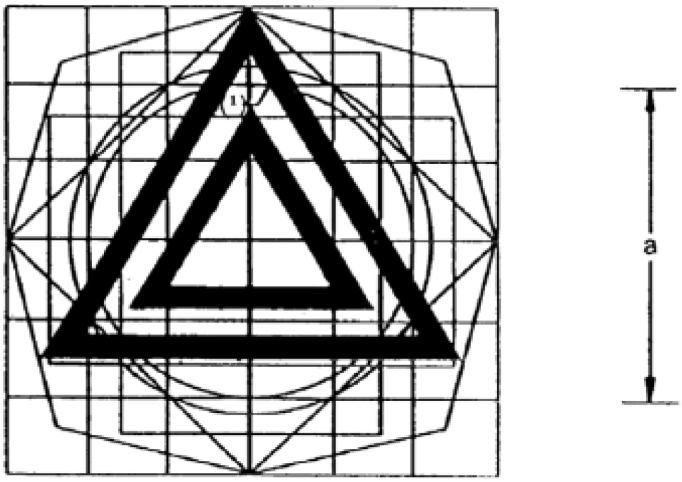
Two possibilities:

— Identifying signal (Figure 8-4),

Tell-tale colour: red

or

— Simultaneous operation of the separate direction indicator tell-tales (Figure 8-3), provided that these normally operate independently (see Note below Figure 8-3).



▼B

Figure 8-5

Manual choke (control / tell-tale)

Tell-tale colour: yellow

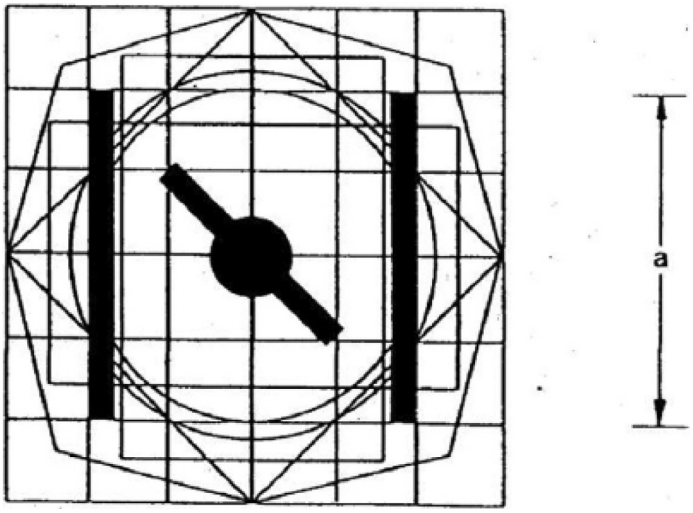
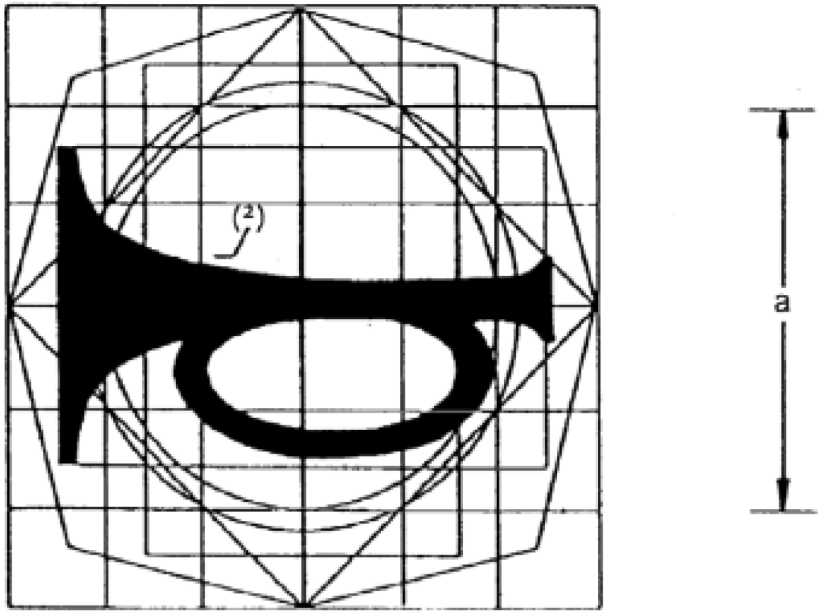


Figure 8-6

Electrical audible warning device (control)



Note: if more than one symbol is provided on the control(s), the supplementary symbol(s) may be mirrored. If the control is located directly on a steering wheel, the requirements of point 2.1.1.1 do not apply.

▼B

Figure 8-7

Fuel level (indicator/tell-tale)

Tell-tale colour: yellow

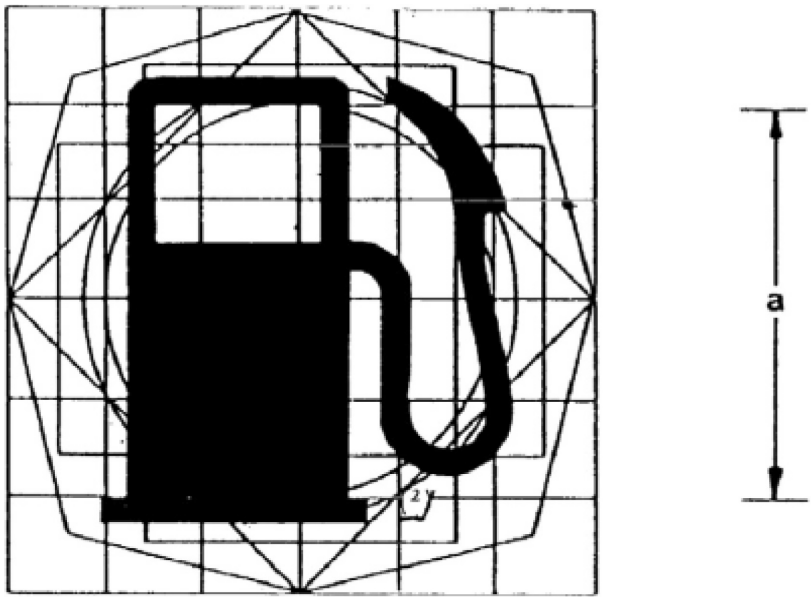
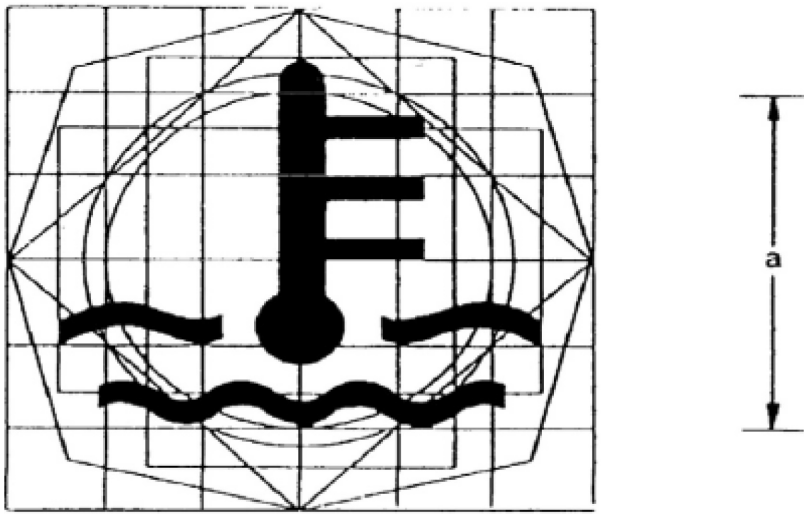


Figure 8-8

Engine coolant temperature (indicator/tell-tale)

Tell-tale colour: red



▼B

Figure 8-9

Battery charge (indicator/tell-tale)

Tell-tale colour: red

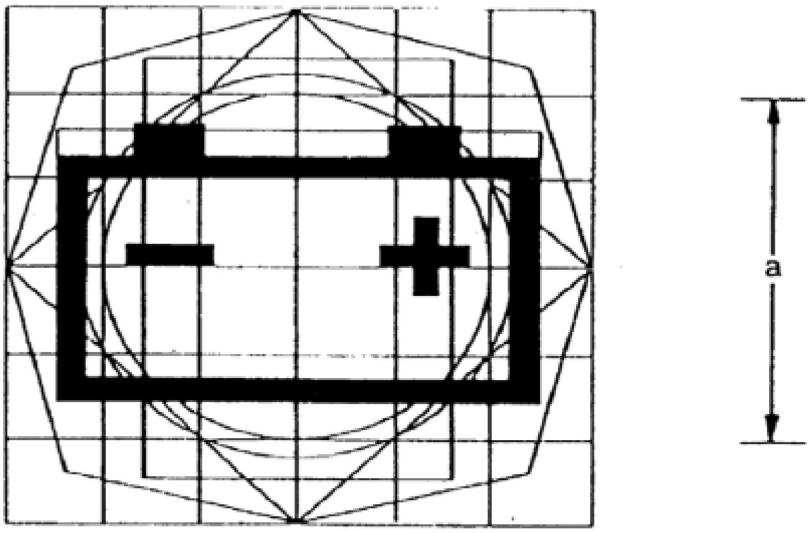
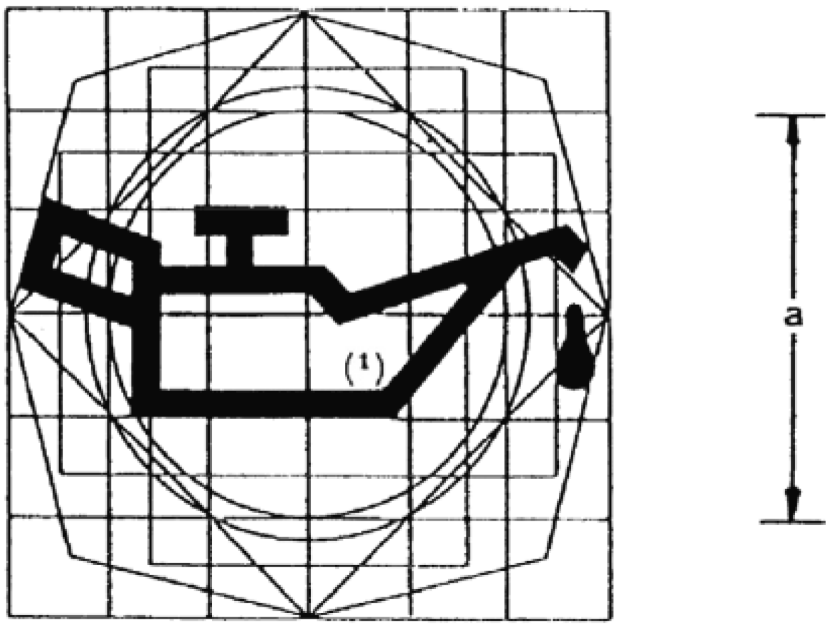


Figure 8-10

Engine oil (indicator/tell-tale)

Tell-tale colour: red



▼B

Figure 8-11

Front fog lamp (control/tell-tale)

Tell-tale colour: green

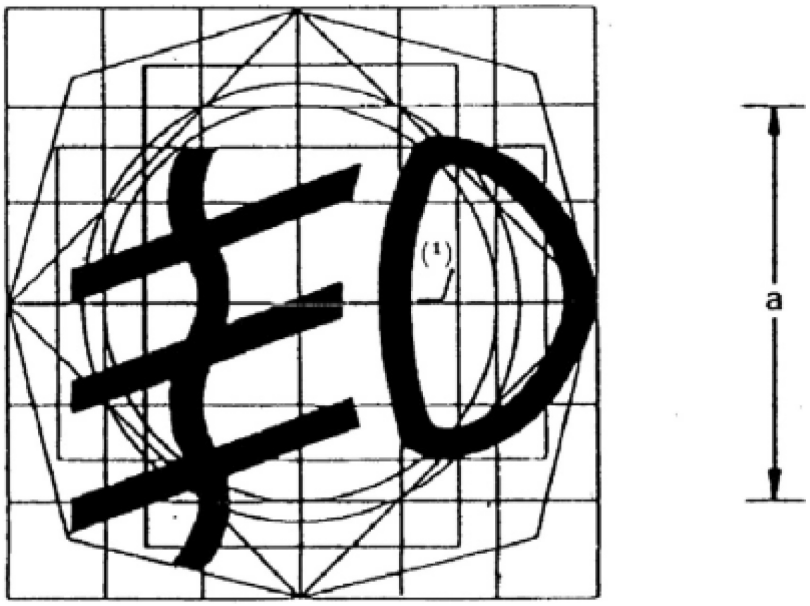


Figure 8-12

Rear fog lamp (control/tell-tale)

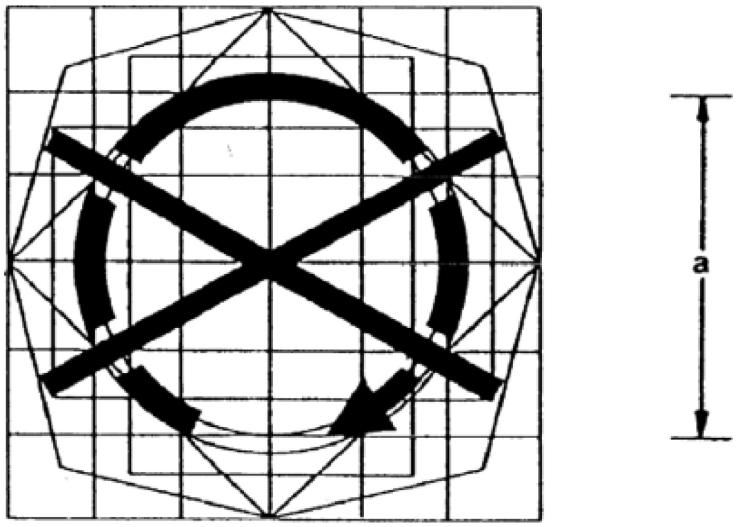
Tell-tale colour: yellow



▼B

Figure 8-13

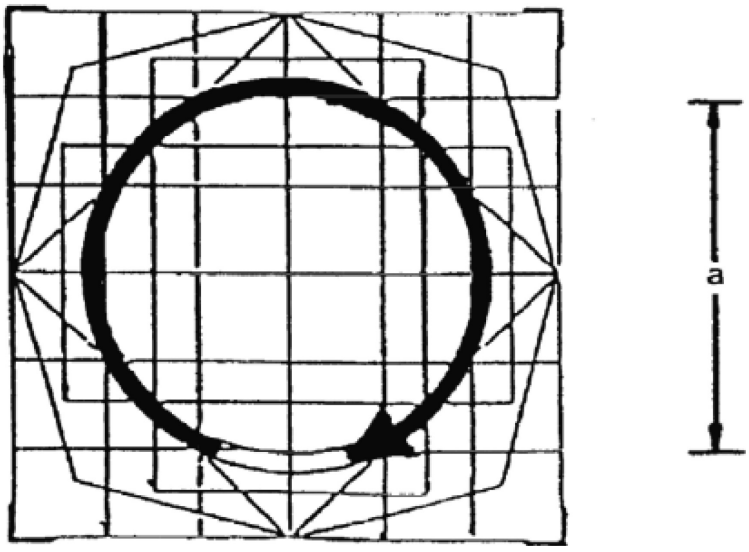
Vehicle master control switch, engine ignition, supplemental engine cut-off (control)



Note: position ‘off’ — identification is not required for switches physically integrated with protective devices acting on the vehicle steering (steering lock).

Figure 8-14

Vehicle master control switch, engine ignition, supplemental engine cut-off (control)



Note: position ‘on’ or ‘run’ — identification is not required for switches physically integrated with protective devices acting on the vehicle steering (steering lock).

▼B

Figure 8-15

Lighting switch (control/tell-tale)

Tell-tale colour: green

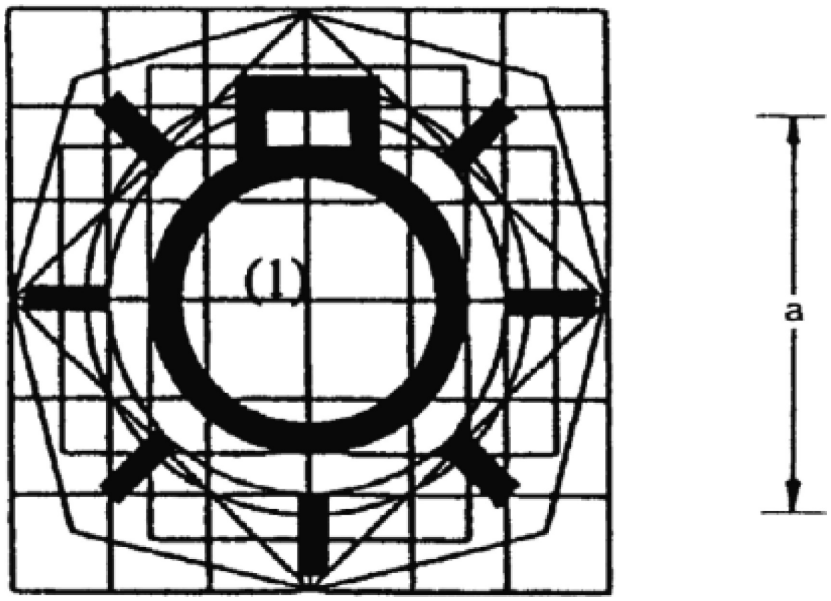
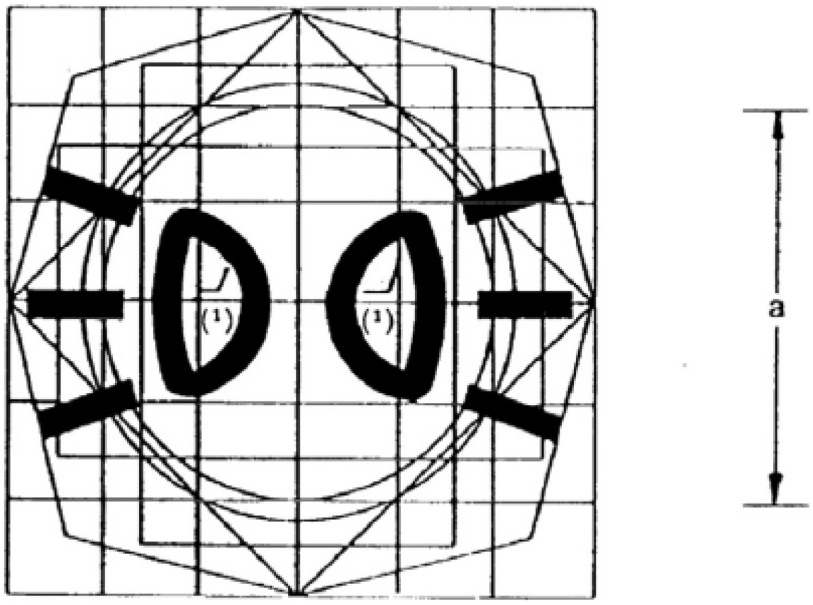


Figure 8-16

Position (side) lamps (control/tell-tale)

Tell-tale colour: green



Note: if this function does not have a separate control or tell-tale, it may be identified by the symbol shown in Figure 8-15.

▼B

Figure 8-17

Parking lamps (control)

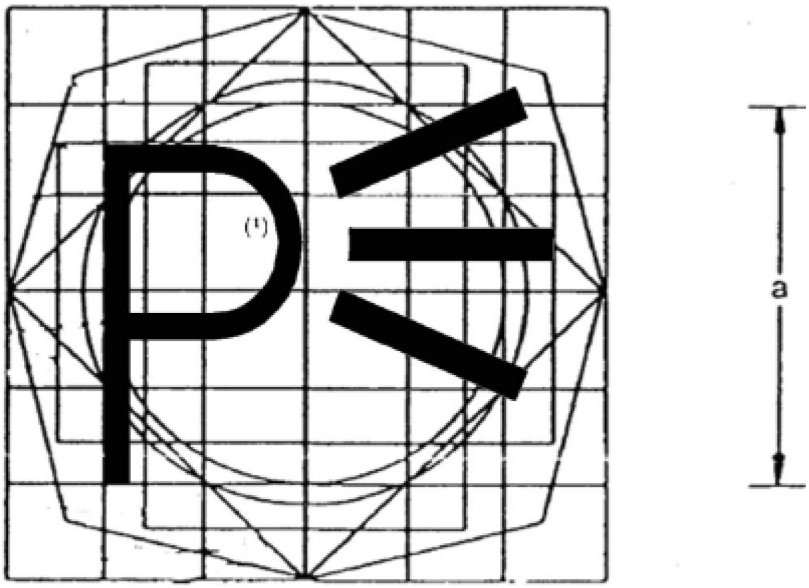
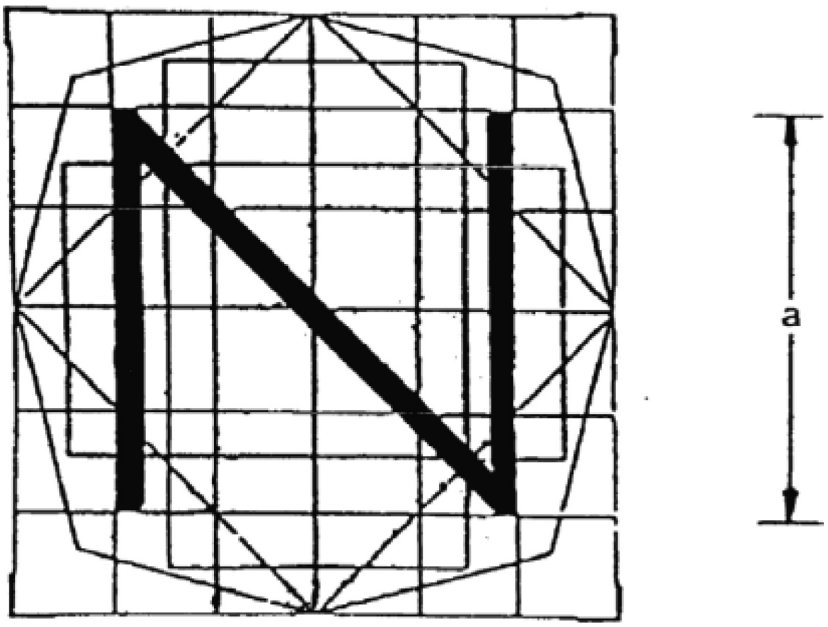


Figure 8-18

Neutral indication (tell-tale)

Tell-tale colour: green



Note: gear box in neutral.

▼B

Figure 8-19

Electric engine starter (control)

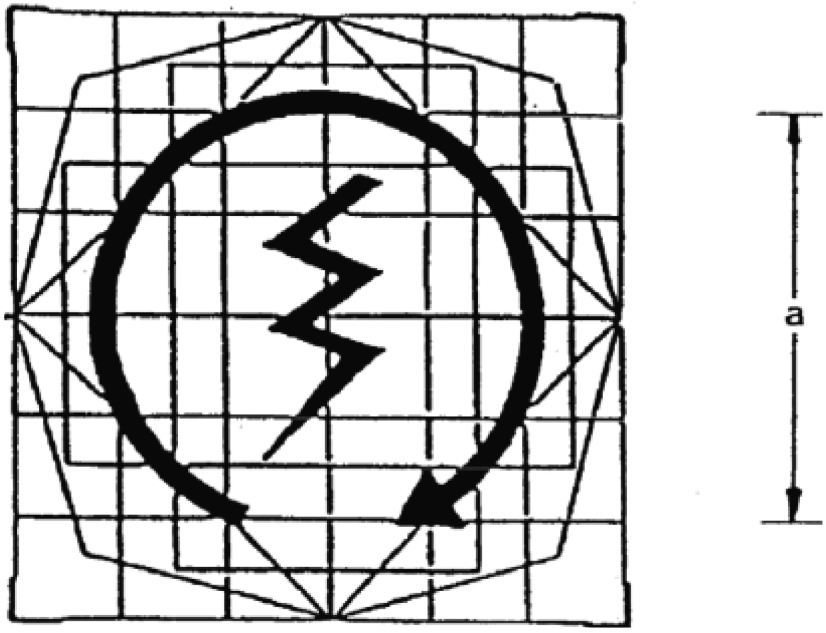
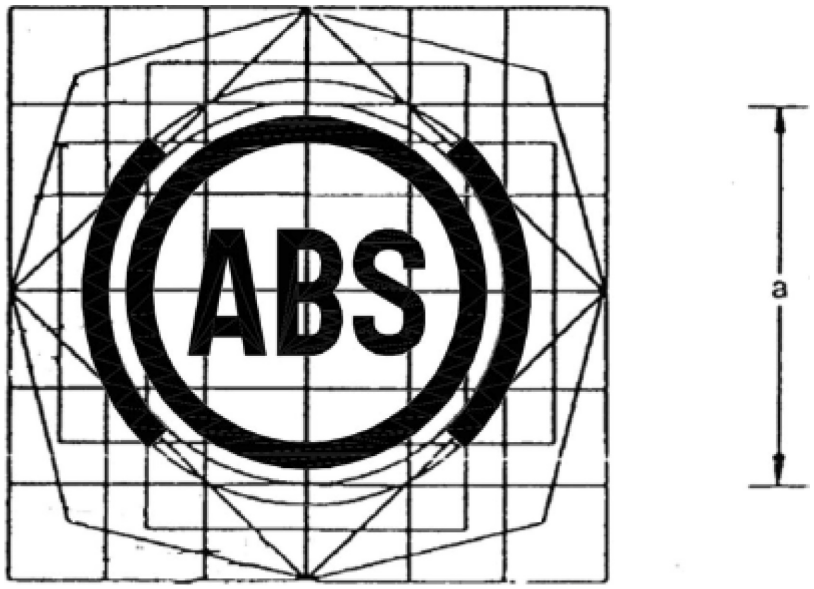


Figure 8-20

Anti-lock Brake System malfunction (tell-tale)

Tell-tale colour: yellow

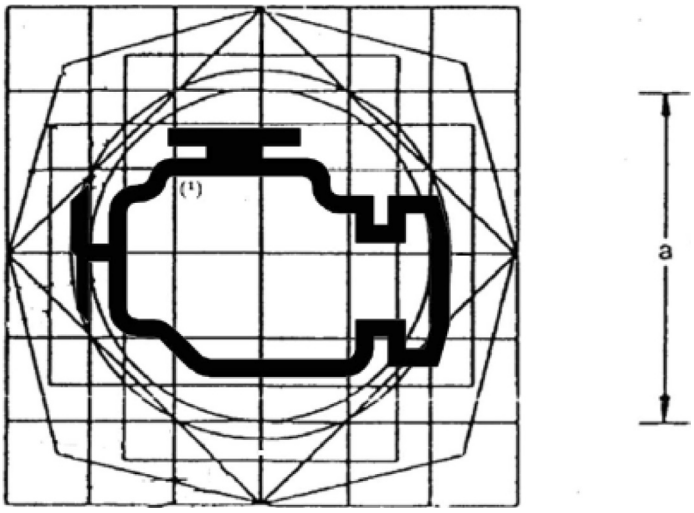


▼B

Figure 8-21

Malfunction indicator lamp (tell-tale)

Tell-tale colour: yellow



Note: shall be used to convey power-train related failures which may affect emissions.

Explanatory notes:

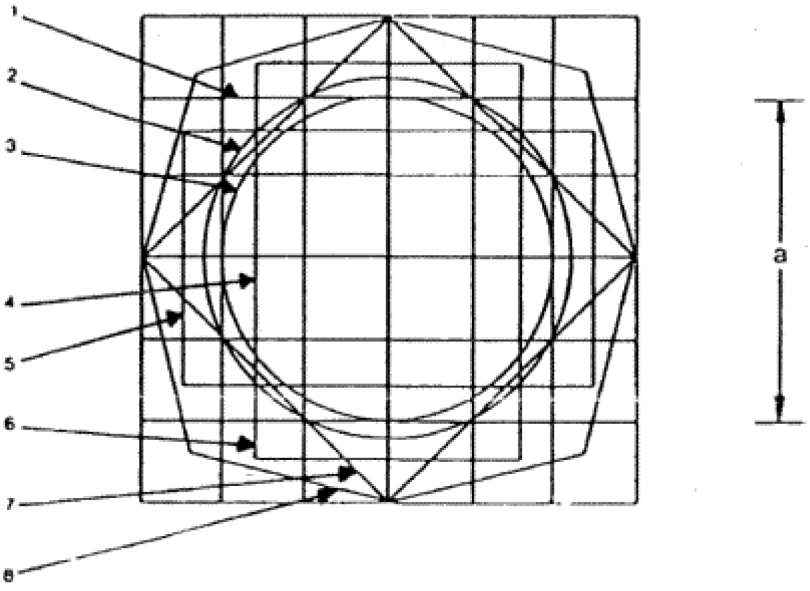
([1]) The framed areas may be solid.

([2]) The dark part of this symbol may be replaced by its silhouette.

2.1.11. The model base provided in Figure 8-22 shall be used.

Figure 8-22

Structure of the model base for the symbols referred to in point 2.1.10



▼B

The model base consists of:

(1) a base 50 mm square, this dimension being equal to nominal dimension ‘a’ in the original;

(2) a base circle 56 mm in diameter having approximately the same area as the base square (1);

(3) a second 50 mm-diameter circle is drawn within the base square (1);

(4) a second square the tips of which lie on the base circle (2) and the sides of which are parallel to those of the base square (1);

(5) and (6) two rectangles having the same area as the base square (1), their sides being at right angles to each other and each of them devised so as to divide the opposite sides of the base square into symmetrical points;

(7) a third square the sides of which pass through the points of intersection of the base square (1) and the base circle (2) and are inclined at 45°, thus providing the greatest horizontal and vertical dimensions of the model base;

(8) an irregular octagon formed by lines inclined at 30° to the sides of the square (7).

The base model is laid upon a grid the lower side of which measures 12,5 mm and coincides with the base square (1).

2.2. Common space for displaying multiple information.

2.2.1. A common space may be used to show information from any source, provided that the following requirements are met:

2.2.1.1. The tell-tales and indicators displayed in the common space shall meet the requirements of points 2.1 to 2.1.11 and shall light up at the initiation of the condition they are designed to identify.

2.2.1.2. The tell-tales and indicators listed in point 2.1.10 and shown in the common space shall light up at the initiation of any underlying condition.

2.2.1.3. Except as provided in points 2.2.1.4 to 2.2.1.6, when the condition exists for actuation of two or more tell-tales, the information shall be either:

— repeated automatically in sequence,

or

— indicated by visible means and capable of being selected for viewing by the driver when seated in the driving position.

2.2.1.4. The tell-tales for any braking system malfunction, headlamp driving beam and direction indicator shall not be shown in the same common space.

2.2.1.5. If any of those tell-tales are displayed in a common space with other tell-tales, their activation shall take precedence over that of anything else in the common space.

2.2.1.6. It shall not be possible to deactivate the braking system malfunction, headlamp driving beam and direction indicator tell-tales, or any other red tell-tale, when the condition for their activation still exists. It may be possible for other information displayed in a common space to be cancelled automatically or by the driver.

▼B

ANNEX IX

Requirements applying to installation of lighting and light signalling devices, including automatic switching of lighting

1. Requirements for the approval of a type of vehicle with regard to installation of lighting

1.1. Vehicles of category L1e shall meet all the relevant requirements of UNECE regulation No 74 ([1]). The requirements of points 1.8 to 1.12 shall also be taken into account.

1.1.1. Vehicles of category L1e-B shall, in the absence of uniform requirements in UNECE regulation No 74, always be fitted with a rear registration plate lamp.

1.1.2. Vehicles of category L1e may, in the absence of specific requirements in UNECE regulation No 74, be fitted with daytime running lamps which are activated instead of automatically switched-on headlamps and which comply with the requirements set out in points 2.3.4 to 2.3.4.7 below.

1.1.3. Vehicles of category L1e-A may alternatively to the requirements laid down in points 1.1 to 1.1.2 be fitted with all the following devices: a headlamp emitting white light towards the front when the vehicle is in motion, a rear position lamp emitting red light towards the rear when the vehicle is in motion, amber side retro-reflectors (one on each side), amber pedal retro-reflectors (towards the front and the rear, both on each side) and a red rear retro-reflector. These lighting devices need not be component type-approved and no other specific fitting, switching and electrical connection requirements apply. In such cases, the manufacturer shall declare that the lighting devices concerned conform to ISO standard 6742-1:1987 and 6742-2:1985.

1.2. Vehicles of category L2e shall meet the requirements of points 1.10 to 2.5.

1.3. Vehicles of category L3e shall meet all the relevant requirements of UNECE regulation No 53. The requirements of points 1.8 to 1.12 shall also be taken into account.

1.4. Vehicles of category L4e shall meet the requirements of points 1.10 to 1.12 and 3 to 3.2.8.1.

1.5. Vehicles of category L5e shall meet the requirements of points 1.10 to 2.5.

1.6. Vehicles of category L6e shall meet the requirements of points 1.10 to 2.5.

1.7. Vehicles of category L7e shall meet the requirements of points 1.10 to 2.5.

1.8. Vehicles of category L1e-A may be fitted with retro-reflective bands on the tyre sidewalls or rims so as to provide a visual impression of circles of white light and making such vehicles easily recognisable.

1.9. Vehicles of categories L1e and L3e may be fitted with additional rear and side retro-reflective devices and materials provided that they do not impair the effectiveness of the mandatory lighting and light-signalling

([1]) OJ L 166, 18.6.2013, p. 88.

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devices. In particular, luggage compartments and saddle bags may be fitted with retro-reflective materials, provided that these have the same colour as the lighting devices at that location.

1.10. No vehicle shall be fitted with auxiliary light sources of which the emitted light can be observed either directly or indirectly under normal driving conditions, other than those for the purpose of illuminating controls, tell-tales and indicators or the occupant compartment.

1.11. No vehicle shall be fitted with lighting devices which, due to a lack of specific wording in the respective component type-approval provisions and unless explicitly allowed by those provisions, display or give the appearance of movement or expansion of its light on the apparent surface or any strobe or flashing effect. Furthermore, if the apparent surface of a lighting function is reduced in size due to the activation of another lighting function with a different colour, the remaining apparent surface of the first named function shall continue to meet the relevant colorimetric and appropriate luminous intensity requirements (e.g. left and right-hand side tail lamp consisting of two rear position lamp rings with LEDs of which the outer ring can become the direction indicator lamp and the inner ring remains a combined rear position and stop lamp). All operation modes shall be duly covered by the lighting device component type-approval.

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1.12. Where automatically switched-on headlamp or daytime running lamp activation is linked to the running of an engine, this shall be construed, for vehicles with electric or other alternative propulsion unit systems and vehicles equipped with an automatic stop/start system of the propulsion unit, as being linked to the master control switch having been activated with the vehicle in normal operation mode.

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2. Requirements concerning vehicles of categories L2e, L5e, L6e and L7e.

2.1. General specifications

2.1.1. All lighting devices shall be type-approved and fitted in accordance with the component manufacturer's specifications and installed so that, under normal conditions of use and notwithstanding any vibration to which they may be subjected, they retain the characteristics as prescribed and enable the vehicle to comply with the requirements of this Annex. In particular, it shall not be possible for the lighting devices to be inadvertently maladjusted.

2.1.2. The illuminating lamps shall be fitted so that their alignment can easily be set correctly.

2.1.3. The reference axis of the lighting device when fitted to the vehicle shall be perpendicular to the longitudinal median plane of the vehicle in the case of side retro-reflectors and parallel to that plane in the case of all other lighting devices, with a permitted tolerance of 3°.

2.1.4. The height and alignment of lighting devices are verified with the vehicle with its mass in running order, plus the mass of any propulsion batteries, placed on a flat horizontal surface, with the steered wheel(s) in the straight ahead position and the tyre pressures adjusted to the manufacturer's specified values.

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2.1.5. In the absence of specific requirements, lighting devices constituting a pair shall:

— be installed on the vehicle symmetrically in relation to the longitudinal median plane,

— be symmetrical to each other in relation to the longitudinal median plane (which includes being in stacked formation),

— have identical colorimetric requirements, and

— have identical photometric characteristics.

2.1.6. In the absence of specific instructions, lamps having different functions may be independent or grouped, combined or reciprocally incorporated in one device, provided that each lamp complies with the requirement applicable to it.

2.1.7. The maximum height above ground is measured from the highest point, and the minimum height from the lowest point, of the light-emitting surface.

2.1.8. In the absence of specific requirements, no lamps other than direction indicator lamps, the hazard warning signal and the emergency braking signal may emit a flashing light.

2.1.9. No light-emitting surface of any red lamp, with the exception of rearmost side marker lamps, shall be visible towards the front and no light-emitting surface of any white lamp, with the exception of reversing lamps, shall be visible towards the rear. No interior or instrument cluster lighting shall be taken into account and the condition is checked as follows:

2.1.9.1. No red lamp shall be directly visible to an observer moving within Zone 1 in a transverse plane situated 25 m in front of the foremost part of the vehicle (see Figure 9-1).

2.1.9.2. No white lamp shall be directly visible to an observer moving within Zone 2 in a transverse plane situated 25 m behind the rearmost part of the vehicle (see Figure 9-2).

2.1.9.3. Zones 1 and 2 are limited in their respective planes as follows (see Figures 9-1 and 9-2):

2.1.9.3.1. Two horizontal planes which are 1,0 m and 2,2 m respectively above the ground;

2.1.9.3.2. Two vertical planes under an angle of 15° towards the front and rear of the vehicle respectively, and outward of the vehicle by reference to the longitudinal median plane of the vehicle. These planes contain, respectively, the vertical lines of intersection of the vertical planes parallel to the longitudinal median plane of the vehicle representing its overall width, and of the transverse vertical planes representing the overall length of the vehicle.

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Figure 9-1

Direct visibility towards the front of the light-emitting surface of a lamp emitting red light

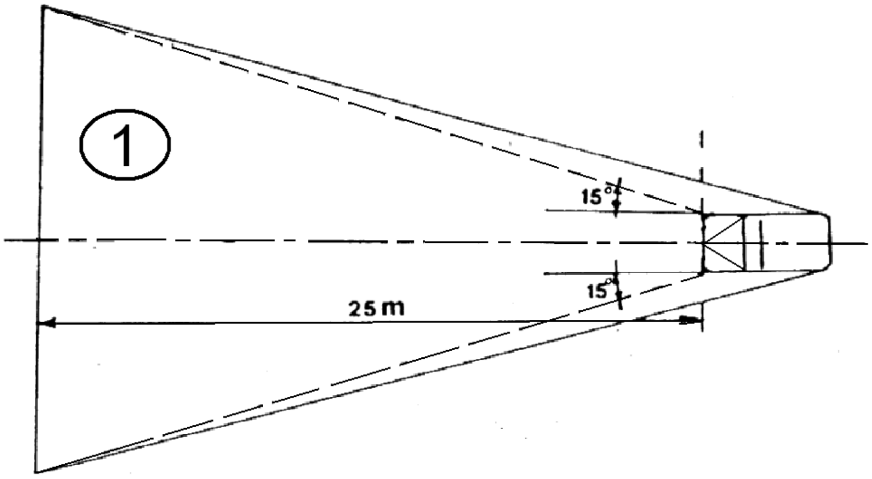
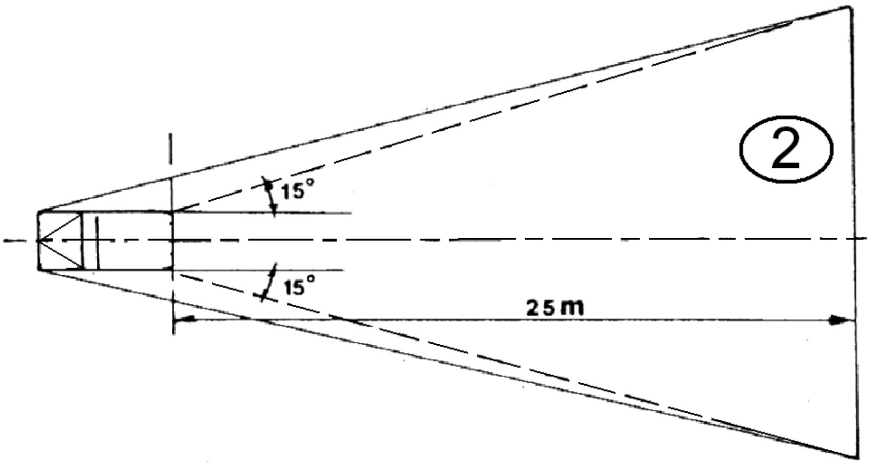


Figure 9-2

Direct visibility towards the rear of the light-emitting surface of a lamp emitting white light



2.1.10. The electrical connections shall be such that front position lamps, rear position lamps and the rear registration plate lamp can be switched on and off only simultaneously.

2.1.11. Vehicles shall be fitted with either:

— daytime running lamps, or

— passing-beam headlamps which are automatically switched on when the vehicle master control switch has been activated.

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2.1.12. In the absence of specific requirements, the electrical connections shall be such that the driving-beam headlamps, the passing-beam headlamps and the front fog lamps cannot be switched on unless the lamps referred to in point 2.1.10 are also switched on. This requirement does not apply in the case of driving-beam and/or passing-beam headlamps when they are used to provide optical warning by means of short and intermittent activation.

2.1.13. Tell tales

2.1.13.1. Provisions concerning specific closed-circuit tell-tales may be fulfilled by the appropriate functions of an operational tell-tale.

2.1.14. The colours emitted by lighting devices shall be as follows:

Driving-beam headlamps:	white
Daytime running lamp:	white
Passing-beam headlamp:	white
Direction indicator lamp:	amber
Stop lamp:	red
Front position lamp:	white
Rear position lamp:	red
Front fog lamp:	white or yellow
Rear fog lamp:	red
Reversing lamp:	white
Hazard warning signal:	amber
Rear registration plate lamp:	white
Non-triangular side retro-reflector (front):	amber
Non-triangular side retro-reflector (rear):	amber or red
Side marker lamp (front):	amber
Side marker lamp (rear):	amber or red
Non-triangular rear retro-reflector:	red

2.1.14.1. Trichromatic coordinates:

Red:	Limit towards yellow:	$y \leq 0{,}335$
	Limit towards purple:	$z \leq 0{,}008$
White:	Limit towards blue:	$x \geq 0{,}310$
	Limit towards yellow:	$x \leq 0{,}500$
	Limit towards green:	$y \leq 0{,}150 + 0{,}640x$

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	Limit towards green:	$y \leq 0{,}440$
	Limit towards purple:	$y \rightleftharpoons 0{,}050 + 0{,}750x$
	Limit towards red:	$y \geq 0{,}382$
Yellow:	Limit towards red:	$y \rightleftharpoons 0{,}138 + 0{,}580x$
	Limit towards green:	$y \leq 1{,}29x - 0{,}100$
	Limit towards white:	$y \rightleftharpoons -x + 0{,}940$ and $y \geq 0{,}440$
		$y \geq 0{,}440$
	Limit towards the spectral value:	$Y \leq -x + 0{,}992$
Amber:	Limit towards yellow:	$y \leq 0{,}429$
	Limit towards red:	$y \geq 0{,}398$
	Limit towards white:	$z \leq 0{,}007$

A source having a colour temperature of 2 856 K is used to check the above limits (International Commission on Illumination (ICI) Standard A).

2.1.14.2. The colour definitions in UNECE regulation No 48 ([1]) may be taken as an alternative to the specifications in point 2.1.14.1, in which case the definition for 'selective-yellow' shall be taken instead of the above specification for 'yellow'.

2.2. General requirements

2.2.1. Vehicles of categories L2e and L6e shall be fitted with the following lighting devices:

— passing-beam headlamp,

— front position lamp,

— direction indicators,

— rear position lamp,

— stop lamp,

— rear registration plate lamp,

— rear retro-reflector (non-triangular), and

— side retro-reflectors (non-triangular).

2.2.2. Vehicles of categories L2e and L6e may be fitted with the following additional lighting devices:

— driving-beam headlamp,

— daytime running lamp,

— front fog lamp,

— hazard warning signal,

— rear fog lamp,

([1]) OJ L 323, 6.12.2011, p. 46.

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— reversing lamp, and

— side marker lamps.

2.2.3. No lighting and light-signalling devices other than those referred to in points 2.2.1 and 2.2.2 shall be installed on vehicles of category L2e or L6e.

2.2.4. Vehicles of categories L5e and L7e shall be fitted with the following lighting devices:

— driving-beam headlamp,

— passing-beam headlamp,

— front position lamp,

— direction indicators,

— rear position lamp,

— stop lamp,

— rear registration plate lamp,

— rear retro-reflector (non-triangular), and

— side retro-reflectors (non-triangular).

2.2.5. Vehicles of categories L5e and L7e may be fitted with the following additional lighting devices:

— daytime running lamp,

— front fog lamp,

— hazard warning signal,

— rear fog lamp,

— reversing lamp, and

— side marker lamps.

2.2.6. No lighting and light-signalling devices other than those referred to in points 2.2.4 and 2.2.5 shall be installed on vehicles of category L5e or L7e.

2.2.7. Only lighting and light-signalling devices which are type-approved for vehicle category L shall be installed on the vehicle. However, lighting and light-signalling devices which are type-approved for installation on vehicles of categories M_1 or N_1, in accordance with UNECE regulation No 48, may also be installed.

2.2.7.1. Vehicles of categories other than L2e and L6e shall not be fitted with passing-beam headlamps of Class A.

2.3. Specific requirements

2.3.1. Driving-beam headlamp

2.3.1.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

— two, in the case of vehicles with an overall width exceeding 1 300 mm.

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2.3.1.2. Arrangement:

— no specific requirements.

2.3.1.3. Position:

2.3.1.3.1. In width:

— a single independent driving-beam headlamp may be fitted above, below or to one side of another front lamp. If these lamps are stacked on top of each other, the reference centre of the driving-beam headlamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;

— a single independent driving-beam headlamp which is reciprocally incorporated with another front lamp shall be fitted in such a way that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is also fitted with another front lamp alongside the driving-beam headlamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle;

— two driving-beam headlamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted in such a way that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle.

2.3.1.3.2. In height:

— no specific requirements.

2.3.1.3.3. In length:

— at the front of the vehicle. This requirement is considered to have been met if the light emitted does not disturb the driver either directly or indirectly by means of the rear-view mirrors and/or other reflective surfaces on the vehicle.

2.3.1.3.4. Distance:

— in the case of a single independent driving-beam headlamp, the distance between the edge of the light-emitting surface and that of any single independent passing-beam headlamp shall not exceed 200 mm.

2.3.1.4. Geometric visibility:

— the visibility of the light-emitting surface, including 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 light-emitting surface and forming an angle of not less than 5° with the reference axis of the driving-beam headlamp.

2.3.1.5. Orientation:

— to the front; may move in line with the steering angle of any handlebars.

2.3.1.6. Electrical connections:

— all driving-beam headlamps shall light up and extinguish simultaneously,

— all driving-beam headlamps shall light up when the forward lighting mode is switched from passing-beam to driving-beam,

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— all driving-beam headlamps shall be extinguished simultaneously when the forward lighting mode is switched from driving-beam to passing-beam,

— the passing-beam headlamps may remain lit at the same time as the driving-beam headlamps.

2.3.1.7. Closed-circuit tell-tale:

— mandatory, if the driving beam headlamp is fitted (non-flashing blue tell-tale).

2.3.1.8. Other requirements:

— the combined value of the maximum intensity of all driving-beam headlamps which can be activated at the same time shall not exceed 430 000 cd, which corresponds to a reference value of 100.

2.3.2. Passing-beam headlamp

2.3.2.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

— two, in the case of vehicles with an overall width exceeding 1 300 mm.

2.3.2.2. Arrangement:

— no specific requirements.

2.3.2.3. Position:

2.3.2.3.1. In width:

— a single independent passing-beam headlamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the passing-beam headlamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— a single independent passing-beam headlamp which is reciprocally incorporated with another front lamp shall be fitted in such a way that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the passing-beam headlamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— two passing-beam headlamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted in such a way that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle,

— where there are two passing-beam headlamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

2.3.2.3.2. In height:

— a minimum of 500 mm and a maximum of 1 200 mm above the ground.

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2.3.2.3.3. In length:

— at the front of the vehicle. This requirement is considered to have been met if the light emitted disturbs the driver neither directly nor indirectly by reflection off the rear-view mirrors and/or other reflective surfaces on the vehicle.

2.3.2.3.4. Distance:

— the distance between the edge of the light-emitting surface of a single independent passing-beam headlamp and that of any single independent driving-beam headlamp shall not exceed 200 mm.

2.3.2.4. Geometric visibility:

— $\alpha = 15°$ upwards and 10° downwards,

— $\beta = 45°$ to the left and to the right if there is only one passing-beam headlamp,

— $\beta = 45°$ outwards and 10° inwards if there are two passing-beam headlamps.

2.3.2.5. Orientation:

— to the front; may move in line with the steering angle of any handlebars.

2.3.2.6. Electrical connections:

— all passing-beam headlamps shall light up and extinguish simultaneously,

— all passing-beam headlamps shall light up when the forward lighting mode is switched from driving-beam to passing-beam,

— all passing-beam headlamps shall be extinguished simultaneously when the forward lighting mode is switched from passing-beam to driving-beam; however, the passing-beam headlamps may remain lit at the same time as the driving-beam headlamps.

2.3.2.7. Closed-circuit tell-tale:

— optional (non-flashing green tell-tale).

2.3.2.8. Other requirements:

— passing-beam headlamps of which the lowest point of the light-emitting surface is 0,8 m or less above the ground shall be adjusted to an initial aiming inclination of between – 1,0 % and – 1,5 %. The precise value may be declared by the manufacturer,

— passing-beam headlamps of which the lowest point of the light-emitting surface is between 0,8 m and 1,0 m above the ground shall be adjusted to an initial aiming of inclination between – 1,0 % and – 2,0 %. The precise value may be declared by the manufacturer,

— passing-beam headlamps of which the lowest point of the light-emitting surface is 1,0 m or more above the ground shall be adjusted to an initial aiming inclination of between – 1,5 % and – 2,0 %. The precise value may be declared by the manufacturer,

— for passing-beam headlamps with a light source with an objective luminous flux not exceeding 2 000 lumen and an initial inclination of between – 1,0 % and – 1,5 %, the vertical inclination shall remain between – 0,5 % and – 2,5 % under all loading conditions. The

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vertical inclination shall remain between – 1,0 % and – 3,0 % if the initial inclination is set between – 1,5 % and – 2,0 %. An external adjusting device may be used to satisfy the requirements, provided that no tools other than those provided with the vehicle are needed,

— for passing-beam headlamps with a light source with an objective luminous flux exceeding 2 000 lumen and an initial inclination of between – 1,0 % and – 1,5 %, the vertical inclination shall remain between – 0,5 % and – 2,5 % under all loading conditions. The vertical inclination shall remain between – 1,0 % and – 3,0 % if the initial inclination is set between – 1,5 % and – 2,0 %. A headlamp levelling device may be used to satisfy the requirements of this point, provided that its operation is fully automatic and the response time is less than 30 seconds.

2.3.2.8.1. Testing conditions:

— the inclination requirements in point 2.3.2.8 shall be verified as follows:

— vehicle with its mass in running order, plus the mass of any propulsion batteries, and a mass of 75 kg simulating the driver,

— vehicle laden to its technically permissible maximum mass with the mass distributed so as to attain the maximum axle loads as declared by the manufacturer for this loading condition,

— vehicle with a mass of 75 kg simulating the driver and additionally laden so as to attain the maximum permissible rear axle load as declared by the manufacturer; however, the front axle load shall be as low as possible in this case,

— before any measurement is made, the vehicle shall be rocked three times and then moved backwards and forwards for at least a complete wheel revolution.

2.3.3. Front position lamp

2.3.3.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

— two, in the case of vehicles with an overall width exceeding 1 300 mm.

2.3.3.2. Arrangement:

— no specific requirements.

2.3.3.3. Position:

2.3.3.3.1. In width:

— a single independent front position lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the front position lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— a single independent front position lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front

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lamp alongside the front position lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— two front position lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle,

— where there are two front position lamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

2.3.3.3.2. In height:

— a minimum of 350 mm and a maximum of 1 200 mm above the ground.

2.3.3.3.3. In length:

— at the front of the vehicle.

2.3.3.4. Geometric visibility:

— α = 15° upwards and 15° downwards; however, the downward angle may be reduced to 5° if the front position lamp is located less than 750 mm above the ground;

— β = 80° to the left and to the right if there is only one front position lamp;

— β = 80° outwards and 45° inwards if there are two front position lamps.

2.3.3.5. Orientation:

— to the front; may move in line with the steering angle of any handlebars.

2.3.3.6. Electrical connections:

— shall light up in compliance with point 2.1.10.

2.3.3.7. Closed-circuit tell-tale:

— mandatory (a non-flashing green tell-tale or the vehicle's instrument cluster illumination may be used to indicate the activation of the lamps as described in point 2.1.10).

2.3.4. Daytime running lamp

2.3.4.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

— two, in the case of vehicles with an overall width exceeding 1 300 mm.

2.3.4.2. Arrangement:

— no specific requirements.

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2.3.4.3. Position:

2.3.4.3.1. In width:

— a single independent daytime running lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the daytime running lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— a single independent daytime running lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the daytime running lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— two daytime running lamps of which either none, one or both are reciprocally incorporated with another front lamp shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle,

— the inward edges of the light-emitting surfaces shall be at least 500 mm apart in the case of vehicles with an overall width exceeding 1 300 mm.

2.3.4.3.2. In height:

— a minimum of 250 mm and a maximum of 1 500 mm above the ground.

2.3.4.3.3. In length:

— at the front of the vehicle. This requirement is considered to have been met if the light emitted disturbs the driver neither directly nor indirectly by reflection off the rear-view mirrors and/or other reflective surfaces on the vehicle.

2.3.4.3.4. Distance:

— if the distance between the front direction indicator lamp and the daytime running lamp is 40 mm or less, the electrical connections of the daytime running lamp on the relevant side of the vehicle shall be such that either:

  — it is switched off, or

  — its luminous intensity is reduced to a level not exceeding 140 cd;

  during the entire period (both on and off cycle) of activation of the relevant front direction indicator lamp.

2.3.4.4. Geometric visibility:

— $\alpha = 10°$ upwards and 10° downwards,

— $\beta = 20°$ to the left and to the right if there is only one daytime running lamp,

— $\beta = 20°$ outwards and 20° inwards if there are two daytime running lamps.

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2.3.4.5. Orientation:

— to the front; may move in line with the steering angle of any handlebars.

2.3.4.6. Electrical connections:

— all daytime running lamps shall light up when the master control switch is activated; however, they may remain off under the following conditions:

  — the automatic transmission control is in the park position,

  — the parking brake is activated, or

  — during the time prior to the vehicle being set in motion for the first time after each manual activation of the master control switch and the vehicle's propulsion system,

— daytime running lamps may be manually deactivated; however, this shall be possible only at a vehicle speed not exceeding 10 km/h. The lamps shall be automatically reactivated when the vehicle speed exceeds 10 km/h or when the vehicle has travelled more than 100 m,

— daytime running lamps shall in each case be deactivated automatically when:

  — the vehicle is shut down by means of the master control switch,

  — the front fog lamps are activated,

  — the headlamps are activated, except when they are used to give intermittent luminous warnings at short intervals, and

  — in ambient lighting conditions of less than 1 000 lux where the indicated speed on the vehicle's speedometer is still clearly legible (e.g. when speedometer illumination is always on) and the vehicle is not fitted with a non-flashing green tell-tale in compliance with point 2.3.3.7 or a dedicated green closed-circuit tell-tale for the daytime running lamp identified by the appropriate symbol. In such a case, the passing-beam headlamps and the lighting devices required in point 2.1.12 shall be automatically activated simultaneously within 2 seconds of the ambient lighting level dropping below 1 000 lux. If the ambient lighting conditions subsequently reach a level of at least 7 000 lux, the daytime running lamps shall be automatically reactivated, while the passing-beam headlamps and the lighting devices required in point 2.1.12 shall be deactivated simultaneously within five to 300 seconds (i.e. fully automatic light switching is required if the driver has no visible indication and stimulus to activate normal lighting when it is dark).

2.3.4.7. Closed-circuit tell-tale:

— optional.

2.3.5. Front fog lamp

2.3.5.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

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— two, in the case of vehicles with an overall width exceeding 1 300 mm.

2.3.5.2. Arrangement:

— no specific requirements.

2.3.5.3. Position:

2.3.5.3.1. In width:

— a single independent front fog lamp may be fitted above, below or to one side of another front lamp. If lamps are stacked on top of each other, the reference centre of the front fog lamp shall be located within the longitudinal median plane of the vehicle. If they are side by side, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— a single independent front fog lamp which is reciprocally incorporated with another front lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle. However, when the vehicle is fitted with another front lamp alongside the front fog lamp, their reference centres shall be symmetrical in relation to the longitudinal median plane of the vehicle,

— two front fog lamps of which either none, one or both are reciprocally incorporated with another front lamp, shall be fitted so that their reference centres are symmetrical in relation to the longitudinal median plane of the vehicle,

— where there are two front fog lamps, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

2.3.5.3.2. In height:

— a minimum of 250 mm and a maximum of 800 mm above the ground,

— no part of the light-emitting surface shall be higher than the top of the light-emitting surface of the highest placed passing-beam headlamp.

2.3.5.3.3. In length:

— at the front of the vehicle. This requirement is considered to have been met if the light emitted disturbs the driver neither directly nor indirectly by reflection off the rear-view mirrors and/or other reflective surfaces on the vehicle.

2.3.5.4. Geometric visibility:

— $\alpha = 5°$ upwards and 5° downwards,

— $\beta = 45°$ to the left and to the right if there is only one front fog lamp,

— $\beta = 45°$ outwards and 10° inwards if there are two front fog lamps.

2.3.5.5. Orientation:

— to the front; may move in line with the steering angle of any handlebars.

▼B

2.3.5.6. Electrical connections:

— all front fog lamps shall light up and extinguish simultaneously,

— it shall be possible to switch the front fog lamp on and off independently of the driving-beam headlamp, the passing-beam headlamp or any combination of these headlamps.

2.3.5.7. Closed-circuit tell-tale:

— mandatory (non-flashing green tell-tale).

2.3.6. Direction indicator lamps

2.3.6.1. Number:

— four,

— six, if two side direction indicator lamps are fitted additionally and in compliance with all relevant requirements of UNECE regulation No 48 as prescribed for vehicle category M_1.

2.3.6.2. Arrangement:

— two front direction indicator lamps of categories 11, 1, 1a or 1b and two rear direction indicator lamps of categories 12, 2a or 2b (i.e. two indicators on each side),

— two side direction indicator lamps of categories 5 or 6 (i.e. one additional side direction indicator on each side) may be fitted in addition to the mandatory direction indicator lamps, provided that their installation meets all relevant requirements of UNECE regulation No 48 as prescribed for vehicle category M_1.

2.3.6.3. Position:

2.3.6.3.1. In width:

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm,

— the inward edges of the light-emitting surfaces of the front direction indicators shall be at least 240 mm apart in the case of vehicles with a single front wheel or in case the vehicle width does not exceed 1 000 mm,

— the inward edges of the light-emitting surfaces of the front direction indicators shall be at least 500 mm apart in the case of vehicles with more than one front wheel and with a vehicle width exceeding 1 000 mm,

— the inward edges of the light-emitting surfaces of the rear direction indicators shall be at least 180 mm apart in the case of vehicles with a single rear wheel or in case the vehicle width does not exceed 1 000 mm,

— the inward edges of the light-emitting surfaces of the rear direction indicators shall be at least 500 mm apart in the case of vehicles with more than one rear wheel and with a vehicle width exceeding 1 000 mm,

▼B

— there shall be a minimum distance between the light-emitting surface of a front direction indicator lamp and the nearest passing-beam headlamps of:

— 75 mm in the case of a minimum indicator intensity of 90 cd,

— 40 mm in the case of a minimum indicator intensity of 175 cd,

— 20 mm in the case of a minimum indicator intensity of 250 cd,

— ≤ 20 mm in the case of a minimum indicator intensity of 400 cd.

2.3.6.3.2. In height:

— a minimum of 500 mm and a maximum of 1 500 mm above the ground.

2.3.6.3.3. In length:

— no specific requirements.

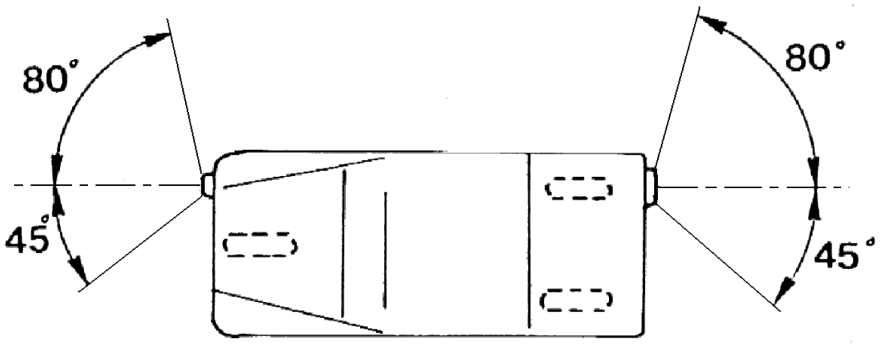
2.3.6.4. Geometric visibility:

— α = 15° upwards and 15° downwards; however, the downward angle may be reduced to 5° if the direction indicator lamps are located less than 750 mm above the ground;

— β = 80° outwards and 45° inwards (see Figure 9-3).

Figure 9-3

Geometric visibility of the right-hand side front and rear direction indicators



2.3.6.5. Orientation:

— to the front; may move in line with the steering angle of any handlebars, as well as to the rear.

2.3.6.6. 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.

▼B

2.3.6.7. Operational tell-tale:

— mandatory, this may be optical, auditory or both,

— if it is optical, the tell-tale shall be green and of the flashing type, which in the event of defective operation of any single front or rear direction indicator lamp shall be extinguished, remain alight without flashing or show a marked change of frequency,

— if it is entirely auditory, it shall be clearly audible and display equivalent operating conditions as the optical tell-tale.

2.3.6.8. Other requirements:

— the following characteristics shall be checked with no load on the electrical system other than that needed for the operation of the engine (if any), following the activation of the master control switch and the activation of lighting devices which are switched on as a result of it.

2.3.6.8.1. Characteristics:

— the light flashing frequency shall be 90 ± 30 times per minute,

— the direction indicator lamps on the same side of the vehicle shall flash at the same frequency, in phase and may occur either synchronously or alternately,

— the first flash of the lamps shall start within one second and end within one-and-a-half seconds of the control being actuated,

— in the event of a malfunction, other than a short circuit, of a front or rear direction indicator lamp the other lamp(s) indicating the same direction shall remain lit or continue to flash; however, in such a case the flashing frequency does not have to correspond to the prescribed value in this point.

2.3.7. Hazard warning signal

2.3.7.1. Number:

— in accordance with the requirements of point 2.3.6.1.

2.3.7.2. Arrangement:

— in accordance with the requirements of point 2.3.6.2.

2.3.7.3. Position:

2.3.7.3.1. In width:

— in accordance with the requirements of point 2.3.6.3.1.

2.3.7.3.2. In height:

— in accordance with the requirements of point 2.3.6.3.2.

2.3.7.3.3. In length:

— in accordance with the requirements of point 2.3.6.3.3.

2.3.7.4. Geometric visibility:

— in accordance with the requirements of point 2.3.6.4.

▼B

2.3.7.5. Orientation:

— in accordance with the requirements of point 2.3.6.5.

2.3.7.6. Electrical connections:

— the hazard warning signal shall be activated by means of a separate control and shall be given by simultaneous operation of all direction indicator lamps. It shall be possible for the hazard warning signal to operate even when the master control switch has been deactivated and the vehicle's on-board electronics system is switched off.

2.3.7.7. Closed-circuit tell-tale:

— mandatory, if the hazard warning signal is provided (flashing red tell-tale),

— if two separate green tell-tales have been provided for the left-hand side and right-hand side direction indicators, these tell-tales may flash simultaneously instead of the single red tell-tale.

2.3.7.8. Other requirements:

— the requirements of point 2.3.6.8 shall apply.

2.3.7.8.1. Characteristics:

— the light flashing frequency shall be 90 ± 30 times per minute,

— all direction indicator lamps shall flash at the same frequency and in phase. Those on opposite sides of the vehicle shall flash synchronously while those on the same side of the vehicle may flash alternately,

— the first flash shall start within one second and end within one-and-a-half seconds of the control being actuated,

— the hazard warning signal may be automatically activated by vehicle systems such as the emergency braking signal or after a collision, and subsequently manually deactivated.

2.3.8. Rear position lamp

2.3.8.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

— two, in the case of vehicles with an overall width exceeding 1 300 mm.

2.3.8.2. Arrangement:

— no specific requirements.

2.3.8.3. Position:

2.3.8.3.1. In width:

— a single rear position lamp shall be installed on the vehicle so that the reference centre of the rear position lamp shall be located within the longitudinal median plane of the vehicle,

▼B

— two rear position lamps shall be installed on the vehicle so that the reference centres of the rear position lamps are symmetrical in relation to the longitudinal median plane of the vehicle,

— in the case of vehicles with two rear wheels and an overall width exceeding 1 300 mm, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

2.3.8.3.2. In height:

— a minimum of 250 mm and a maximum of 1 500 mm above the ground.

2.3.8.3.3. In length:

— at the rear of the vehicle.

2.3.8.4. Geometric visibility:

— α = 15° upwards and 15° downwards, however, the downward angle may be reduced to 5° if the rear position lamp is located less than 750 mm above the ground,

— β = 80° to the left and to the right if there is only one rear position lamp,

— β = 80° outwards and 45° inwards if there are two rear position lamps.

2.3.8.5. Orientation:

— to the rear.

2.3.8.6. Electrical connections:

— shall light up in compliance with point 2.1.10.

2.3.8.7. Closed-circuit tell-tale:

— in accordance with the requirements of point 2.3.3.7.

2.3.9. Stop lamp

2.3.9.1. Number:

— one or two, in the case of vehicles with an overall width not exceeding 1 300 mm,

— two, in the case of vehicles with an overall width exceeding 1 300 mm,

— an additional stop lamp of category S3 or S4 (i.e. central high mounted stop lamp) may be fitted, provided that all relevant requirements of UNECE regulation No 48 applying to the installation of such stop lamps on vehicles of category M_1 are met.

2.3.9.2. Arrangement:

— no specific requirements.

▼B

2.3.9.3. Position:

2.3.9.3.1. In width:

— a single stop lamp shall be installed on the vehicle so that the reference centre of the stop lamp is located within the longitudinal median plane of the vehicle,

— two stop lamps shall be installed on the vehicle so that the reference centres of the stop lamps are symmetrical in relation to the longitudinal median plane of the vehicle,

— the inward edges of the light-emitting surfaces shall be at least 600 mm apart in the case of vehicles with two rear wheels and an overall width exceeding 1 300 mm,

— the inward edges of the light-emitting surfaces shall be at least 400 mm apart in the case of vehicles with two rear wheels, an overall width not exceeding 1 300 mm and two stop lamps.

2.3.9.3.2. In height:

— a minimum of 250 mm and a maximum of 1 500 mm above the ground.

2.3.9.3.3. In length:

— at the rear of the vehicle.

2.3.9.4. Geometric visibility:

— $\alpha = 15°$ upwards and 15° downwards; however, the downward angle may be reduced to 5° if the stop lamp is located less than 750 mm above the ground,

— $\beta = 45°$ to the left and to the right if there is only one stop lamp,

— $\beta = 45°$ outwards and 10° inwards if there are two stop lamps.

2.3.9.5. Orientation:

— to the rear.

2.3.9.6. Electrical connections:

— shall light up at any service brake application.

2.3.9.7. Closed-circuit tell-tale:

— prohibited.

2.3.9.8. Other requirements:

— vehicles may be fitted with an emergency stop signal as defined in point 2.28 of UNECE regulation No 48, provided that all relevant requirements of that regulation applying to such signals are met and the signal is activated and deactivated during conditions and/or decelerations as prescribed for vehicles of category M_1,

— vehicles may be fitted with a rear-end collision alert signal (RECAS) as defined in point 2.33 of UNECE regulation No 48, provided that all relevant requirements of that regulation applying to RECAS are met.

▼B

2.3.10. Rear fog lamp

2.3.10.1. Number:

— one or two.

2.3.10.2. Arrangement:

— no specific requirements.

2.3.10.3. Position:

2.3.10.3.1. In width:

— in the case of vehicles intended and equipped for right-hand traffic, a single rear fog lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle or to the left side thereof,

— in the case of vehicles intended and equipped for left-hand traffic, a single rear fog lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle or to the right side thereof,

— in the case of vehicles intended and equipped for both left-hand and right-hand traffic, a single rear fog lamp shall be fitted so that its reference centre lies within the longitudinal median plane of the vehicle;

— in the case of vehicles intended and equipped for left-hand and/or right-hand traffic, two rear fog lamps shall be installed on the vehicle so that the reference centres of the rear fog lamps are symmetrical in relation to the longitudinal median plane of the vehicle.

2.3.10.3.2. In height:

— a minimum of 250 mm and a maximum of 1 000 mm above the ground; however, the latter value may be raised to 1 200 mm if the rear fog lamp is grouped with another lighting device.

2.3.10.3.3. In length:

— at the rear of the vehicle.

2.3.10.3.4. Distance:

— the distance between the edge of the light-emitting surface of the rear fog lamp and that of any stop lamp shall exceed 100 mm.

2.3.10.4. Geometric visibility:

— $\alpha = 5°$ upwards and 5° downwards,

— $\beta = 25°$ to the left and to the right.

2.3.10.5. Orientation:

— to the rear.

▼B

2.3.10.6. Electrical connections:

— all rear fog lamps shall light up and extinguish simultaneously,

— it shall be possible to activate the rear fog lamp only when the driving-beam headlamp, the passing-beam headlamp or the front fog lamp is activated,

— it shall be possible to switch off the rear fog lamp independently of any other lamp,

— the rear fog lamp shall be automatically deactivated when:

— the front position lamp is switched off, and

— the vehicle is shut down by means of the master control switch,

— once the rear fog lamp has been switched off or deactivated, it shall not be automatically or independently reactivated unless the control for switching it on has been manually operated.

2.3.10.7. Closed-circuit tell-tale:

— mandatory (non-flashing yellow tell-tale).

2.3.11. Reversing lamp

2.3.11.1. Number:

— one or two.

2.3.11.2. Arrangement:

— no specific requirements.

2.3.11.3. Position:

2.3.11.3.1. In width:

— if there is a single reversing lamp: no specific requirements,

— if there are two reversing lamps, these shall be installed on the vehicle so that the reference centres of the reversing lamps are symmetrical in relation to its longitudinal median plane.

2.3.11.3.2. In height:

— a minimum of 250 mm and a maximum of 1 200 mm above the ground.

2.3.11.3.3. In length:

— at the rear of the vehicle.

2.3.11.4. Geometric visibility:

— $\alpha = 15°$ upwards and 5° downwards,

— $\beta = 45°$ to the left and to the right if there is only one reversing lamp,

▼B

— β = 45° outwards and 30° inwards if there are two reversing lamps.

2.3.11.5. Orientation:

— to the rear.

2.3.11.6. Electrical connections:

— the reversing lamp shall emit light when the reversing device is engaged and the master control switch has been activated,

— the reversing lamp shall not emit any light unless both conditions mentioned above satisfied.

2.3.11.7. Closed-circuit tell-tale:

— optional.

▼M1

2.3.11.8. Other requirements:

— in the absence of prescriptions for reversing lamp lighting devices which can be type-approved for vehicles of category L, the reversing lamp shall be type-approved according to UNECE regulation No 23 ([1]).

▼B

2.3.12. Rear registration plate lamp

2.3.12.1. Number:

— one or more.

2.3.12.2. Arrangement and position:

— such that the rear registration lamp illuminates the intended space for the rear registration plate.

2.3.12.3. Electrical connections:

— shall light up in compliance with point 2.1.10.

2.3.12.4. Closed-circuit tell-tale:

— the requirements of point 2.3.3.7 shall apply.

2.3.13. Rear retro-reflector (non-triangular)

2.3.13.1. Number:

— one or two,

— two in the case of vehicles with an overall width exceeding 1 000 mm,

— additional rear retro-reflecting devices and materials are permitted provided that they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

([1]) OJ L 237, 8.8.2014, p. 1

▼B

2.3.13.2. Arrangement:

— one or two rear retro-reflectors of Class IA or IB.

2.3.13.3. Position:

2.3.13.3.1. In width:

— if there is a single rear retro-reflector, this shall be installed on the vehicle so that the reference centre of the rear retro-reflector is located within its longitudinal median plane,

— if there are two rear retro-reflectors, these shall be installed on the vehicle so that the reference centres of the rear retro-reflectors are symmetrical in relation to its longitudinal median plane,

— if there are two rear retro-reflectors, the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm.

2.3.13.3.2. In height:

— a minimum of 250 mm and a maximum of 900 mm above the ground.

2.3.13.3.3. In length:

— at the rear of the vehicle.

2.3.13.4. Geometric visibility:

— $\alpha = 10°$ upwards and 10° downwards; however, the downward angle may be reduced to 5° if the rear retro-reflector is located less than 750 mm above the ground,

— $\beta = 30°$ to the left and to the right if there is only one rear retro-reflector,

— $\beta = 30°$ outwards and 30° inwards if there are two rear retro-reflectors.

2.3.13.5. Orientation:

— to the rear.

2.3.13.6. Other requirements:

— the light-emitting surface of a retro-reflector may have parts in common with any other red lamp installed at the rear of the vehicle.

2.3.14. Side retro-reflectors (non-triangular)

2.3.14.1. Number:

— one or two on each side.

2.3.14.2. Arrangement:

— a side retro-reflector of Class IA or IB shall be fitted within the first third and/or the last third of the vehicle's overall length,

▼B

— additional side retro-reflective devices and materials are permitted, provided that they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

2.3.14.3. Position:

2.3.14.3.1. In width:

— no specific requirements.

2.3.14.3.2. In height:

— a minimum of 250 mm and a maximum of 900 mm above the ground; however, the latter value may be raised to 1 200 mm if the side retro-reflector is grouped with another lighting device.

2.3.14.3.3. In length:

— no specific requirements.

2.3.14.4. Geometric visibility:

— α = 10° upwards and 10° downwards; however, the downward angle may be reduced to 5° if the side retro-reflector is located less than 750 mm above the ground,

— β = 45° to the front and to the rear.

2.3.14.5. Orientation:

— to the side.

2.3.15. Side marker lamp

2.3.15.1. Number:

— one or two on each side.

2.3.15.2. Arrangement:

— a side marker lamp of Class SM1 or SM2 may be fitted within the first third and/or the last third of the vehicle's overall length.

2.3.15.3. Position:

2.3.15.3.1. In width:

— no specific requirements.

2.3.15.3.2. In height:

— a minimum of 250 mm and a maximum of 1 500 mm above the ground.

2.3.15.3.3. In length:

— no specific requirements.

2.3.15.4. Geometric visibility:

— α = 10° upwards and 10° downwards; however, the downward angle may be reduced to 5° if the side retro-reflector is located less than 750 mm above the ground;

▼B

— β = 30° to the front and to the rear.

2.3.15.5. Orientation:

— to the side.

2.3.15.6. Electrical connections:

— shall light up together with the lighting devices referred to in point 2.1.10,

— may be such that the side marker lamps flash at the same frequency, in phase and either synchronously or alternately with the direction indicator lamps installed on the same side of the vehicle.

2.3.15.7. Closed-circuit tell-tale:

— in accordance with the requirements of point 2.3.3.7.

▼M1

2.3.15.8. Other requirements:

— in the absence of prescriptions for side marker lamp lighting devices which can be type-approved for vehicles of category L, the lamps shall be type-approved according to UNECE regulation No 91 ([1]).

▼B

2.4. As an alternative to the requirements in points 2 to 2.3.15.8, vehicles of categories L2e, L5e, L6e and L7e may comply with all relevant requirements of UNECE regulation No 48 as prescribed for vehicle category M_1.

In this case, specific requirements of UNECE regulation No 48 shall not be substituted or waived on the basis of differences in, or an absence of, specific provisions in this Annex (e.g. installation of headlamp cleaning devices, manual headlamp levelling device).

2.5. Bearing in mind the variety of forms of construction of categories L2e, L5e, L6e and L7e vehicles, the vehicle manufacturer may in agreement with the technical service and approval authority choose to apply all relevant requirements of UNECE regulation No 53, as prescribed for vehicles of category L3e, as an alternative to the requirements as laid down in points 2 to 2.3.15.8. In this case, specific requirements of UNECE regulation No 53 shall not be substituted or waived on the basis of differences in, or an absence of, specific provisions in this Annex and it shall be accepted only in case of vehicles with an overall width not exceeding 1 300 mm which tend to lean while cornering (e.g. for a type of vehicle which has the overall appearance of a motorcycle, but which is equipped with three wheels classifying it as an L5e category vehicle).

3. Requirements concerning vehicles of category L4e.

3.1. If the side-car can be detached from the motorcycle so that the motorcycle can be used without it, the motorcycle shall fulfil the requirements for solo motorcycles in point 1.3 in addition to those in points 3.2 to 3.2.8.1 below. The requirements of point 1.9 may also be taken into account.

([1]) OJ L 4, 7.1.2012, p. 27

▼B

3.1.1. In this case, it shall be possible to electrically disconnect the direction indicator lamps mounted on the motorcycle and placed between the motorcycle and the side-car.

3.2. When the side-car is connected to the motorcycle, either permanently or in a detachable way, the motorcycle with side-car shall fulfil all the relevant requirements of UNECE regulation No 53 as prescribed for vehicle category L3e and the additional provisions below.

3.2.1. Front position lamps

3.2.1.1. Number:

— two or three;

— the side-car shall be equipped with one front position lamp;

— the motorcycle shall be equipped with one front position lamp; however, it may be equipped with two front position lamps, provided that these are fitted in accordance with the relevant provisions of UNECE regulation No 53 as prescribed for vehicle category L_3e (solo motorcycle).

3.2.1.2. Position:

— the position shall be as specified in UNECE regulation No 53 for vehicle category L3e, except as follows:

3.2.1.2.1. In width:

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm (this limit value does not apply to a second front position lamp fitted to the motorcycle).

3.2.1.3. Geometric visibility:

— the front position lamps on the side-car and motorcycle may be considered as a pair.

3.2.1.4. In all remaining respects, front position lamps shall comply with the requirements of UNECE regulation No 53 as prescribed for vehicle category L3e.

3.2.2. Daytime running lamps

3.2.2.1. Number:

— two or three,

— the side-car may be equipped with one daytime running lamp,

— the motorcycle may be equipped with one daytime running lamp; however, it may be equipped with two daytime running lamps, provided that these are fitted in accordance with the relevant provisions of UNECE regulation No 53 as prescribed for vehicle category L3e (solo motorcycle).

3.2.2.2. Position:

— the position shall be as specified in UNECE regulation No 53 for vehicle category L3e, except as follows:

▼B

3.2.2.2.1. In width:

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm (this limit value does not apply to a second daytime running lamp fitted to the motorcycle).

3.2.2.3. Geometric visibility:

— the daytime running lamps on the side-car and motorcycle may be considered as a pair.

3.2.2.4. In all remaining respects, daytime running lamps shall comply with the requirements of UNECE regulation No 53 as prescribed for vehicle category L3e.

3.2.3. Direction indicator lamps

3.2.3.1. Position:

— the position shall be as specified in UNECE regulation No 53 for vehicle category L3e, except as follows:

3.2.3.1.1. In width (concerning all electrically connected direction indicator lamps):

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm,

— the inward edges of the light-emitting surfaces shall be at least 600 mm apart,

— there shall be a minimum distance between the light-emitting surface of a front direction indicator lamp and the nearest passing-beam headlamps of:

— 75 mm in the case of a minimum indicator intensity of 90 cd,

— 40 mm in the case of a minimum indicator intensity of 175 cd,

— 20 mm in the case of a minimum indicator intensity of 250 cd,

— ≤ 20 mm in the case of a minimum indicator intensity of 400 cd,

— both front direction indicator lamps shall have a comparable level of photometric performance, as shall both rear direction indicator lamps.

3.2.3.1.2. In length (this point applies only to the side of the side-car):

— the front direction indicator lamp shall be located on the front half of the side-car and the rear direction indicator lamp shall be located on the rear half.

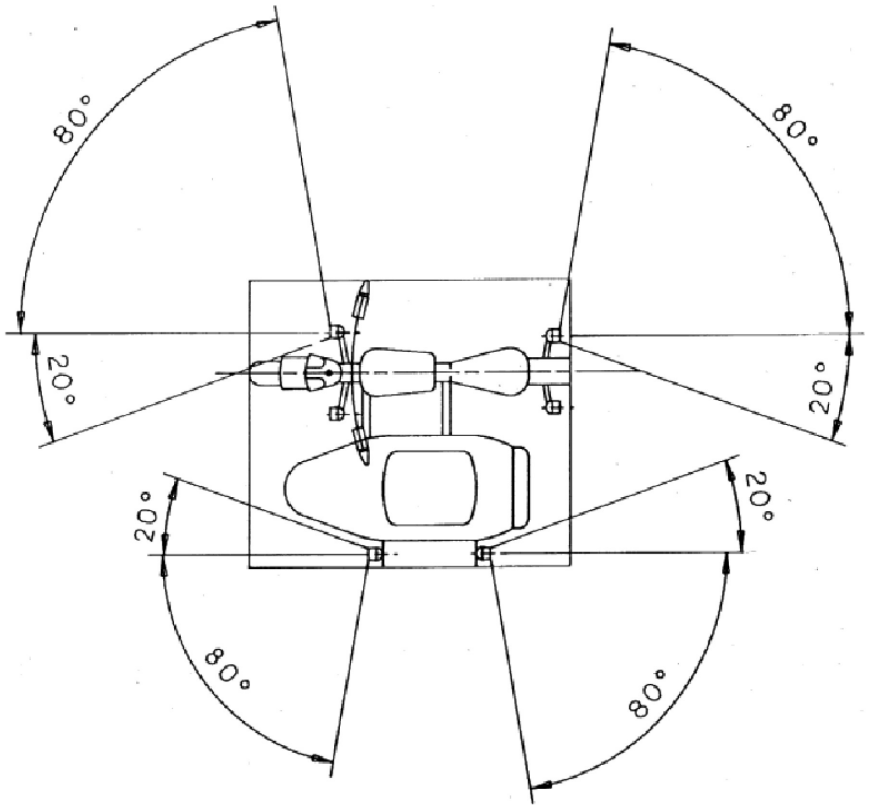
3.2.3.2. Geometric visibility:

— the horizontal angles are clarified as follows: see Figure 9-4.

▼B

Figure 9-4

Direction indicator lamp arrangement



3.2.3.3. In all remaining respects, direction indicator lamps shall comply with the requirements of UNECE regulation No 53 as prescribed for vehicle category L3e.

3.2.4. Hazard warning signal

3.2.4.1. The hazard warning signal shall be given by simultaneous operation of all direction indicator lamps, as referred to in points 3.1 to 3.2 and 3.2.3 to 3.2.3.3.

3.2.5. Rear position lamps

3.2.5.1. Number:

— two or three,

— the side-car shall be equipped with one rear position lamp,

— the motorcycle shall be equipped with one rear position lamp; however, it may be equipped with two rear position lamps provided that these are fitted in accordance with the relevant provisions of UNECE regulation No 53 as prescribed for vehicle category L3e (solo motorcycle).

3.2.5.2. Position:

— the position shall be as specified in UNECE regulation No 53 as prescribed for vehicle category L3e, except as follows:

▼B

3.2.5.2.1. In width:

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm (this limit value does not apply to a second rear position lamp fitted to the motorcycle).

3.2.5.3. Geometric visibility:

— the rear position lamps on the side-car and motorcycle may be considered as a pair.

3.2.5.4. In all remaining respects, rear position lamps shall comply with the requirements of UNECE regulation No 53 as prescribed for vehicle category L3e.

3.2.6. Stop lamps

3.2.6.1. Number:

— two or three;

— the side-car shall be equipped with one stop lamp;

— the motorcycle shall be equipped with one stop lamp; however, it may be equipped with two stop lamps provided that these are fitted in accordance with the relevant provisions of UNECE regulation No 53 as prescribed for vehicle category L3e (solo motorcycle).

3.2.6.2. Position:

— the position shall be as specified in UNECE regulation No 53 for vehicle category L3e, except as follows:

3.2.6.2.1. In width:

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm (this limit value does not apply to a second stop lamp fitted to the motorcycle).

3.2.6.3. Geometric visibility:

— the stop lamps on the side-car and motorcycle may be considered as a pair.

3.2.6.4. In all remaining respects, stop lamps shall comply with the requirements of UNECE regulation No 53 as prescribed for vehicle category L3e.

3.2.7. Rear retro-reflector (non-triangular)

3.2.7.1. Number:

— two or three;

— the side-car shall be equipped with one rear retro-reflector;

▼B

— the motorcycle shall be equipped with one rear retro-reflector, or two, provided that these are fitted in accordance with the relevant provisions of UNECE regulation No 53 as prescribed for vehicle category L3e (solo motorcycle);

— additional rear retro-reflecting devices and materials are permitted provided that they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

3.2.7.2. Position:

— the position shall be as specified in UNECE regulation No 53 for vehicle category L3e, except as follows:

3.2.7.2.1. In width:

— the lateral distance between the outward edges of the light-emitting surfaces and the outermost edges of the vehicle shall not exceed 400 mm (this limit value does not apply to a second rear retro-reflector fitted to the motorcycle or any additional rear retro-reflecting devices and materials fitted to the vehicle).

3.2.7.3. Geometric visibility:

— the rear retro-reflectors on the side-car and motorcycle may be considered as a pair.

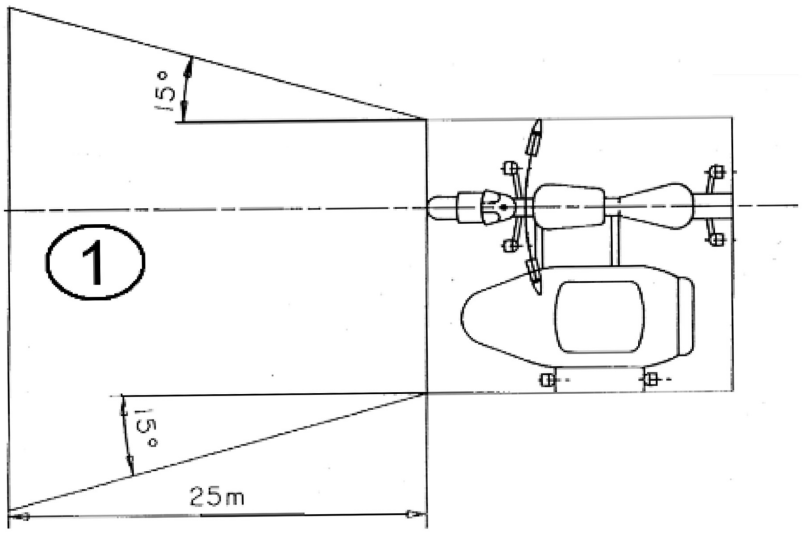
3.2.7.4. In all remaining respects, rear retro-reflectors shall comply with the requirements of UNECE regulation No 53 as prescribed for vehicle category L3e.

3.2.8. Visibility of a red light towards the rear and a white light towards the front.

3.2.8.1. Zone 1 and Zone 2, as referred to in UNECE regulation No 53, are applied as follows: see Figures 9-5 and 9-6.

Figure 9-5

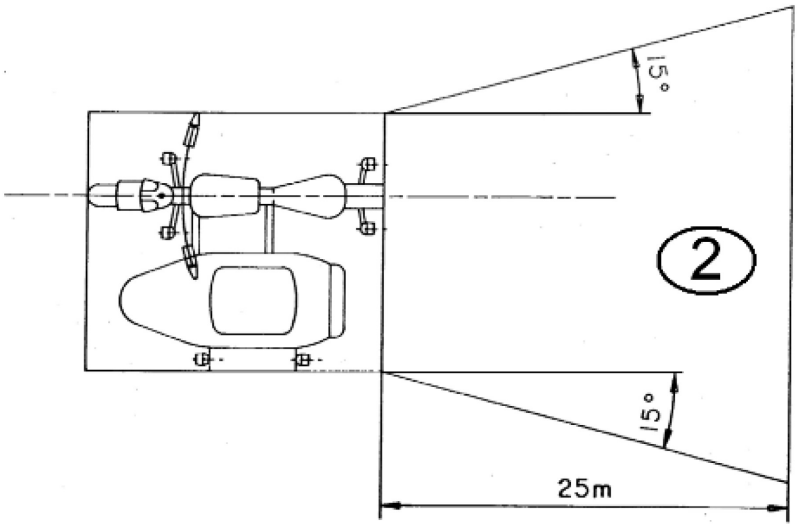
Direct visibility towards the front of the light-emitting surface of a lamp emitting red light



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Figure 9-6

Direct visibility towards the rear of the light-emitting surface of a lamp emitting white light



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ANNEX X

Requirements regarding rearward visibility

1. Vehicles of categories L1e-B, L3e and L4e shall meet all the relevant requirements of UNECE regulation No 81.

1.1. Vehicles of categories L1e-B, L3e and L4e may be fitted with Class II or III devices for indirect vision which are type-approved according to UNECE regulation No 46.

2. Vehicles of categories L2e, L5e, L6e and L7e shall meet all the relevant requirements of UNECE regulations Nos 81 or 46.

2.1. Vehicles of categories L2e, L5e, L6e and L7e meeting the relevant requirements of UNECE regulation No 81 may be fitted with Class II or III devices for indirect vision which are type-approved according to UNECE regulation No 46.

2.2. Vehicles of categories L2e, L5e, L6e and L7e may optionally be fitted with an additional Class I device.

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ANNEX XI

Requirements applying to roll-over protective structure (ROPS)

1. Requirements for the approval of a type of vehicle with regard to roll-over protective structure

1.1. Vehicles of category L7e-B2 shall be equipped with a roll-over protection structure (ROPS) and so designed and constructed as to fulfil the essential purpose laid down in this Annex. This condition is considered to be fulfilled if the prescriptions in points 2 to 4.9 are complied with, if no part of the zone of clearance has been entered by the protection structure, and if no part of the zone of clearance has been exposed outside the boundaries of the protection structure at any time during the three tests.

2. Testing provisions

2.1. General testing provisions

2.1.1. Tests conducted using special rigs are intended to simulate the loads imposed on a protection structure when the vehicle overturns. These test loads therefore concern push forces. The tests as described in this Annex enable observations to be made on the strength of the protection structure and any brackets attaching it to the vehicle and any parts of the vehicle which transmit the test force.

2.2. Preparation of the test

2.2.1. The protection structure submitted for type-approval shall conform to the series production specifications. It shall be attached to the vehicle for which it is designed in accordance with the manufacturer's declared method. A complete vehicle is not required for the test; however, the protection structure and parts of the vehicle to which it is attached for the tests shall represent an operating installation, hereinafter referred to as 'the assembly'.

2.2.2. The assembly shall be secured to the bedplate so that the members connecting the assembly and the bedplate do not deflect significantly in relation to the protection structure under loading. The method of attachment of the assembly to the bedplate shall not of itself affect the strength of the assembly.

2.2.3. The assembly shall be supported and secured or modified so that all the test energy is absorbed by the protection structure and its attachment to the rigid components of the vehicle.

2.2.3.1. To comply with the requirements of point 2.2.3, the modification shall lock any vehicle wheel and axle suspension system so as to ensure that it does not absorb any of the test energy.

2.2.4. For the tests, the vehicle shall be fitted with all structural components of the series production which may influence the strength of the protection structure or which may be necessary for the strength test. Components which may create a hazard in the zone of clearance shall also be fitted so that they may be examined for compliance with the requirements of point 1.1.

2.2.4.1. All components that the vehicle operator can remove shall be removed for the tests. If it is possible to keep doors and windows open or to remove them completely when the vehicle is in use, they shall be kept open or removed during the tests, so as not to increase the strength of the roll-over protection structure.

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3. Apparatus and equipment

3.1. Vertical loading tests (transverse and longitudinal)

3.1.1. Material, equipment and tie-down provisions shall be arranged so as to ensure that the assembly is firmly fixed to the bedplate, independently of wheels and axles if present (i.e. the mounting shall override any wheel or axle suspension). See Figures 11-1 and 11-2.

Figure 11-1

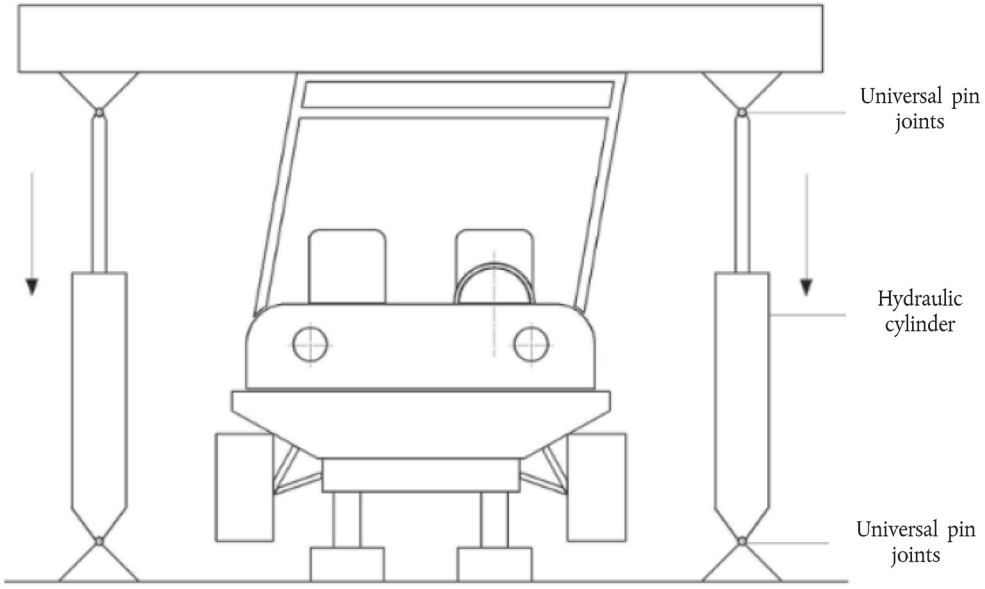
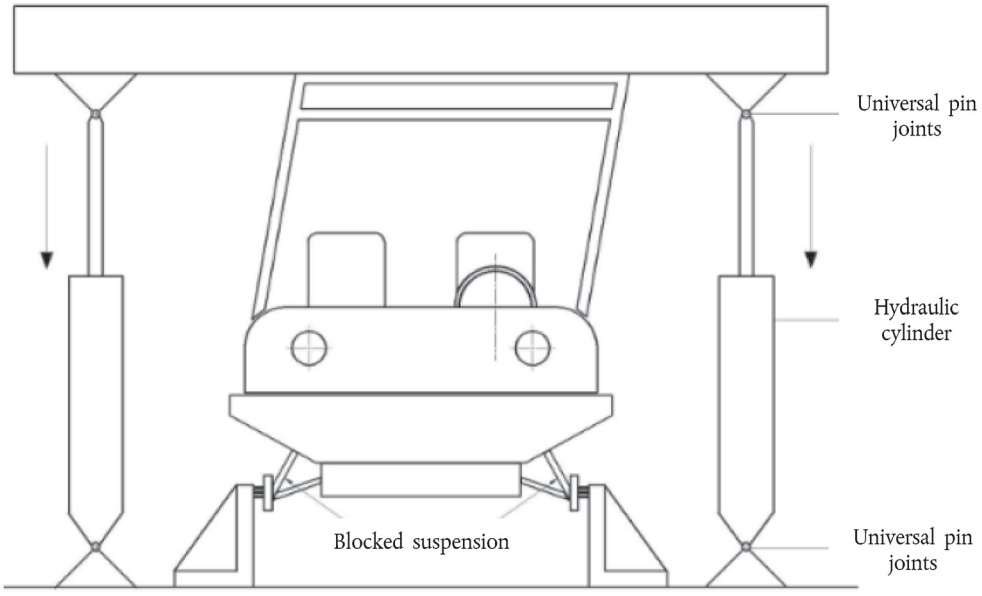


Figure 11-2



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3.1.2. The vertical forces on the protection structure shall be applied in turn through a transverse orientation stiff beam and a longitudinal orientation stiff beam on separate untested assemblies. The beam's vertical longitudinal median plane, as considered in the transverse direction in relation to the vehicle, shall be placed 300 mm forward of the driver's seat R-point for the transverse test. The beam's vertical longitudinal median plane, as considered in the longitudinal direction in relation to the vehicle, shall be placed inward of the vertical longitudinal plane touching the widest point of the top third of the protective structure at a distance equal to one sixth of the overall width of the top third. The left or right side of the protective structure of vehicle for the test shall be selected in accordance with point 4.3 and the technical service shall provide clear justification for the judgment criteria in the test report.

3.1.2.1. The beam shall be sufficiently stiff, have a bottom vertical face width of 150 ± 10 mm and be long enough to cover the entire protective structure, even when the latter is flexing under load.

3.1.2.2. Provision shall be made so that the load can be uniformly distributed normal to the direction of loading.

3.1.2.3. The edges of the beam in contact with the protection structure may have a radius of curvature of up to 25 mm.

3.1.2.4. Universal joints or the equivalent shall be incorporated to ensure that the loading device does not constrain the structure in rotation or translation in any direction other than the direction of loading.

3.1.2.5. Where the horizontal length of the protection structure to which the load is to be applied does not constitute a straight line normal to the direction of application of the load, the space shall be packed or otherwise filled so as to distribute the load horizontally over this length.

3.1.3. Equipment shall be provided for measuring the energy absorbed by the protection structure and the rigid parts of the vehicle to which it is attached, for example by measuring the force applied along its vertical direction of application and the corresponding vertical deflection of the beam relative to the horizontal plane passing through the R-point of the driver's seating position.

3.1.4. Visual means shall be provided to assess any intrusion or exposure of the zone of clearance during the force application.

4. Test provisions

4.1. If, during the test, any part of the test setup fixing and restraining equipment shifts significantly, the test shall be invalidated.

4.2. The protection structure to be tested need not be fitted with front, side or rear safety glazing or any detachable panels, fittings and accessories which have no function of structural strength and which cannot create a hazard in the event of overturning.

4.3. Where the driver's seat is not on the median longitudinal plane of the vehicle and/or where the strength of the structure is non-symmetrical, the vertical longitudinal loading shall be on the side most likely to lead to infringement or exposure of the zone of clearance during the test.

4.4. The protection structure shall carry the necessary equipment to obtain the data required to draw the force-deflection diagram.

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4.5. The rate of deflection under loading by the vertical force shall not exceed 5 mm/s. As the load is applied, the values F_v (N) (i.e. static load force exerted by the beam) and D_v (mm) (i.e. vertical deflection of the beam at the point of, and in line with, the load application) shall be recorded simultaneously at deflection increments of 15 mm or less to ensure sufficient accuracy. Once the initial application has commenced, the load shall not be reduced until the test has been completed; however, load increases may be suspended, for example to record measurements.

4.6. If no structural cross-member exists at the point of application, a substitute test beam which does not add strength to the structure may be used for the test procedure.

4.7. The energy (J) absorbed by the structure in each vertical loading test shall be at least equal to $E_v = 1{,}4 \times m_{test}$, (where m_{test} (kg) equals the vehicle mass in running order plus the mass of any propulsion batteries) and the minimum energy level to be achieved is calculated as follows: $E_v = F_v \times D_v / 1\,000$. F_v shall not exceed $2 \times m_{test} \times g$, even if the minimum energy level to be achieved is not reached.

4.8. The longitudinal vertical loading condition shall be repeated taking into account a simultaneously applied horizontal force component. First, a static horizontal transverse load equal to $F_h = 0{,}5 \times m_{test} \times g$ (where g equals 9,81 $m.s^{-2}$) shall be applied onto the widest point as described in point 3.1.2 and on the side selected in accordance with point 4.3. Then, the longitudinal vertical loading shall be applied at the same coordinates of the test performed without the horizontal transverse load, equal to $0{,}5 \times F_{v(max)}$ (where $F_{v(max)}$ is the maximum value of F_v observed during the test performed without the horizontal transverse load).

4.9. After each test, the final permanent deflection of the protection structure shall be recorded in the test report.

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ANNEX XII

Requirements applying to safety belt anchorages and safety belts

PART 1

Requirements for the approval of a type of vehicle with regard to safety belt anchorages and safety belts

1. General requirements

1.1. Vehicles of categories L2e, L5e, L6e and L7e with a mass in running order > 270 kg shall be fitted with safety belt anchorages and safety belts on seats (i.e. not required in case of saddles), complying with the requirements of this Annex.

1.2. Vehicles of categories L2e, L5e, L6e and L7e with a mass in running order ≤ 270 kg may be fitted with safety belt anchorages and/or safety belts, provided that these comply with the requirements of this Annex.

1.3. The number of safety belt anchorages provided shall be sufficient to facilitate the correct installation of the mandatory, voluntary or optionally installed safety belt on any given seat.

1.4. Safety belt anchorages shall conform to the 7/16-20 UNF 2B thread size and tolerance specifications.

1.4.1. However, if the vehicle manufacturer has fitted safety belts as standard equipment to specific seating positions, the safety belt anchorages for those seating positions may have characteristics different from those specified in point 1.4.

1.4.2. Anchorage points complying with the specific provisions for the installation of special-type (e.g. harness-type) safety belts may have characteristics different from those specified in point 1.4.

1.5. It shall be possible to remove a safety belt without any remaining damage to the safety belt anchorage point.

1.6. The R-point of a seating position shall be determined as follows:

1.6.1. The R-point of a saddle shall be taken as declared by the vehicle manufacturer and duly justified by means of appropriate vehicle design criteria taking into account the characteristics of a 50th percentile male manikin (i.e. Hybrid III anthropomorphic test device) and its hip pivot point.

1.6.2. The R-point of a seat shall be established in accordance with the provisions in Appendix 3 to Part 2 of Annex VII to this Regulation.

PART 2

Requirements applying to safety belt anchorages

1. Specific requirements for safety belt anchorages

1.1 The safety belt anchorages may be incorporated within the chassis, bodywork, seat or any other structure of the vehicle.

1.2. A single safety belt anchorage point may be used for attaching the safety belts for two adjacent seating positions.

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1.3. The permitted locations of the effective safety belt anchorage points for all seating positions are indicated in Figures 11-P2-1 and 11-P2-2 and clarified below.

1.4. Position of the lower effective safety belt anchorages

1.4.1. The α_1 and α_2 angles shall lie between 30° and 80° in all normal positions of use of the seat.

1.4.2. If seats are fitted with an adjustment system and the manufacturer's declared torso angle is less than 20°, the α_1 and α_2 angles referred to in the previous point may lie between 20° and 80° in all normal positions of use of the seat.

1.4.3. The distance between the two vertical planes parallel to the longitudinal median plane of the vehicle and passing through each of the two lower effective anchorages L_1 and L_2 of the same safety belt shall not be less than 350 mm. This may be reduced to 240 mm in the case of a centre-row rear seating position. The longitudinal median plane of the seating position shall pass points L_1 and L_2 at no less than 120 mm from those points.

1.5. Location of the upper effective safety belt anchorages

1.5.1. If a strap guide, D-ring or similar device affecting the position of an effective safety belt upper anchorage is used, that position is determined in a conventional manner by considering the position of the anchorage when the safety belt is worn by an occupant, represented by a 50th percentile male manikin, with the seat adjusted to the design position as specified by the vehicle manufacturer.

1.5.2. Points J_1 and J_2 shall be determined as follows:

point J_1 is determined in relation to the R-point by means of the following three segments:

— RZ: segments of torso reference line measured from the R-point upwards over a length of 530 mm;

— ZX: segment perpendicular to the longitudinal median plane of the vehicle measured from point Z in the direction of the anchorage and having a length of 120 mm;

— XJ_1: segment perpendicular to the plane defined by segments RZ and ZX measured from point X forwards over a length of 60 mm;

point J_2 is determined by symmetry with point J_1 about the longitudinal plane vertically crossing the torso reference line of the relevant seat.

1.5.3. A single upper effective safety belt anchorage point shall comply with the following requirements:

1.5.3.1. The upper effective safety belt anchorage point shall lie below the plane FN that is perpendicular to the longitudinal median plane of the seating position and forms an angle of 65° with the torso reference line. For rear seats, this angle may be reduced to 60°. The plane FN may therefore not be perfectly horizontal and shall intersect the torso reference line at a point D so that:

$DR = 315\ mm + 1{,}8\ S.$

However, if S does not exceed 200 mm:

$DR = 675\ mm.$

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1.5.3.2. The upper effective safety belt anchorage point shall also lie behind plane FK perpendicular to the longitudinal median plane of the seat and intersect the torso reference line at an angle of 120° at a point B so that:

$$BR = 260 \text{ mm} + S.$$

If S is not less than 280 mm, the vehicle manufacturer may opt to use:

$$BR = 260 \text{ mm} + 0{,}8 \ S$$

1.5.3.3. The value S shall not be less than 140 mm.

1.5.3.4. The upper effective safety belt anchorage point shall also be located behind a vertical plane that is perpendicular to the longitudinal median plane of the vehicle and passes through the R-point.

1.5.3.5. The upper effective safety belt anchorage point shall also be located above the horizontal plane passing through the point C.

Point C is located 450 mm vertically above the R-point.

However, if distance S is 280 mm or more and if the vehicle manufacturer did not opt to use the alternative formula for BR in point 1.5.3.2, the vertical distance of 500 mm between point C and the R-point shall apply.

1.5.3.6. More than one actual upper safety belt anchorage point may be fitted, provided that all resulting effective safety belt anchorage points meet the requirements of points 1.5.3 to 1.5.3.5.

1.5.3.7. If the height of the upper safety belt anchorage point is manually adjustable without the use of any tools, all selectable upper safety belt anchorage point positions and the resulting effective safety belt anchorage points shall comply with the requirements of points 1.5.3 to 1.5.3.5. In this case, the permitted area as defined above may be enlarged by shifting it 80 mm upwards and downwards in the vertical direction; however, the permitted area remains bounded by the horizontal plane passing through point C (See Figure 11-P2-1).

1.5.4. Anchorage points intended for special-type (e.g. harness-type) safety belts

1.5.4.1. Any additional upper effective safety belt anchorage point shall lie on the opposite side of the first upper effective anchorage point in relation to the longitudinal median plane of the seating position. In addition:

— both upper safety belt effective anchorage points shall be located above the horizontal plane passing through the point C;

— both upper safety belt effective anchorage points shall be located behind the transverse plane passing through the torso reference line;

— where there is a single actual safety belt anchorage point (i.e. both ends of the safety belt are to be attached to a single anchorage point), this shall be located within the area common to two dihedrals bounded by vertical lines passing through the points J_1 and J_2, and for each point forming an angle of 30° horizontally

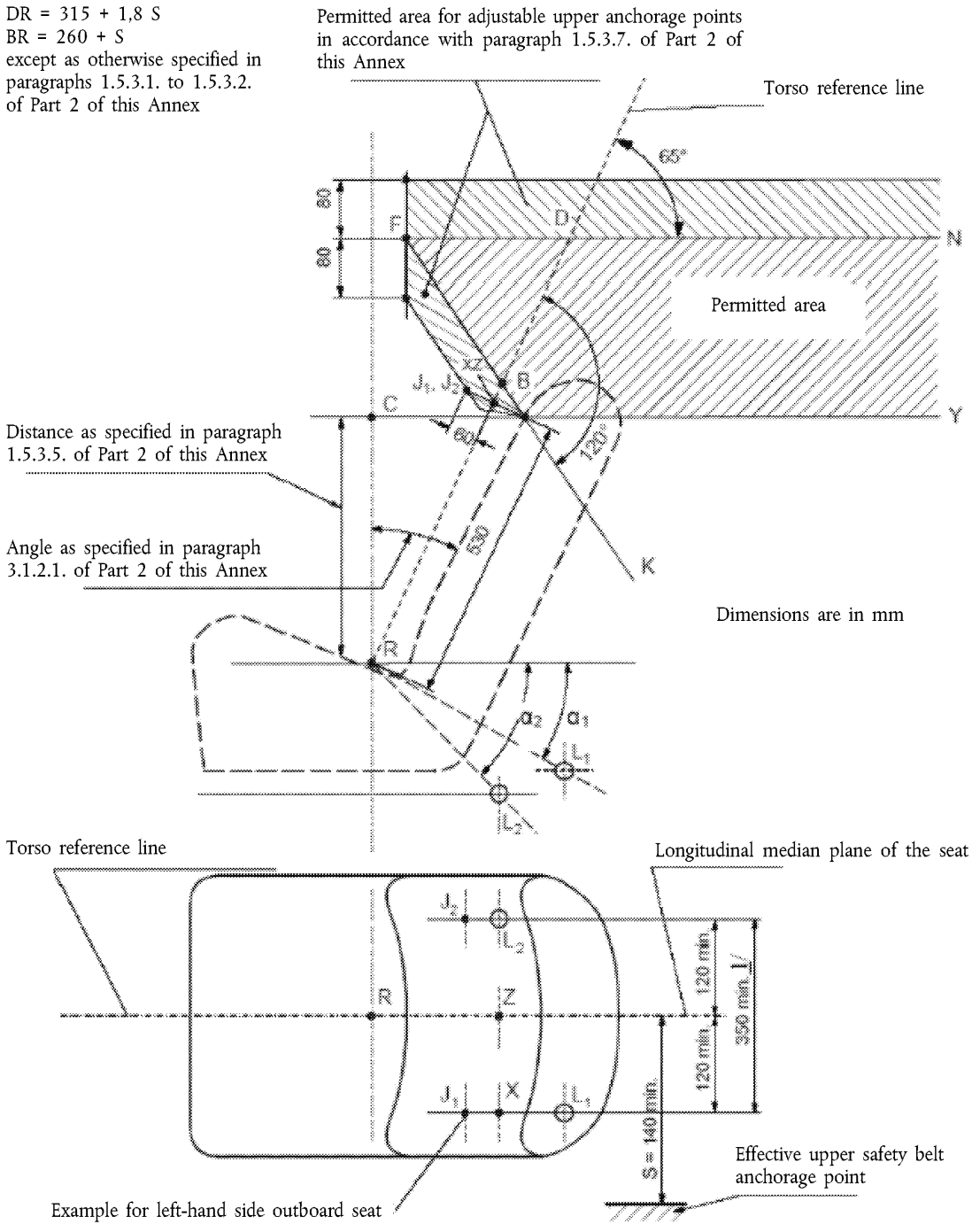
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between two vertical planes which are in turn related to the two vertical longitudinal planes intersecting both J_1 and J_2 and forming an outward angle of 10° and an inward angle of 20° with those longitudinal planes. (See Figure 11-2);

— where there are two separate actual safety belt anchorage points, these shall be located within each of the respective areas formed by dihedrals bounded by vertical lines passing through the points J_1 and J_2, and for each point forming an angle of 30° horizontally between two vertical planes which are in turn related to the two vertical longitudinal planes intersecting both J_1 and J_2 and forming an outward angle of 10° and an inward angle of 20° with those longitudinal planes. (See Figure 11-P2-2). In addition, the two anchorage points shall be so located that they are no more than 50 mm apart in any direction when one of the points is mirrored in relation to the vertical longitudinal plane passing through the R-point of the seating position in question.

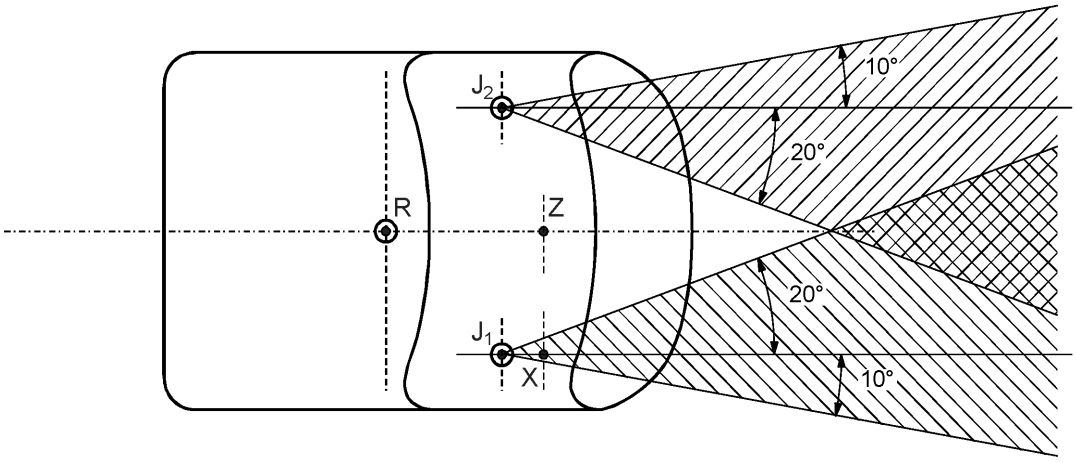
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Figure 11- P2-1



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Figure 11- P2-2



2. Strength of safety belt anchorages

2.1. Each safety belt anchorage point shall capable of withstanding the tests provided for in points 3 to 3.5.1. Permanent deformation, including partial rupture of an anchorage or the surrounding area, does not constitute failure if the required force is sustained for the specified time. During the test, the minimum distances for the lower effective safety belt anchorage points set out in point 1.4.3 and the minimum height of the upper effective safety belt anchorage points set out in point 1.5.3.5 shall be maintained.

2.2. Displacement systems fitted to seats shall be capable of being manually activated once after the tractive force is no longer applied.

3. Testing provisions

3.1. General testing provisions

3.1.1. Subject to the provisions set out in points 3.2 to 3.2.3 and in line with the manufacturer's request:

3.1.1.1. The tests may be carried out on either a vehicle structure or a fully finished vehicle.

3.1.1.2. The windows and doors may be installed and placed in the open or closed position.

3.1.1.3. Any normally fitted component which is likely to contribute to the overall structural integrity of the vehicle may be installed.

3.1.2. All seats shall be adjusted to a position of use for normal driving, as selected by the technical service responsible for carrying out the type-approval tests, and it shall be ensured that the least favourable (i.e. worst-case) positions of the seats are assessed during the tests.

3.1.2.1. The position of the seats shall be accurately recorded in the report. If its angle is adjustable, the backrest shall be locked in position in accordance with the manufacturer's instructions or, in their absence, in a position corresponding to a torso angle as close as possible to 25°.

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3.2. Provisions for securing and restraining the vehicle during the test

3.2.1. The method used to restrain the vehicle during the test shall not have the effect of reinforcing the anchorage or anchorage areas, or interfere with the normal deformation of the structure.

3.2.2. The method used to restrain the vehicle during the test is considered satisfactory if it has no effect on an area extending throughout the width of the structure and if the vehicle or structure is locked or attached at the front at an overall distance of at least 500 mm from the actual anchorage point to be tested and held or attached at the rear at an overall distance of at least 300 mm from the actual anchorage point to be tested.

3.2.3. It is recommended that the structure rests on supports directly below the wheel axles or, if this is not possible, directly below the wheel suspension points.

3.3. General test requirements

3.3.1. All the anchorages within the same group of seats shall be tested simultaneously.

3.3.2. The tractive force shall be applied forwards at an angle of 10° ± 5° above the horizontal in a plane parallel to the longitudinal median plane of the vehicle.

3.3.3. The loading shall begin as quickly as possible. The anchorages shall withstand the specified load for at least 0,2 seconds.

3.3.4. The traction devices to be used for the tests described in points 3.4 to 3.4.5.2 shall comply with the specifications laid down in Annex 5 to UNECE regulation No 14 ([1]). The width of the traction device shall be selected so as to correspond with, or be as close as possible to, the design value of the width between the lower effective safety belt anchorages.

3.3.5. Safety belt anchorages for seats fitted with upper anchorages shall be tested under the following conditions:

3.3.5.1. Outboard front seating positions:

In the case of safety belts incorporating a inertia reel retractor attached to a separate lower side anchorage point:

— the anchorages are subjected to the test laid down in points 3.4.1 to 3.4.1.3 in which the forces are applied to them by means of a device reproducing the geometry of a three-point belt incorporating an inertia reel retractor attached to a lower side anchorage and a D-ring acting through the upper anchorage.

([1]) OJ L 109, 28.4.2011, p. 1.

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In the case of safety belts not incorporating a inertia reel retractor attached to a separate lower side anchorage point:

— the anchorages shall be subjected to the test laid down in points 3.4.2 to 3.4.2.2. in which the forces are applied to them by means of a device reproducing the geometry of a three-point non-inertia reel belt;

— the lower anchorages shall in addition be subjected to the test laid down in points 3.4.3 to 3.4.3.1 in which the forces are transferred to the lower anchorages by means of a device representing a lap belt;

— the two tests may be carried out on two different structures at the request of the manufacturer.

If the height of the upper safety belt anchorage point is manually adjustable without the use of any tools, it shall be set in the least favourable (i.e. worst-case) position as decided by the technical service.

In the case of multiple upper safety belt anchorage points for use with a special-type (e.g. harness-type) safety belt, these shall all be subjected to the test required in points 3.4.5 to 3.4.5.2, in which the forces are applied to them by means of a device reproducing the geometry of the type of safety belt intended to be attached to those anchorages.

3.3.5.2. Rear outboard seating positions and/or centre seating positions:

In the case of three-point safety belts incorporating a inertia reel retractor attached to a separate lower side anchorage point:

— the anchorages are subjected to the test laid down in points 3.4.1 to 3.4.1.3 in which the forces are applied to them by means of a device reproducing the geometry of a three-point belt incorporating an inertia reel retractor attached to a lower side anchorage and a D-ring acting through the upper anchorage.

In the case of three-point safety belts not incorporating a inertia reel retractor attached to a separate lower side anchorage point:

— the anchorages shall be subjected to the test laid down in points 3.4.2 to 3.4.2.2 in which the forces are applied to them by means of a device reproducing the geometry of a three-point non-inertia reel belt;

— the lower anchorages shall in addition be subjected to the test laid down in points 3.4.3 to 3.4.3.1 in which the forces are transferred to the lower anchorages by means of a device representing a lap belt;

— at the request of the manufacturer, the two tests may be carried out on two different structures.

If the height of the upper safety belt anchorage point is manually adjustable without the use of any tools, it shall be set in the least favourable (i.e. worst-case) position as decided by the technical service.

In the case of multiple upper safety belt anchorage points for use with a special-type (e.g. harness-type) safety belt, they shall all be subjected to the test required in points 3.4.5. to 3.4.5.2., in which the forces are applied to them by means of a device reproducing the geometry of the type of safety belt intended to be attached to those anchorages.

3.3.6. Safety belt anchorages for seating positions not fitted with upper anchorages shall be tested under the following conditions:

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3.3.6.1. Outboard front seating positions:

In the case of two-point or lap safety belts:

— not permitted.

3.3.6.2. Rear outboard seating positions and/or centre seating positions:

In the case of two-point or lap safety belts:

— the lower anchorages shall be subjected to the test laid down in points 3.4.3 to 3.4.3.1 in which the forces are transferred to the lower anchorages by means of a device representing a lap belt.

3.3.7. If the safety belt systems to be installed in the vehicle require the use of specific equipment such as brackets, rollers, additional anchorages or guides, without which the testing straps or cables cannot be attached directly to the anchorages, such equipment shall be mounted and used during all tests as appropriate.

3.4. Specific requirements for the tests to be carried out on vehicles having a mass in running order ≤ 600 kg

3.4.1. Test in three-point belt configuration incorporating a retractor having a D-ring, pulley or strap guide at the upper actual safety belt anchorage

3.4.1.1. A reverser, pulley or guide for the cable or strap with the characteristics needed to transfer the forces from the traction device is attached to the upper anchorages. A normal safety belt system may be used instead.

3.4.1.2. A test loading of 675 daN ± 20 daN shall be applied to a shoulder belt traction device attached to the belt anchorages by means of a cable or strap reproducing the geometry of the upper diagonal strap of the corresponding safety belt.

3.4.1.3. At the same time, a tractive force of 675 daN ± 20 daN shall be applied to a lap belt traction device attached to the two lower anchorages.

3.4.2. Test in three-point belt configuration without a retractor or with a retractor mounted directly to the upper actual anchorage point

3.4.2.1. A test loading of 675 daN ± 20 daN shall be applied to a shoulder belt traction device attached to the upper anchorage and to the opposite lower belt anchorage of the same safety belt using, if fitted as standard equipment by the manufacturer, a retractor fixed at the upper actual safety belt anchorage.

3.4.2.2. At the same time, a tractive force of 675 daN ± 20 daN shall be applied to a lap belt traction device attached to the two lower anchorages.

3.4.3. Test in lap-belt configuration

3.4.3.1. A test loading of 1 110 daN ± 20 daN shall be applied to a lap belt traction device attached to the two lower anchorages.

3.4.4. Additional test requirements in the case of safety belt anchorage points located wholly within the seat structure or dispersed between the vehicle structure and the seat structure

3.4.4.1. The three specific safety belt configuration tests in points 3.4.1, 3.4.2 and 3.4.3 shall be conducted while an additional force, as specified below, is exerted for each seat and/or each group of seats.

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3.4.4.2. The additional longitudinal and horizontal force shall be equal to ten times the weight of the complete seat and applied directly to the centre of gravity of the seat structure in question through a separate force application device.

3.4.5. Test in special-type belt configuration (other than those for three-point belt or lap-belt)

3.4.5.1. A test loading of 675 daN ± 20 daN shall be applied to a shoulder belt traction device attached to the belt anchorages meant for a special-type safety belt, by means of cables or straps reproducing the geometry of the upper diagonal strap or straps of the corresponding safety belt.

3.4.5.2. At the same time, a tractive force of 675 daN ± 20 daN shall be applied to a lap-belt traction device attached to the two lower anchorages.

3.5. Specific requirements for the tests to be carried out on vehicles having a mass in running order > 600 kg or where the vehicle manufacturer chooses to fulfil these requirements on a voluntary basis

3.5.1. Vehicles covered by the criteria set out in point 3.5 shall meet all the relevant requirements of UNECE regulation No 14 with regard to anchorages for safety belts intended for adult occupants, as prescribed for vehicle category M_1.

3.6. If an ISOFIX anchorage system or a system which resembles ISOFIX is fitted optionally to the vehicle, all relevant location, marking and strength requirements for such systems in UNECE regulation No 14 shall be met.

3.6. Test report requirements

3.6.1. The deformation of the safety belt anchorage points and the load supporting structures resulting from the application of the loads as specified in points 3.4 to 3.5.1 shall be accurately recorded after the tests and included in the test report.

PART 3

Requirements applying to the installation of safety belts

1. In the absence of specific requirements for vehicles of categories L2e, L5e, L6e and L7e in UNECE regulation No 16, vehicles of those categories which are fitted with safety belts shall meet all relevant requirements of that regulation as prescribed for vehicle category N_1, as well as the following:

1.1. Without prejudice to the requirements of points 1.1 and 1.2 of Part 1, concerning the mass in running order, safety belts shall be fitted to all seating positions consisting of seats.

1.1.1. The driver's seating position (including where this is central) shall in this case always be fitted with a three-point or harness-type safety belt.

1.2. Vehicles of categories L7e-A2, L7e-B2 and L7e-C shall be fitted with three-point or harness-type safety belts on all seating positions, regardless of the vehicle mass in running order.

1.3. Any reference in UNECE regulation No 16 to UNECE regulation No 14 shall be understood as a reference to Part 2, where appropriate.

1.4. Safety belts may be fitted to seating positions consisting of saddles. These may be two-point or lap safety belts, rather than three-point safety belts, but shall meet all the remaining relevant requirements.

1.5. All safety belts shall be type-approved and fitted in accordance with the safety belt manufacturer's specifications.

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ANNEX XIII

Requirements applying to seating positions (saddles and seats)

1. Requirements for the approval of a type of vehicle with regard to seating positions

1.1. Vehicles shall be fitted with at least one seat or saddle.

1.1.1. All seating positions shall be forward-facing.

1.2. Vehicles without bodywork may have saddles.

1.3. Vehicles of categories L2e, L5e, L6e and L7e which are fitted with bodywork shall have seats.

1.3.1. By way of derogation to Article 2(5) of this Regulation and for the purpose of this Annex, a vehicle is deemed to have bodywork if there are structural elements beside and/or behind the lowest seating position which exceed the height of the R-point of the seating position in question. The area concerned is thus located in and behind the transverse vertical plane passing through the R-point of the seating position in question. Other seating positions, back rests, luggage compartments and racks, and any other fittings or components mounted to them, shall not be regarded as structural elements in this context (i.e. side doors, B-pillars and/or roof are regarded as bodywork). The technical service shall provide clear justification for the judgment criteria in the test report.

1.4. The R-point of a seating position shall be determined as follows:

1.4.1. The R-point of a saddle shall be taken as declared by the vehicle manufacturer and duly justified by means of appropriate vehicle design criteria taking into account the characteristics of a 50th percentile male manikin (i.e. Hybrid III anthropomorphic test device) and its hip pivot point.

1.4.2. The R-point of a seat shall be established in accordance with Appendix 3 to Part 2 of Annex VII to this Regulation.

1.5. All seats shall have seat backs.

1.5.1. In order to assess the functionality of a seat back, it shall be possible to carry out at least one of the procedures below for each seat.

1.5.1.1. The procedure for the determination of the H-point following the prescriptions in Annex 3 to UNECE regulation No 17 shall be carried out successfully (i.e. not taking into account any exemptions provided for in that regulation).

1.5.1.2. Where the procedure of point 1.5.1.1 cannot be carried out correctly for a specific seat, this shall be demonstrated satisfactorily and subsequently a 50th percentile male manikin (i.e. Hybrid III anthropomorphic test device) may instead be placed on the seat, which shall be adjusted to the design position as specified by the vehicle manufacturer. In this case, the R-point of the seat in question shall be taken as declared by the vehicle manufacturer and duly justified by means of appropriate vehicle design criteria taking into account the characteristics of a 50th percentile male manikin and its hip pivot point. The technical service shall provide clear justification for the judgment criteria in the test report.

1.5.1.3. If neither procedure can be carried out correctly, the seat and seat back are deemed not to comply with the requirements of this Annex.

1.6. Spaces resembling seating positions, but not designated as such, shall not be permitted.

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1.6.1. Spaces resembling seats and on which a 5th percentile adult female manikin can be seated shall be regarded as seats and shall therefore meet all relevant requirements of this Annex.

1.7. The height of the R-point of the seating position of the driver or rider shall be ≥ 540 mm in the case of vehicles of categories L1e, L3e and L4e and ≥ 400 mm in the case of vehicles of categories L2e, L5e, L6e and L7e, as measured from the ground surface.

1.7.1. If the vehicle is equipped with systems which can change the vehicle's riding height, this shall be set in the normal running condition as specified by the vehicle manufacturer.

1.8. All seats and saddles which are fitted with safety belt anchorage points and/or safety belts shall be capable of withstanding a deceleration of 10 g for 20 ms in forward direction without breakage. If fitted, locking, adjustment and displacement systems shall not malfunction or release. Displacement systems fitted to seats shall be capable of being manually activated once after being subjected to the deceleration.

1.8.1. Compliance with point 1.8 shall be demonstrated as follows:

— for seats:

— by submitting representative parts of the vehicle to a deceleration of 10 g in forward direction for at least 20 ms or

— by performing the test in points 3.4.4 to 3.4.4.2 of Part 2 of Annex XII,

— for saddles:

— by exerting in the forward direction, in its centre of gravity, a force equal to ten times the weight of the complete saddle in question.

2. Child restraint systems

2.1. Child restraint systems complying with UNECE regulation No 44 ([1]) may be recommended by the vehicle manufacturers for use in vehicles of categories L2e, L5e, L6e and L7e fitted with safety belts and/or ISOFIX.

2.1.1. In this case, all relevant requirements of UNECE regulation No 16 regarding the installation of child restraint systems shall be met, including those regarding information provided in the vehicle's instruction manual.

2.2. Child restraint systems complying with UNECE regulation No 44 may be recommended by the vehicle manufacturers for use in side-cars of vehicles of category L4e fitted with safety belts and/or ISOFIX.

2.2.1. In this case, the safety belt anchorages shall comply with the requirements of points 1.3 to 1.6.2 of Part 1 of Annex XII and points 1 to 3.6.1 of Part 2 of Annex XII; however, seats in side-cars may be fitted with two-point lap belts.

2.2.2. All relevant requirements of UNECE regulation No 16 regarding the installation of child restraint systems shall be met, including those regarding the information to be provided in the vehicle's instruction manual.

([1]) OJ L 233, 9.9.2011, p. 95.

▼B

ANNEX XIV

Requirements regarding steer-ability, cornering properties and turn-ability

1. Requirements for the approval of a type of vehicle with regard to steer-ability, cornering properties and turn-ability

1.1. Vehicles of categories L1e and L3e shall be tested according to the provisions of points 2 to 2.6 and meet the relevant requirements.

1.2. Vehicles of categories L2e, L4e, L5e, L6e and L7e shall be tested according to the provisions of points 2 to 2.8 and meet the relevant requirements. In addition, these vehicles shall meet the specific construction requirements of points 1.2.1 to 1.2.2.2.

1.2.1. Vehicles shall be constructed so that all wheels are capable of rotating at different individual speeds at all times. A device such as a differential may be installed; these may be locked automatically or by external means, but shall normally be unlocked.

1.2.1.1. The locking function of such a device shall not be used to comply with specific braking requirements in Annex III, in particular regarding braking action being required, operating on all the vehicle's wheels.

1.2.2. Vehicles of categories L2e, L5e, L6e and L7e which are fitted with bodywork shall be equipped with a device for reversing which can be operated from the driver's position.

1.2.2.1. By way of derogation to Article 2(5) of this Regulation and for the purpose of this Annex, a vehicle is deemed to have bodywork if there are structural elements beside and/or behind the lowest seating position which exceed the height of the R-point of the seating position in question. The area concerned is thus located in and behind the transverse vertical plane passing through the R-point of the seating position in question. Other seating positions, back rests, luggage compartments and racks, and any other fittings or components mounted to them, shall not be regarded as structural elements in this context (i.e. side doors, B-pillars and/or roof are regarded as bodywork). The technical service shall provide clear justification for the judgment criteria in the test report.

1.2.2.2. Vehicles of category L2e with a technically permissible maximum mass ≤ 225 kg, not fitted with a safety belt on the driver's seating position and which cannot be fitted with side doors, are exempted from the requirement to be fitted with a device for reversing.

2. Test provisions

2.1. The tests shall be conducted on a level surface affording good adhesion.

2.2. During the tests, the vehicle shall be loaded to its technically permissible maximum mass.

2.3. The tyre pressures shall be adjusted to the values specified by the vehicle manufacturer for the relevant load condition.

2.4. It shall be possible to steer a vehicle from a straight ahead direction into a spiral with a final turning circle radius of 12 m at a speed of at least 6 km/h. In order to demonstrate compliance, one steering movement shall be made to the right and one to the left.

▼B

2.5. It shall be possible to leave a curve with a turning circle radius of ≤ 50 m at a tangent without unusual vibration in the steering equipment at 50 km/h or at the maximum design vehicle speed, if this is lower. In order to demonstrate compliance, one steering movement shall be made to the left and one to the right.

2.5.1. The test speed may be reduced to 45 km/h if the radius is 40 m, 39 km/h if the radius is 30 m, 32 km/h if the radius is 20 m and 23 km/h if the radius is 10 m.

2.6. It shall be possible to travel along a straight section of road surface without unusual steering corrections by the rider or driver and without unusual vibration in the steering system at 160 km/h for vehicles with a maximum design speed ≥ 200 km/h, at 0,8 × V_{max} for vehicles with a maximum design speed < 200 km/h or the actual maximum speed which the vehicle can attain in the test load condition, if this is lower.

2.7. When a vehicle of category L2e, L4e, L5e, L6e or L7e is driven in a circle with its steered wheels at approximately half lock and a constant speed of at least 6 km/h, the turning circle shall remain the same or become larger if the steering control is released.

2.8. Vehicles of category L4e from which the side-car can be detached so that the motorcycle can be used without it shall fulfil the requirements for solo motorcycles in point 1.1 as well as those in point 1.2.

▼B

ANNEX XV

Requirements regarding the installation of tyres

1. Requirements for the approval of a type of vehicle with regard to the installation of tyres

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1.1. Subject to the provisions of points 1.1.1. to 1.1.2., all tyres fitted to vehicles, including any spare tyre, shall be type-approved according to UNECE regulation No 75.

1.1.1. Where a vehicle is designed for conditions of use which are incompatible with the characteristics of tyres type-approved according to UNECE regulation No 75 as applicable in the Union legislation at the time of type-approval testing of the vehicle and it is therefore necessary to fit tyres with different characteristics, the requirements of point 1.1. do not apply, provided that the following conditions are met:

— the tyres are type-approved according to Council Directive 92/23/EEC ([1]), Regulation (EC) No 661/2009 of the European Parliament and of the Council ([2]) or UNECE regulation No 106; and

— the approval authority and technical service are satisfied that the tyres fitted are suitable for the operating conditions of the vehicle. The nature of this exemption and reasons for acceptance shall be clearly stated in the test report.

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1.1.2. Vehicles of categories L1e, L2e and L6e with a technically permissible maximum mass ≤ 150 kg may be fitted with non-type-approved tyres with a section width ≤ 67 mm.

▼M1

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2. Tyre fitment

2.1. All tyres normally fitted to the same axle, except those on side-cars of L4e category vehicles, shall be of the same type.

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2.2. The vehicle manufacturer may restrict the category of use of original and replacement tyres that may be installed on the vehicle. In this case, the categories of use of tyres that may be fitted to the vehicle shall be clearly stated in the vehicle's instruction manual.

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2.3. The space in which each wheel revolves shall be such as to allow unrestricted movement when using the maximum permissible size of tyres and rim widths, taking into account the minimum and maximum wheel off-sets if applicable, within the minimum and maximum suspension and steering constraints as declared by the vehicle manufacturer. This shall be verified by performing the checks for the largest and the widest tyre in each space, taking into account the applicable rim size

([1]) Council Directive 92/23/EEC of 31 March 1992 on tyres for motor vehicles and their trailers (OJ L 129, 14.5.1992, p. 95).

([2]) Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor (OJ L 200, 31.7.2009, p. 1).

▼M1

and the maximum allowed section width and outer diameter of the tyre, in relation to the tyre size designation as specified in the applicable legislation. The checks shall be performed by rotating a representation of the tyre's permissible overall dimensions in the form of a maximum envelope, not just the actual tyre, in the space for the wheel in question.

2.3.1. All tyres that may be fitted to the vehicle in accordance with point 2.2. shall be taken into account for the determination of the permissible overall dimensions (i.e. the maximum envelope) of the relevant tyre, as applicable in the Union legislation at the time of type-approval testing of the vehicle. For this purpose, either the specifications as provided for in Annex 5 of UNECE Regulation No 75 or the permitted percentages as provided for sizes not included in that Annex shall be taken into account (e.g. overall width of multiservice tyres (MST) + 25 %, normal and snow service tyres + 10 % in case of rim diameter code 13 and above and + 8 % in case of rim diameter codes up to 12 inclusive).

2.3.2. In addition, the permissible dynamic growth of the height of bias and bias/belted construction tyres which are type-approved according to UNECE regulation No 75 depends on the speed category and the category of use of the tyre. To ensure an appropriate selection of bias and bias/belted replacement tyres for the end-user of the vehicle, the vehicle manufacturer shall take into account both the permitted categories of use as well as the speed category that is compatible with the maximum design vehicle speed, for the determination of the permitted tolerance laid down in point 4.1. of Annex 9 to UNECE regulation No 75 (i.e. $H_{dyn} = H \times 1{,}10$ up to $H_{dyn} = H \times 1{,}18$). More stringent categories may be taken into account at the discretion of the vehicle manufacturer.

2.4. The technical service may agree to an alternative test procedure (e.g. virtual testing) to verify that the requirements of point 2.3. to 2.3.2. are met, provided that the clearance between the tyre's maximum envelope and vehicle structure exceeds 10 mm at all points.

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3. Load capacity

3.1. The maximum load rating of each tyre with which the vehicle is fitted shall be at least equal to the following:

— the maximum permissible mass on the axle where the axle is equipped with one tyre only;

— half of the maximum permissible mass on the axle where the axle is equipped with two tyres in single formation;

— 0,54 times the maximum permissible mass on the axle where the axle is equipped with two tyres in dual (twin) formation;

— 0,27 times the maximum permissible mass on the axle where the axle is equipped with two sets of tyres in dual (twin) formation;

— with reference to the maximum permissible mass on each axle as declared by the vehicle manufacturer.

3.1.1. The load capacity index indicated in the information document shall be the lowest grade which is compatible with the maximum permissible load on the tyre in question. Tyres with a higher grade may be fitted.

▼B

3.2. The relevant information shall be stated clearly in the vehicle's instruction manual in order to ensure that suitable replacement tyres with an appropriate load capacity are fitted when necessary once the vehicle has been put into service.

4. Speed capacity

4.1. Every tyre with which the vehicle is normally fitted shall bear a speed category symbol.

4.1.1. The speed category symbol shall be compatible with the maximum design vehicle speed.

4.1.1.1. The speed category as indicated in the information document shall be the lowest grade which is compatible with the maximum design vehicle speed. Tyres with a higher grade may be fitted.

4.1.2. In the case of tyres of speed categories V, W, Y and Z, the adjusted load rating as specified in the relevant Directive, EU Regulation or UNECE regulation shall be taken into account.

4.1.3. In the case of tyres of class C2 or C3, the adjusted load rating specified in point 2.29 of UNECE regulation No 54 shall be taken into account.

4.2. The requirements of point 4.1.1 to 4.1.3 shall not apply in the following situations:

4.2.1. In the case of temporary-use spare units.

▼M1

4.2.2. In the case of vehicles normally equipped with ordinary tyres and occasionally fitted with snow tyres, where the speed category symbol of the snow tyre shall correspond to a speed either greater than the maximum design vehicle speed or not less than 130 km/h (or both). However, if the maximum design vehicle speed is greater than the speed corresponding to the lowest speed category symbol of the fitted snow tyres, a maximum speed warning label, specifying the lowest value of the maximum speed capability of the fitted snow tyres or the manufacturer's recommended speed for the vehicle (whichever is lower), shall be displayed inside the vehicle in a prominent position or, if the vehicle does not have an interior, as close as possible to the instrument cluster, readily and permanently visible to the driver.

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4.3. The relevant information shall be stated clearly in the vehicle's instruction manual in order to ensure that suitable replacement tyres with an appropriate speed capacity are fitted when necessary once the vehicle has been put into service.

5. Tyre pressures

5.1. The vehicle manufacturer shall recommend the cold tyre pressure for each tyre for normal on-road use. It is permitted that more than one pressure or a range of pressures is declared, depending on the vehicle loading conditions. It is not permitted that multiple pressures are declared for the purpose of reducing wear or increasing fuel efficiency to the detriment of comfort, or any other similar purpose.

5.2. The declared cold tyre pressure(s) in compliance with point 5.1 shall be stated on the vehicle (e.g. on one or more labels). The information shall be clearly legible without the need to remove any parts with the use of tools and shall be affixed in a way that it is not easily removed.

5.3. The relevant information shall also be stated clearly in the vehicle's instruction manual in order to encourage the vehicle operator to frequently check the tyre pressures and to adjust them if necessary.

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ANNEX XVI

Requirements applying to the vehicle maximum speed limitation plate and its location on the vehicle

1. Requirements for the approval of a type of vehicle with regard to the maximum speed limitation plate and its location on the vehicle

1.1. Vehicles of categories L7e-B1 and L7e-B2 shall be fitted with a plate on which the maximum design vehicle speed is indicated.

1.2. Vehicles of categories L1e, L3e, L4e, L5e-A may be fitted with a plate on which the maximum design vehicle speed is indicated, provided that the requirements of this Annex are met.

2. Specific requirements concerning the plate

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2.1. All characters on the plate shall be formed by retro-reflective material type-approved as Class D, E or D/E according to UNECE regulation No 104 ([1]).

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2.2. The surface shall consist of a round white non-retro-reflective plate with a diameter of 200 mm.

2.2.1. The surface may be fixed onto a larger and differently shaped area such as bodywork, provided that all requirements are still complied with.

2.3. The number indicated on the plate shall be marked in orange digits.

2.3.1. The font type shall be normal, clearly legible, upright and common. Handwriting styles or italic scripts shall not be permitted.

2.3.2. All digits shall have the same font size, at least 100 mm in height and 50 mm in width, with the exception of the number ‘1’, which may be narrower.

2.4. In the case of vehicles intended and equipped for operation in territories where metric values are used, the characters ‘km/h’ shall be stated under the speed indication.

2.4.1. The overall dimensions of the term ‘km/h’ shall be at least 40 mm in height and 60 mm in width.

2.5. In the case of vehicles intended and equipped for operation in territories where imperial values are used, the characters ‘mph’ shall be stated under the speed indication.

2.5.1. The overall dimensions of the term ‘mph’ shall be at least 40 mm in height and 60 mm in width.

2.6. If vehicles are intended and equipped for operation in territories where both metric and imperial values are used, both versions of the speed limitation plate shall be fitted and comply with all requirements of this Annex.

([1]) OJ L 75, 14.3.2014, p. 29

▼B

3. Location, visibility and characteristics of the plate

3.1. The plate shall consist of a virtually flat surface.

3.2. Position of the plate in relation to the longitudinal median plane of the vehicle:

3.2.1. The centre point of the plate shall not be situated to the left of the longitudinal median plane of the vehicle.

3.3. Position of the plate in relation to the vertical longitudinal plane of the vehicle:

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3.3.1. The plate shall be perpendicular, ± 5°, to the longitudinal plane of the vehicle.

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3.3.2. The right-hand edge of the plate may not be situated to the right of the vertical plane which is parallel to the longitudinal median plane of the vehicle and touches the extreme outer edge of the vehicle.

3.4. Position of the plate in relation to the vertical transverse plane:

3.4.1. The plate may be inclined to the vertical:

3.4.1.1. At between – 5° and 30°, provided that the height of the upper edge of the plate is not more than 1,20 m from the ground surface;

3.4.1.2. At between – 15° and 5°, provided that the height of the upper edge of the plate is more than 1,20 m from the ground surface.

3.5. Height of the plate from the ground surface

3.5.1. The lower edge of the plate height shall be 0,30 m or more from the ground surface.

3.5.2. The upper edge of the plate shall be no more than 1,20 m from the ground surface. However, where it is not practicable to comply with the height provision due to the construction of the vehicle, the height may exceed 1,20 m, provided that it is as close to that limit as the constructional characteristics of the vehicle allow, and shall in no case exceed 2,00 m.

3.6. Geometrical visibility:

3.6.1. If the upper edge of the plate is no more than 1,20 m from the ground surface, the plate shall be visible in the whole space included within the following four planes:

▼M1

— the two vertical planes touching the two lateral edges of the plate and forming an angle measured outwards to the left and to the right of the plate of 30° in relation to the longitudinal plane, parallel to the longitudinal median plane of the vehicle, passing through the centre of the plate,

▼B

— the plane touching the upper edge of the plate and forming an angle measured upwards of 15° to the horizontal,

— the horizontal plane through the lower edge of the plate.

▼B

3.6.2. If the upper edge of the plate is more than 1,20 m from the ground surface, the plate shall be visible in the whole space included within the following four planes:

▼M1

— the two vertical planes touching the two lateral edges of the plate and forming an angle measured outwards to the left and to the right of the plate of 30° in relation to the longitudinal plane, parallel to the longitudinal median plane of the vehicle, passing through the centre of the plate,

▼B

— the plane touching the upper edge of the plate and forming an angle measured upwards of 15° to the horizontal,

— the plane touching the lower edge of the plate and forming an angle measured downwards of 15° to the horizontal.

4. Test procedure

4.1. Determination of the vertical inclination and height of the plate from the ground surface:

4.1.1. Before the measurements are made, the vehicle is placed on a smooth ground surface with its mass adjusted to the manufacturer's declared mass in running order, plus the mass of any propulsion batteries.

4.1.2. If the vehicle is equipped with systems which can change the vehicle's riding height, this shall be set in the normal running condition as specified by the vehicle manufacturer.

4.1.3. If the plate is facing downwards, the measurement of the inclination is expressed as a negative (minus) figure.

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ANNEX XVII

Requirements regarding vehicle occupant protection, including interior fittings and vehicle doors

PART 1

Requirements for the approval of a type of vehicle with regard to interior fittings

1. General requirements

1.1. Vehicles of categories L2e, L5e, L6e and L7e which are fitted with bodywork shall meet the following requirements:

1.1.1. The interior of the vehicle is divided into three main areas:

— interior zone 1:

— in front of the torso reference line in relation to the seating position of the driver,

— above the R-point of the seating position of the driver,

— interior zone 2:

— in front of the torso reference line in relation to the seating position of the driver,

— below the R-point of the seating position of the driver, and

— interior zone 3:

— behind the torso reference line in relation to the seating position of the driver,

— in front of the torso reference line in relation to the seating position of the rearmost passenger,

— above the R-point of the lowest seating position other than that of the driver.

1.1.1.1. By way of derogation to Article 2(5) of this Regulation and for the purpose of this Annex, a vehicle is deemed to have bodywork, and thus an interior, if it is fitted with safety glazing, side doors, side pillars and/or a roof creating an enclosed or partly enclosed compartment. The technical service shall provide clear justification for the judgment criteria in the test report.

1.1.2. All vehicle doors and glazing shall be in the closed position. If the vehicle is fitted with a roof which can be opened or removed, this shall be in the closed position.

1.1.3. Other elements in the interior which have multiple positions of use, such as levers, sun visors, cup holders, ash trays, ventilation outlets, knobs and buttons, shall be assessed in all positions in which they can be placed, including all intermediate positions. Storage compartments (e.g. glove box) shall be assessed in the closed position.

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1.1.4. Materials which are softer than 50 Shore (A) hardness shall be disregarded in the assessment of compliance with the requirements. The technical service may therefore request the removal of such materials during the type-approval checks.

1.1.5. The front side of seat structures shall be disregarded. The rear side of seat structures in interior zone 3 shall comply with the requirements of Part 1 (with any soft materials removed) or with the relevant requirements for seat areas 1, 2 and 3 in UNECE regulation No 17, as prescribed for vehicle category M_1.

1.1.6. Testing apparatus

1.1.6.1. A head-form testing apparatus shall be used in interior zones 1 and 3 to simulate situations where edges may come into contact with the head of an occupant. The apparatus shall consist of a sphere with a diameter of 165 mm. Where necessary, a force not exceeding 2,0 daN shall be applied with the testing apparatus in order to expose edges.

1.1.6.2. A knee-form testing apparatus shall be used in interior zone 2 to simulate situations where edges may come into contact with the knees of an occupant. The specifications of the knee-form testing apparatus shall be as set out in Appendix 1 to Part 1. Where necessary, a force not exceeding 2,0 daN shall be applied with the testing apparatus in order to expose edges.

1.1.6.3. The testing apparatus itself shall not be moved out of the zone which is being assessed; however, the head-form testing apparatus may be moved below the lower horizontal boundary of interior zone 1 and the knee-form testing apparatus may be moved above the upper horizontal boundary of interior zone 2 as long as the relevant point of contact still lies within the zone which is being assessed (i.e. no overlap of contact points). If the interior of the vehicle is open to the outside, for instance due to the absence of doors or a roof, an imaginary exterior boundary shall be taken into account as if the entire vehicle, and thus its openings, were covered with a thin plastic wrapping sheet.

▼M1

1.1.6.3.1. However, in case the level of the instrument panel is located above the level of the horizontal plane coinciding with the R-point of the seating position of the driver, a knee-form testing apparatus shall be used above the upper horizontal boundary of interior zone 2 to assess contactable edges of the instrument panel, as well as any elements mounted directly onto it, located below the level of the instrument panel. The technical service shall clearly indicate in the test report which parts of the interior are deemed to be instrument panel and relevant elements, in agreement with the type-approval authority. The steering control shall be disregarded for the determination of the level of the instrument panel.

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2. Specific requirements and tests

2.1. Interior zone 1:

2.1.1. In this zone, a head-form testing apparatus shall be moved in all directions possible. All contactable edges, except those mentioned below, shall be rounded with a radius of curvature of at least 3,2 mm.

▼B

2.1.2. Contactable edges above the level of the instrument panel which are either a part of the instrument panel or of elements mounted directly onto the instrument panel shall be rounded with a radius of curvature of at least 2,5 mm.

2.1.3. Parts in interior zone 1 which are covered by a forward horizontal projection of a circle circumscribing the outer limits of the steering control, plus a peripheral band 127 mm in width, shall be disregarded. Parts shall be considered with the steering control placed in all positions of use (i.e. only disregard the projection which is covered in all cases).

2.1.4. Contactable edges on the instrument panel which will be covered by an inflated airbag in the event of a collision shall be at least blunted.

2.1.5. Contactable edges of the steering control shall be rounded with a radius of curvature of at least 2,5 mm.

2.1.6. Contactable edges of the steering control which will be covered by an inflated airbag in the event of a collision shall be at least blunted.

2.1.7. Contactable edges of vanes and openings of ventilation outlets shall be at least blunted.

▼M1

2.1.8. Contactable edges of type-approved interior rear-view mirrors (Class I) are deemed to comply with the requirements of this Annex.

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2.2. Interior zone 2:

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2.2.1. In this zone, as well as that covered by point 1.1.6.3.1., a knee-form testing apparatus shall be moved from any given starting location in a horizontal and forward direction, while the orientation of the X-axis of the device may be varied within the specified limits. All contactable edges, except those mentioned below, shall be rounded with a radius of curvature of at least 3.2 mm. Contacts made with the rear face of the device shall be disregarded.

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2.2.2. Operating pedals and their fixtures shall be disregarded.

2.3. Interior zone 3:

2.3.1. In this zone, a head-form testing apparatus shall be moved in all directions possible. All contactable edges, except those mentioned below, shall be rounded with a radius of curvature of at least 3,2 mm.

2.3.2. Contactable edges on the rear side of seat structures may alternatively comply with the specific requirements of seat areas 1, 2 and 3 referred to in point 1.1.5.

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2.4. Interior zones 1, 2 and 3

2.4.1. Radii of contactable edges that cannot be determined accurately with the use of conventional measuring tools (e.g. radius gauge) due to oblique corners, limited protrusions, character or style lines, ribs and bumps as well as surface graining, are deemed in compliance with the requirements provided that such edges are at least blunted.

2.4.2. The vehicle manufacturer may as an alternative choose to apply in full all relevant requirements of UNECE regulation No 21 ([1]) as prescribed for vehicle category M1, covering the entire, not just portions, of the interior.

([1]) OJ L 188, 16.7.2008, p. 32.

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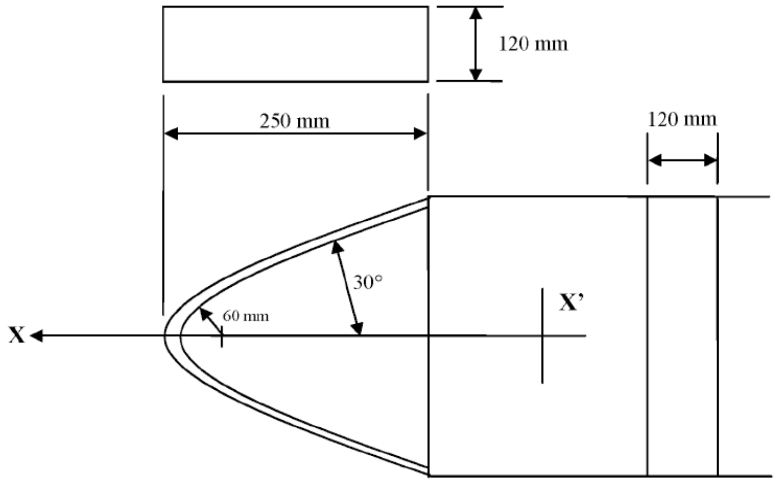
Appendix 1

Testing apparatus

1. Knee-form testing apparatus

1.1. Diagram of the testing apparatus:

Figure 16-P1-Ap1-1



2. Procedure for use:

2.1. The testing apparatus shall be placed in any position so that:

— plane X-X' remains parallel to the longitudinal median plane of the vehicle, and

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

PART 2

Requirements for the approval of a type of vehicle with regard to doors

1. Requirements and test

1.1. Vehicles of categories L2e, L5e, L6e and L7e which are fitted with doors shall meet the following requirements:

1.1.1. Each door shall be fitted with a device which keeps it in a closed position. A door may be fitted with hinges and/or other retaining mechanisms, systems or devices, and a closed door may have gaps and openings to the outside.

1.1.2. Each door shall be capable of withstanding a push force of 200 daN, delivered by a flat-ended ram applied in an outward and horizontal (and thus in the vehicle's transverse) direction. The end of the ram shall have an overall diameter not exceeding 50 mm and may have rounded edges. The force shall be applied either onto the door centre or at another point in the transverse vertical plane passing through the R-point of the seating position closest to the door in question at a height corresponding to that of the R-point or a point up to 500 mm above it. Interior fittings, components or other elements which interfere with the application of the force shall be removed during the test.

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1.1.2.1. The device or devices which keep the door in a closed position shall not fail, release or open completely within 0,2 seconds of reaching the minimum prescribed application force and the door shall remain closed after removal of the force. Gaps and openings to the outside due to flexing of materials are permitted.

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ANNEX XVIII

Requirements regarding maximum continuous rated or net power and/or maximum vehicle speed limitation by design

1. Requirements for the approval of a type of vehicle with regard to maximum continuous rated or net power and/or maximum vehicle speed limitation by design

1.1. Vehicles of the specified categories shall comply with the maximum vehicle speed and, if applicable, the maximum continuous rated or net power requirements in Annex I to Regulation (EU) No 168/2013.

1.1.1. Such vehicles shall be equipped with devices which limit the maximum vehicle speed that can be attained on a horizontal, flat and smooth surface and/or devices which limit the maximum continuous rated or net power output.

1.1.2. Such devices shall operate on the following principles:

1.1.2.1. For vehicles with positive-ignition engines propelling the vehicle either directly or through a mechanical or hydraulic transmission:

Maximum vehicle speed and/or maximum power shall be limited by adjusting two or more of the following:

— the properties, timing or presence of the spark igniting the fuel/air mixture in the cylinder(s),

— the amount of air intake of the engine,

— the amount of fuel intake of the engine, and

— the electronically and/or mechanically controlled output rotation speed of the drive-train, such as clutch, gearbox or final drive.

▼M1

1.1.2.1.1. Adjustment of the spark properties, including timing and/or presence, in order to limit the maximum design vehicle speed and/or maximum power shall be allowed for (sub)categories L3e-A2 (only if maximum net power ≥ 20 kW), L3e-A3, L4e-A, L5e, L6eB and L7eC. It may also be allowed for other (sub)categories provided that the adjustment concept does not negatively affect emission of gaseous pollutants, CO_2 emissions and fuel consumption while at maximum design vehicle speed and/or maximum power conditions which shall be verified by the technical service.

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1.1.2.2. For vehicles with compression-ignition engines propelling the vehicle either directly or through a mechanical or hydraulic transmission:

Maximum vehicle speed and/or maximum power shall be limited by adjusting two or more of the following:

— the amount of air intake of the engine,

— the amount of fuel intake of the engine, and

— the electronically and/or mechanically controlled output rotation speed of the drive-train, such as clutch, gearbox or final drive.

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1.1.2.3. For vehicles which are propelled by means of one or more electric motors, including pure and hybrid electric vehicles:

Maximum vehicle speed and/or maximum power shall be limited by means of two or more of the following:

— reduction of the maximum power output of one or more electric motors based on the vehicle or rotation speed as sensed internally to the electric motor,

— reduction of the maximum power output of one or more electric motors based on the actual vehicle speed as sensed fully externally to the electric motor, and

— physical vehicle speed limitation by means of internal or external components such as a maximum achievable revolution speed of an electric motor.

1.1.2.4. For vehicles which are propelled by means other than those listed above:

Maximum vehicle speed and/or maximum power shall be limited by two or more separate means, which shall as far as possible be based on the abovementioned adjustment, reduction or physical speed limitation principles.

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1.1.2.5. At least two of the limitation methods used, as referred to in points 1.1.2.1 to 1.1.2.4., shall operate independently of each other, be different in nature and have different design philosophies, although they may apply similar elements (e.g. both methods based on the notion of rotation speed as a criterion, but one measured inside a motor and the other in the drive-train's transmission). Failure of one method to work as intended (e.g. due to tampering) shall not impair the limitation function of other methods. In this case, the maximum power and/or vehicle speed which can be attained may be lower than under normal conditions. Without prejudice to the conformity of production tolerance set out in point 4.1.4. of Annex IV to Regulation (EU) No 44/2014, the maximum power and/or vehicle speed may not be higher than demonstrated at type-approval, if one out of the two redundant limitation methods is eliminated.

1.1.2.6. The vehicle manufacturer shall be allowed to make use of limitation methods other than those listed in points 1.1.2.1 to 1.1.2.4. if the manufacturer can prove to the technical service and to the satisfaction of the type approval authority that those alternative limitation methods meet the principles of redundancy set out in point 1.1.2.5. and provided that at least one of the parameters listed in points 1.1.2.1., 1.1.2.2. or 1.1.2.3. (e.g. limitation of fuel mass, air mass, spark delivery and drivetrain rotation limitation) is applied in one of the limitation methods.

1.1.2.7. The manufacturer shall be allowed to combine two or more of the individual limitation methods referred to in points 1.1.2.1 to 1.1.2.4. as part of a limitation strategy. Such combination of limitation methods shall be regarded as a single limitation method within the meaning of point 1.1.2.5.

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1.1.2.8. Individual limitation methods or combinations of the limitation methods referred to in points 1.1.2.1 to 1.1.2.4. may be applied more than once provided that their multiple uses operate independently of each other, as required by point 1.1.2.5., so that failure of one of the methods to work as intended (e.g. due to tampering) does not impair the functioning in another application, of the same limitation method or combination of methods.

1.1.2.9. A limitation strategy that in case of failure (e.g. due to tampering) includes the activation of a special operating (e.g. 'limp home') mode with substantially reduced maximum vehicle speed and/or maximum power not suitable for normal operation or that activates an ignition interlock preventing the engine from running for as long as the failure remains, shall be regarded as one limitation method.

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1.1.3. The maximum vehicle speed or power shall not be limited by means of a mechanical throttle stop or any other mechanical stop that limits the opening of a throttle to restrict the engine's air intake.

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1.1.4. The provision and use of any other means enabling the vehicle operator to directly or indirectly adjust, set, select or alter the maximum propulsion unit performance determined on the basis of the information submitted in accordance with Annex I, Part B, point 2.8., items 1.8.2. to 1.8.9. of Regulation (EU) No 901/2014 (e.g. high performance switch, special encoded recognition transponder in ignition key, physical or electronic jumper setting, selectable option through electronic menu, programmable feature of control unit) resulting in exceedance is prohibited.

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2. Requirements concerning type-approval demonstration

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2.1. The vehicle manufacturer shall demonstrate compliance with the specific requirements of points 1.1 to 1.1.2.9 by proving that two or more of the methods implemented, by integrating specific devices and/or functions in the vehicle propulsion system, ensure the required maximum continuous rated or net power and/or maximum vehicle speed limitation and that each method does so in a fully independent manner.

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2.1.1. The vehicle manufacturer shall prepare the demonstration vehicle so as to ensure that only one method is applied during the type-approval test. The specific vehicle preparation and demonstration test shall be carried out in full agreement with the technical service.

2.1.2. The technical service may request the preparation and demonstration of additional failure modes which may be the result of intentional tampering and may or may not cause damage to the vehicle.

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ANNEX XIX

Requirements regarding vehicle structure integrity

1. Requirements for the approval of a type of vehicle with regard to structural integrity

1.1. Vehicles shall be so designed and constructed as 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 instruction manual provided with the vehicle. The vehicle manufacturer shall provide a signed statement to this effect.

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1.1.1. Vehicles of category L1e-A and cycles designed to pedal of vehicle category L1e-B shall be designed and constructed as to conform with all prescriptions regarding requirements and test methods laid down for handlebar stem-assembly, seat-post, front forks and frames as encompassed in standard ISO 4210:2014, irrespective of any scope mismatch in that technical standard. The minimum value of the required test forces shall be in accordance with Table 19-1 in point 1.1.1.1.

▼C1

1.1.1.1. *Table 19-1*

Test and minimum forces or number of test cycles for vehicles of category L1e-A and cycles designed to pedal of vehicle category L1e-B

Subject	Name of test	Reference of test which shall be used	Minimum value of the required test force or minimum number of test cycles
Handlebar and stem	Lateral bending test (static test)	ISO 4210-5:2014, test method 4.3	800 N (= Force, F_2)
	Fatigue test (Stage 1 — Out of phase loading)	ISO 4210-5:2014, test method 4.9	270 N (= Force, F_6)
	Fatigue test (Stage 2 — In phase loading)	ISO 4210-5:2014, test method 4.9	370 N (= Force, F_7)
Frame	Fatigue test with pedalling forces	ISO 4210-6:2014, test method 4.3	1 000 N (= Force, F_1)
	Fatigue test with horizontal forces	ISO 4210-6:2014, test method 4.4	Forward force, F_2 = 850 N, Rearward force, F_3 = 850 N, C1 = 100 000 (= Number of test cycles)
	Fatigue test with a vertical force	ISO 4210-6:2014, test method 4.5	1 100 N (= Force, F_4)
Front fork	Static bending test	ISO 4210-6:2014, test method 5.3	1 500 N (= Force, F_5)
Seat-post	Stage 1, fatigue test	ISO 4210-9:2014, test method 4.5.2	1 100 N (= Force, F_3)
	Stage 2, static strength test	ISO 4210-9:2014, test method 4.5.3	2 000 N (= Force, F_4)

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1.1.2. Cycles designed to pedal of vehicle category L1e-B shall have a mass in running order ≤ 35 kg and shall be fitted with pedals enabling the vehicle to be propelled solely by the rider's muscular leg power. The vehicle shall feature adjustable rider positioning in order to enhance the

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ergonomic posture of the rider for pedalling. The auxiliary propulsion power shall be added to the driver's pedal power and shall be less than or equal to four times the actual pedal power.

1.2. Vehicle assembly and construction in the assembly plant(s), in particular the processes relating to the vehicle frame, chassis and/or body and the ►M1 powertrain ◄, 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.

1.2.1. The requirements of point 1.2 shall be covered by the vehicle manufacturers' obligations regarding the conformity of production arrangements referred to in Article 33 of Regulation (EU) No 168/2013.

1.3. In accordance with Annex VIII to Regulation (EU) No 168/2013, 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.

1.4. 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 1.3. 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).