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Working Party on the Construction of Vehicles

### CONSOLIDATED RESOLUTION ON THE CONSTRUCTION OF VEHICLES (R.E.3)

#### Revision 1

Note: The text reproduced below contains, under a consolidated presentation, texts extracted from the Recommendations and Resolutions adopted so far by the Working Party on the Construction of Vehicles and endorsed, where applicable, by the (Principal) Working Party on Road Transport \*/. The texts extracted are those which, in principle, can be considered still pertinent and applicable. This Revision 1 of the Consolidated Resolution was adopted by the Working Party on the Construction of Vehicles at its one-hundred-and-twelfth session (TRANS/WP.29/566, paras. 86 and 87).

The Agreement of 20 March 1958 was amended as of 16 October 1995 and it is now titled: "Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts, which can be fitted and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions" (E/ECE/324-E/ECE/TRANS/505/Rev.2); it remains to be referred to as the "1958 Agreement".

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\*/ This Revision 1 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) consolidates and updates all previous individual Recommendations, contained in documents TRANS/SC1/WP29/78 and Amend.1-3, TRANS/SC.1/WP.29/78/Amend.4 and 5, TRANS/WP.29/78/Amend.6, 7, 8 and 9.

Annexed to the 1958 Agreement are Regulations containing those uniform technical prescriptions. A number of countries are Parties to this Agreement and are signatories to various Regulations.

A complete overview of the status of the 1958 Agreement, i.e. the list of the Contracting Parties to the Agreement and the detailed information on the existing Regulations including the application of individual Regulations by the Contracting Parties is regularly published in a document titled "Status of the Agreement, of the annexed Regulations and of the amendments thereto" (presently TRANS/WP.29/343/Rev.5, recording the situation at 20 February 1997 and TRANS/WP.29/343/Rev.5/Amend.1, containing an update as at 20 June 1997; document TRANS/WP.29/343/Rev.5/Amend.2 should be issued for the coming one-hundred-and-thirteenth session of the Working Party, to be held in November 1997. In 1998, the status document should be issued again in February under document symbol [TRANS/WP.29/343/Rev.6], with updates in June and October/November. Please note that in the following years, the symbol of the document might be modified, however, its title shall remain unchanged). Also included in this status document are references to draft Regulations and the amendments to existing Regulations being in the process of legal consideration.

With respect to the countries not applying the above-mentioned 1958 Agreement, the relevant uniform technical prescriptions in the Regulations annexed to the 1958 Agreement may be regarded as recommendations.

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  - Annex 2 - Tyres - detailed provisions
  - Annex 3 - deleted (ECE method of measuring the fuel consumption of motor vehicles)
  - Annex 4 - Flammability of materials intended to be used inside road vehicles
  - Annex 5 - deleted (ECE test method for the determination of loss by evaporation from the fuel system of power-driven vehicles equipped with a positive-ignition engine)
  - Annex 6 - Measures to prevent unauthorized modifications to mopeds and motor cycles in use
  - Annex 7 - Classification and definition of power-driven vehicles and trailers
  - Annex 8 - Methods and instruments for measuring noise inside motor vehicles
  - Annex 9 - Installation of and technical specifications for supports for two-wheeled motor vehicles
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  - Annex 14 - Requirements for installation of rear marking plates on slow-moving vehicles (by construction) and their trailers
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PREAMBLE

THE WORKING PARTY ON ROAD TRANSPORT,

DESIRING to establish greater uniformity in the regulations relating to the construction of vehicles, in order to improve road safety and facilitate international road traffic, as well as international trade in vehicles and their equipment and parts,

BEARING IN MIND that for this purpose a Convention on Road Signs and Signals was opened for signature at Vienna on 8 November 1968 and that a European Agreement supplementing that Convention was opened for signature at Geneva on 1 May 1971,

BEARING IN MIND also that an Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts was opened for signature at Geneva on 20 March 1958, revised as from 16 October 1995,

NOTING nevertheless that the provisions of these international instruments leave open the possibility of divergences between one country and another as regards some of the regulations in question,

RECOMMENDS Governments, in order to eliminate these divergences as far as possible, to incorporate into their domestic legislation regulations which conform to the provisions reproduced in document TRANS/WP29/343 \*/ and below, and

RECOMMENDS Governments which are not yet in a position to ratify or accede to the above international instruments nevertheless to apply the provisions of those instruments forthwith to the fullest extent possible.

\* \* \*

1. VEHICLES AND COMBINATIONS OF VEHICLES

- Vehicles and combinations of vehicles shall, in general, be in conformity with the technical requirements laid down in annex 5 to the Convention on Road Traffic (Vienna) 1968.
- They shall satisfy the provisions of the existing Regulations of the Economic Commission for Europe.
- They shall also satisfy, in the areas specified below, the additional requirements there mentioned.

Where test methods might influence the results, the methods described in relevant Regulations shall be applied.

1.1. Braking.

1.1.1. New vehicles, used singly.

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\*/ See the introductory note, the symbol of this status document may change.

- 1.1.1.1. Agricultural vehicles.  
Provisions contained in Regulation No. ... 1/.
- 1.1.2. Vehicles in service, used singly.
  - 1.1.2.1. A single motor vehicle may be maintained in service only if the respective performance of the service, emergency and parking braking devices are at least equal to 90 per cent of the performance prescribed for a new motor vehicle in Regulation No. 13.
  - 1.1.2.2. The performance may be verified by methods and at speeds different from those prescribed in the relevant ECE regulations.
  - 1.1.2.3. For the purpose of testing a motor vehicle in service, the vehicle is regarded as belonging to the category resulting from its characteristics and the weight indicated in its registration document.
- 1.1.3. Combination of new vehicles.
  - 1.1.3.1. General provisions.
    - 1.1.3.1.1. In addition to the requirements which, by virtue of Regulation No. 13, must be met by each of their components, combinations of new vehicles must satisfy the following conditions:
      - 1.1.3.1.1.1. In a combination of which at least one component is used for the carriage of passengers, the performance of the service braking device and of the emergency braking device must meet the requirements laid down in Regulation No. 13 for the drawing vehicle.
      - 1.1.3.1.1.2. In other combinations.
        - 1.1.3.1.1.2.1. The performance of the service braking device must be such that the stopping distance is:
$$S \leq 0.18 V + \frac{V^2}{115} \quad \begin{array}{l} \text{(the second term corresponding} \\ \text{to a mean braking deceleration} \\ \text{of } 4.4 \text{ m/sec}^2) \\ V = \text{Initial speed in km/h} \\ S = \text{Stopping distance in metres.} \end{array}$$
        - 1.1.3.1.1.2.2. The performance of the emergency braking device must be such that the stopping distance is:
$$S \leq 0.18 V + \frac{2.V^2}{115} \quad \begin{array}{l} \text{(the second term corresponding} \\ \text{to a mean braking deceleration} \\ \text{of } 2.2 \text{ m/sec}^2) \end{array}$$

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1/ At present exists only in draft form (TRANS/SC1/WP29/R.274).



- 1.1.3.1.1.3. The performances indicated in paragraphs 1.1.3.1.1.1. and 1.1.3.1.1.2. above shall be checked by a type-0 test with the engine disconnected, as described in Regulation No. 13, annex 4, paragraph 1.4.  
The test must be carried out at the speed prescribed for the motor vehicle, and the force applied on the controls must not exceed the maximum prescribed for the braking of the motor vehicle alone.  
(Regulation No. 13, annex 4, paragraph 3.).
- 1.1.3.2. Continuous braking devices.
  - 1.1.3.2.1. In a combination of vehicles equipped with continuous braking devices, the vehicles of that combination must meet the requirements laid down in Regulation No. 13 and in addition, the following conditions:
    - 1.1.3.2.1.1. In an emergency manoeuvre, the time elapsing between the moment when the control begins to be actuated and the moment when the braking force on the least favourably placed axle reaches the level corresponding to the prescribed performance must not exceed 0.6 sec. (See Regulation No. 13, annex 4, paragraph 5).
    - 1.1.3.2.1.2. The action of the service brakes must be appropriately distributed and synchronized between the motor vehicle and the trailer.
  - 1.1.4. Combinations of vehicles in service.
    - 1.1.4.1. A combination of vehicles, where both the motor vehicle and the trailer have been in use, may be maintained in service only:
      - 1.1.4.1.1. if the respective performances of the service, emergency and parking \*/ braking devices are at least equal to 90 per cent of the performances prescribed in Regulation No. 13 for each of the components when new;
      - 1.1.4.1.2. if the respective performances of the service and emergency braking devices are at least equal to 90 per cent of the performances prescribed in Regulation No. 13, annex 4, paragraph 2.3.2.
    - 1.1.4.2. A combination of vehicles where either the drawing vehicle or the trailer has been in use must satisfy the following conditions:
      - 1.1.4.2.1. The requirements of Regulation No. 13 must be met by that component of the combination which is new.

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\*/ The parking brake performance for new motor vehicles and trailers is assumed to be 18 per cent, as decided at the thirty-third session of the Group of Experts.

- 1.1.4.2.2. For that component of the combination which has been in use, the respective performances of the service, emergency and parking \*/ braking devices must be at least equal to 90 per cent of the performances prescribed for new vehicles in Regulation No. 13.
- 1.1.4.2.3. For the combination as a whole, the above provisions must be met. (See paragraph 1.1.4.1.2.).
- 1.1.4.3. The performances required under paragraphs 1.1.4.1., 1.1.4.2.2. and 1.1.4.2.3. may be verified by methods and at speeds different from those prescribed for new vehicles and combinations of new vehicles.
- 1.1.4.4. For the purpose of testing a vehicle in operation, the vehicle is regarded as belonging to the category resulting from its characteristics and the weight indicated in its registration document.
- 1.2. Audible warning devices.
- 1.2.1. The provision of a bell is compulsory on cycles with auxiliary engine (if this category of vehicle is provided for in national regulations).  
This bell may, however, be replaced by a warning device as mentioned in paragraph 1.2.5.
- 1.2.2. On motor vehicles as defined in the 1968 Convention on Road Traffic, the provision of an audible warning device is compulsory.
- 1.2.3. The provision of additional audible warning devices is not compulsory on cycles with auxiliary engine or on motor vehicles.
- 1.2.4. Electrically-operated audible warning devices shall not be subject to stricter conditions than those set out below, it being understood that the present recommendation does not apply either to any audible warning devices mounted on vehicles for use in built-up areas only, or to the use and characteristics of alternating-tone or special-tone audible warning devices.
- 1.2.5. The audible warning as mentioned in 1.2.1. shall be in conformity with the provisions of Regulation No. 28 annexed to the Agreement;  
however, the sound-pressure level of the device fitted to the vehicle shall be equal to or greater than 76 dB(A).

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\*/ The parking brake performance for new motor vehicles and trailers is assumed to be 18 per cent, as decided at the thirty-third session of the Group of Experts.

1.3.           Emission of pollutants.

1.3.1.       Vehicles in service (positive-ignition engines).  
In the course of the technical inspection of vehicles in service that are equipped with positive-ignition engines, the emission of polluting gases shall be checked as follows.

1.3.1.1.     Emission of carbon monoxide at idling speed.

1.3.1.1.1.   Scope.

This Recommendation shall apply to motor vehicles equipped with a positive-ignition engine.

It shall not apply to two-wheeled or three-wheeled motor vehicles with a maximum weight of less than 400 kg and/or a maximum design speed of less than 50 km/h.

1.3.1.1.2.   Limit value.

The carbon monoxide content of exhaust gases emitted at idling speed shall not exceed 4.5 per cent by volume.

However, exceptions may be made by national administrations in individual cases, where the vehicle cannot be operated satisfactorily in traffic if the engine is set so as to permit observance of the 4.5 per cent limit.

1.3.1.1.3.   Conditions of measurement.

1.3.1.1.3.1.   The carbon monoxide content shall be measured when the engine is warm and running at idling speed.

The engine shall be considered to be warm if the oil temperature is not below 60°C.

1.3.1.1.3.2.   For vehicles with a manual or semi-automatic-shift gear-box, the test shall be carried out with the gears in neutral and the clutch engaged.

1.3.1.1.3.3.   In the case of power-driven vehicles with automatic transmission, the test shall be carried out with the selecting lever in the "neutral" or "parking" position.

1.3.1.1.4.   Gas sampling.

The sampling probe shall be inserted as far as possible, but not less than 30 cm, into the exhaust pipe or into a collector pipe connected thereto.

1.3.1.1.5.   Correction of measured values.

It is considered not to be necessary to apply correction factors.

1.3.1.2.     Emission of crank-case gases.

1.3.1.2.1. Scope.

This Recommendation shall apply to vehicles subject, at the time of approval, to compulsory inspection in respect of emission of crank-case gases.

1.3.1.2.2. Test method.

The engine, including its recycling device, shall be inspected from every angle.

1.3.1.2.3. Requirements.

All the parts designed by the manufacturer for limiting the emission of crank-case gases (such as pipes, screwed joints and covers) shall be in place and in good working condition.

1.3.1.3. Other emissions.

The vehicle shall be free from oil leaks which might give rise to emissions of fumes.

1.4. External projections.

1.4.1. Passenger cars.

Provisions contained in Regulation No. 26, and for devices not covered by that Agreement, the following provisions.

1.4.1.1. A non-essential additional part (ornament or other accessory) may be mounted on the vehicle only if either it is so attached that a person struck can slide easily along it without being held or injured, or it bends under slight pressure so as to present no danger.  
In no case shall it exhibit sharp edges, points, hooks or projections.

1.4.1.2. Any device (light surround, bumper or the like) installed or replaced by the user of a vehicle shall meet requirements similar to those prescribed in the above-mentioned Regulation No. 26.

1.4.1.3. Roof rack, advertising panels, route indicators, taxi signs and other taxi accessories shall be securely attached to the vehicle and shall exhibit no point, sharp edge or tapered projection.  
The radii of curvature of the external parts, including the fastenings, shall be not less than 2.5 mm.

1.4.1.4. The parts of a coupling device which extend beyond the external contour of the vehicle shall meet requirements similar to those prescribed in the Regulation No. 26 referred to in paragraph 1.4.1. above.

- 1.4.1.5. Flag-holders and other devices of the same kind shall be able to tilt under slight pressure.
- 1.4.1.6. In windscreen visors the radius of the extremities and that of the fastenings shall not be less than 2.5 mm.
- 1.4.1.7. Air or rain deflectors at the windows or on the roof shall not exhibit any point or sharp or cutting edge liable to endanger such road-users outside the vehicle as may come into contact with the deflectors.

1.5. Noise emission.

1.5.1. Noise inside vehicles.

1.5.1.1. Scope.

This recommendation sets out provisions concerning the measurement of noise inside motor vehicles of categories  $M_2$ ,  $M_3$ ,  $N_1$ ,  $N_2$  and  $N_3$ , as defined in annex 7, to which the driver and/or passengers occupying seats in the cab of the vehicle or in the passenger compartment, are exposed.

1.5.1.2. Methods of measuring the sound level.

The noise produced by the vehicle type shall be measured in accordance with the two methods described in annex 8 for moving vehicles and for stationary vehicles (see paragraph 1.5.2. in this document).

The two values measured shall be recorded in a test report. The test on the vehicle when stationary may usefully be taken as a reference value by technical services wishing to use this method to check vehicles in service.

1.5.2. Control of noise emitted by vehicles in use.

1.5.2.1. To facilitate the prevention of sound pollution by vehicles in use through the introduction of simple checks, the use of the following sound-level measuring methods is recommended:

1.5.2.1.1. For four-wheeled vehicles, the method described in Regulation No. 51, annex 3, paragraph 3.2. (Measurement of noise emitted by stationary vehicles, in proximity to the exhaust);

1.5.2.1.2. For motor cycles, the method described in Regulation No. 41, annex 3, paragraph 3.2. (Measurement of noise emitted by stationary motor cycles, in proximity to the exhaust); and

1.5.2.1.3. For mopeds, the method described in Regulation No. 63, annex 3, paragraph 3.2. (Measurement of noise emitted by stationary mopeds, in proximity to the exhaust).

1.5.2.2. In view of the tolerances of measuring instruments, the disturbances that may occur at the time of measurement and the scatter of measurements for vehicles of the same type, it will

be necessary to allow for a margin of 5 dB(A) in comparison with the corresponding value recorded at the time of the type approval.

1.5.2.3. The last-mentioned value, and also the initial constant running speed of the engine, shall be entered in the registration documents of each new vehicle, or on the manufacturer's plate in the case of vehicles for which registration is not required.

1.5.2.4. Checks on vehicles brought into use prior to the introduction of this method shall be carried out in accordance with the procedures previously in force.

1.5.2.5. A visual inspection of the exhaust system and a check of its marking shall also be carried out where possible.

1.6. Door latches and hinges.

Direction of operation of inside door handles.  
Manufacturers should fit their door handles, when they rotate round a horizontal axis, in such a way that:

- (a) the handles move symmetrically to the median longitudinal axis of the vehicle;
- (b) in the closed (as distinct from the locked) position the handle is horizontal or nearly so and is pulled upwards to open the door.

1.7. Anchorage for child restraints.

Detailed requirements contained in annex 10 of this document.

1.8. Compatibility between drawing vehicles and trailers or semitrailers.

Provisions contained in Regulation No. .. 1/.

1.9. Device to indicate a broken coupling.

Drawing vehicles to which a trailer is coupled need not necessarily be equipped with a device for automatic signalling of the breakage of the trailer's coupling.

1.10. Weight and axle load distribution.

1.10.1. Passenger cars.

Provisions contained in Regulation No. .. 2/.

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1/ At present, exists only in draft form (TRANS/SC1/WP29/R.12 and Corr.1).

2/ At present exists only in draft form (TRANS/SC1/WP29/R.127).

1.10.2. Motor coaches and buses.

The load distribution on the axles of motor coaches and buses shall be such that the front axle or axles carry at least 25 per cent of the total weight of the vehicle when stationary on a level road.

This condition shall be complied with both:

1.10.2.1. when the vehicle is empty and a weight equivalent to that of a driver is placed on the driver's seat; and

1.10.2.2. when the vehicle is fully laden with a load consisting of:

- (a) a weight equivalent to that of a passenger, which is placed on each seat provided;
- (b) a weight equivalent to that of the permissible number of standing passengers, which is distributed uniformly over the area set aside for them; and
- (c) a weight equivalent to the total permissible weight of luggage, which is distributed among the spaces reserved for luggage.

1.11. Protection of the occupants of goods-carrying power-driven vehicles against the shifting of loads.

1.11.1. The equipment of vehicles (without prejudice to the provisions concerning the arrangement, and possibly concerning the securing, of loads on the vehicle) shall be in conformity with provisions calculated to reduce the risks run by the driver and the other occupants of goods-carrying vehicles in the event of a forward shift of the load on sudden braking, the following provisions being taken as a model:

1.11.1.1. The occupants of such a vehicle shall be protected by a screen or headboard capable of withstanding, without breaking, a uniformly-distributed static force of 800 daN per ton of the vehicle's permissible load, exerted horizontally and parallel to the longitudinal median plane of the vehicle.  
This protective screen or headboard may be detachable.  
It must meet the following requirements:

1.11.1.1.1. its width (measured at right angles to the longitudinal median axis of the vehicle) must be at least equal to the width of the space provided for the occupants and, where there is a separate cab, at least equal to the width of the cab;

1.11.1.1.2. in height it must reach at least 800 mm above the level of the loading platform where there is a separate cab, or be of the same over-all height as the load compartment where there is no separate cab;

1.11.1.1.3. it must be secured directly to the chassis or to the front of the loading platform.

If it is secured to the loading platform or, where appropriate, to the body, the anchorage of that platform to the chassis must be capable of withstanding the thrust transmitted.

In cases where the cab is integral with the body, the protective screen or headboard may be secured to, or form part of, the body structure.

In the case of an articulated vehicle, no protective screen need be provided on the vehicle drawing a semitrailer; such a screen must always be placed at the front of the semitrailer's loading platform.

- 1.11.2. In addition, if a power-driven vehicle or a semitrailer is loaded with beams, pipes, girders, sheet metal or similar loads liable, in the event of failure of the securing devices, dangerously to penetrate the cab of the power-driven vehicle under the effect of sudden braking, the protective screen or headboard must have a resistance at least equal to that of a steel plate not less than 3 mm thick.
- 1.11.3. Where a vehicle is equipped with a trestle or bolster behind the cab for the purpose of supporting long loads, such as steel girders or telegraph poles, the trestle or bolster must be capable of withstanding the combined effect of two forces, each of 600 daN per ton of permissible load, acting forwards and downwards on the top of the trestle.
- 1.11.4. This recommendation shall not apply to passenger cars even when they are carrying goods, to tank-lorries and special-purpose vehicles for the carriage of containers, or to special-purpose vehicles used for the carriage of indivisible objects, where the latter vehicles and their operation are already subject to special regulations.
- 1.12. Locking, for safe operation, of tilt cabs of motor vehicles \*/ normally used for carrying goods by road.
- 1.12.1. Cab in dropped position.
- 1.12.1.1. Tilt cabs shall be fitted with a main locking system and an auxiliary locking system.
- 1.12.1.2. The main and auxiliary locking systems shall be independent of each other so that the failure of either does not entail the failure of the other.
- 1.12.1.3. The main and auxiliary locking systems shall be able to withstand a force directed vertically upwards equivalent to one-and-one-half times the cab's weight.

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\*/ Within the meaning of the 1968 Convention on Road Traffic, article 1 (p), but including the drawing vehicles of semitrailers.



- 1.12.1.4. The main and auxiliary locking devices shall be so designed that they cannot either be worked inadvertently or open at the wrong time through the vehicle's acceleration or deceleration or vibrations due to the use of the vehicle.
- 1.12.1.5. If the driver himself cannot readily make certain, whether from outside the vehicle or from his seat, that the main locking device is properly engaged, a warning signal must be fitted.
- 1.12.1.6. At least the auxiliary locking device must be able to operate automatically when the cab is dropped to the normal driving position.
- 1.12.1.7. The auxiliary locking device shall be able to hold the cab in position should the main locking device fail.
- 1.12.1.8. A steady manual effort shall be required to release the auxiliary locking device so that the cab can tilt.
- 1.12.1.9. A plate or label indelibly inscribed with precise instructions on the operation of the locking devices shall be affixed in a clearly visible position on the vehicle.
- 1.12.2. Cab in raised position.  
  
The cab shall be capable of being held in the raised position either automatically or by means of a retaining device.
- 1.13. Mounting of the body or load platform of commercial vehicles.
- 1.13.1. The axle-load limits shall not be exceeded when the vehicle is loaded to its permissible maximum weight, the load being uniformly distributed over the space provided for it.
- 1.13.2. The body or load platform shall be made and mounted taking into account the specifications, if any, of the chassis manufacturer.
- 1.13.3. The size and positioning of the mounting holes and/or welds shall be such that the strength of the chassis frame is not adversely affected.  
Holes in and welding on the flanges and the adjacent ends of the web of the side-members of the chassis frame shall be prohibited except where expressly permitted by the chassis manufacturer.  
In addition, no welding shall be allowed if this is expressly prohibited by the chassis manufacturer.
- 1.13.4. In mounting the body or load platform, all practicable steps shall be taken to keep the centre of gravity of the vehicle as low as possible.  
In addition, this mounting shall not adversely affect the stability of the vehicle.

- 1.13.5. The body, including the necessary intermediate components, shall be attached directly to the chassis frame of the vehicle.
- 1.13.6. When U bolts are employed to secure the body or load platform to the chassis frame, spacers shall be used between the flanges of side-members to prevent buckling.
- 1.13.7. For mountings, use shall be made of round holes and suitable bolts with the least possible play, at least at the foremost and rearmost attachment points.
- 1.13.8. The mounting of the body or load platform shall be such as not to impair the soundness and functioning of the wiring and braking circuits.
- 1.13.9. Where the cab and bodywork are integral, account shall be taken of the flexibility of the cab mounting.
- 1.13.10. In the mounting of rigid bodies such as tanks, account shall be taken of any flexibility in the chassis frame.
- 1.13.11. In the case of tank-vehicles, where outrigger brackets are used to fasten the tank to the chassis of the vehicle, the vertical face of the brackets shall not be less in height than the depth of the chassis frame to which they are attached.
- 1.13.12. In the case of tipping vehicles, where there is no supplementary underframe to distribute the load, the pivot brackets for rearward-tipping bodies shall be located as near as possible to the rear spring brackets to minimize additional bending stresses on the chassis frame during tipping.
- 1.13.13. In the case of bodies tipping rearwards only, guide plates shall be provided to control the lateral movement of the body when lowered onto the chassis frame.
- 1.13.14. In the case of tipping bodies, steps shall be taken to prevent excessive noise caused by the bodywork of the vehicle when it is unladen.
- 1.14. Lashing and securing arrangements on road vehicles for sea transportation on Ro/Ro ships.
- 1.14.1. General Requirements for commercial vehicles and combinations of vehicles, semitrailers excluded, contained in standard ISO 9367-1:1989.
- 1.14.2. General Requirements for semitrailers contained in standard ISO 9367-2:1994.

- 1.15.           Caravans.  
Provisions contained in Regulation No. .. 1/.
- 1.16.           Driver's field of view.
- 1.16.1.        Power-driven vehicles.  
Provisions contained in Regulation No. .. 2/.
- 1.16.2.        Public service vehicles.  
Provisions contained in Regulation No. .. 3/.
- 1.17.           Identification of controls, tell-tales and indicators.
- 1.17.1.        Motor vehicles.  
Provisions contained in Regulation No. .. 4/.
- 1.17.2.        Agricultural (or forestry) wheeled tractors.  
Provisions contained in Regulation No. .. 5/.
- 1.18.           Windscreen-wipers and washers.  
Provisions contained in Regulation No. .. 6/.
- 1.19.           Windscreen de-frosting and de-misting systems.  
Provisions contained in Regulation No. .. 7/.
- 1.20.           Flammability of materials intended to be used inside road vehicles.  
  
Governments wishing to adopt requirements relating to the flammability characteristics of materials used in vehicles are recommended to base them on the technical specifications set out in annex 4 to this document.

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1/ At present, exists only in draft form (TRANS/SC1/WP29/R.90/Rev.1).  
2/ At present, exists only in draft form (TRANS/SC1/WP29/R.43 and Add. 1).  
3/ Idem (TRANS/SC1/WP29/GRSA/R.45).  
4/ Idem (TRANS/SC1/WP29/R.1/Rev.3 and Rev.3/Corr.1).  
5/ Idem (TRANS/SC1/WP29/GRSG/R.76/Rev.2).  
6/ Idem (TRANS/SC1/WP29/R.36/Rev.2).  
7/ Idem (TRANS/SC1/WP29/R.44/Rev.1).

1.21. Measures to prevent unauthorized modifications to mopeds and motor cycles in use.

Governments wishing to take measures in this respect are recommended to apply provisions described in annex 6 to this document.

2. EQUIPMENT AND PARTS

- The equipment and parts used in the construction of vehicles and combinations of vehicles shall, in general, be in conformity with the technical requirements laid down in annex 5 to the Convention on Road Traffic (Vienna, 1968).
- They shall satisfy the provisions of the existing Regulation of the Economic Commission for Europe.
- They shall also satisfy, in the areas specified below, the additional requirements there mentioned.

Where test methods might influence the results, the methods described in relevant Regulations shall be applied.

2.1. Braking.

- 2.1.1. Resistance of brake pipes to corrosion.  
The resistance of brake pipes to corrosion shall be at least equivalent to that of steel pipes coated with a 12-micron layer of zinc.  
It is further recommended that encouragement be given to information campaigns for the benefit of vehicle users, maintenance workshops and motor vehicle inspection services on the dangers of brake pipe corrosion.

2.1.2. Brake fluids.

- 2.1.2.1. Manufacturers should include in the maintenance handbooks for their vehicles, in addition to the usual indications of the fluids to be used in braking equipment, a specific statement as to whether or not fluids of the non-petroleum type can be used.
- 2.1.2.2. Users' associations should draw the attention of vehicle users to the dangers of using unsuitable fluids or of mixing different, possibly incompatible, fluids.

2.2. Light signalling.

2.2.1. Incandescent electric filament lamps.

- 2.2.1.1. Incandescent electric filament lamps to be used in approved lamps of power-driven vehicles and their trailers shall comply with the requirements laid down in Regulation No. 37.

- 2.3.           Audible warning (Audible warning devices).
- 2.3.1.        Devices intended to be used for audible warnings to be given by cycles with auxiliary engine (if this category of vehicle is provided for in national regulations) should be in conformity with the provisions of Regulation No. 28;  
However, the sound pressure level shall be equal to or greater than 85 dB(A), the sound level being measured and the acoustic tests carried out as described in Regulation No. 28.
- 2.3.2.        Supplementary acoustic warning devices.
- Provisions contained in Regulation No. .. 1/.
- 2.4.           Tyres.
- Detailed provisions are contained in annex 2 to this document.
- 2.5.           Mudguards.
- The bodies of motor vehicles (other than special-purpose vehicles, agricultural or forest tractors and vehicles with a maximum rated speed not exceeding 20 km/h), and the bodies of all trailers coupled thereto, shall be equipped with effective mudguards, at least for their rear wheels.
- 2.6.           Tachographs.
- The fitting of a tachograph should be compulsory on motor vehicles whose permissible maximum weight, including that of trailers permitted to be coupled to the vehicle, exceeds 7.5 tons, or which belong to category D as defined in annexes 6 and 7 to the 1968 Convention on Road Traffic.
- 2.7.           Windscreen wipers and washers.
- Provisions contained in Regulation No. .. 2/.
- 2.8.           Windscreen de-frosting and de-misting systems.
- Provisions contained in Regulation No. .. 3/.
- 2.9.           Installation of and technical specifications for supports for two-wheeled motor vehicles.
- Governments wishing to take measures in this respect are recommended to apply the provisions set out in annex 9 to this document.

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1/ At present, exists only in draft form (TRANS/SC1/WP29/GRB/R.33).

2/ At present, exists only in a draft form (TRANS/SC1/WP29/R.36/Rev.2).

3/ Idem (TRANS/SC1/WP29/R.44/Rev.1).

3. OTHER DEVICES

3.1. Rear registration number plates 1/.

3.1.1. Manufacturers of vehicles other than motor cycles should provide, for mounting the rear registration number plate, a space either 520 mm wide by 120 mm high, or 340 mm wide by 240 mm high, at the manufacturer's discretion, and also lighting therefore.

3.1.2. For rear registration number plates mounted in future, Governments should prescribe under their domestic legislation:

3.1.2.1. either a plate with dimensions not exceeding 340 mm in width and 120 mm in height,

3.1.2.2. or a choice between "wide" plates and "tall" plates, the following maximum dimensions being prescribed for these plates:

"wide" plates width : 520 mm  
height : 120 mm  
"tall" plates width : 340 mm  
height : 240 mm.

3.2. First aid kits.

It should be compulsory for motor vehicles of category D as defined in annexes 6 and 7 to the 1968 Convention on Road Traffic, other than those used for urban services, to carry a first aid kit.

4. MISCELLANEOUS

4.1. Harmonization of technical standards.

4.1.1. When instituting a procedure for the preparation of any national regulation or for an amendment whose content does not conform to or embodies requirements additional to:

- those embodied in one or more Regulations annexed to the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts (1958) and dealing with the same topic; or
- one or more recommendations adopted by the Working Party on Road Transport in the sphere to which the proposed national regulation relates,  
Governments should inform the Executive Secretary of the Economic Commission for Europe of their intention as soon possible, so that the information can be communicated to the other countries concerned.

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1/ These recommendations will be included in a regulation, at present existing only in draft form (TRANS/SC1/WP29/R.85).

- 4.1.2. Governments of countries considering bringing into force, in the matter of the construction or equipment of road vehicles, a national regulation dealing with topics not referred to in the above-mentioned Regulations and recommendations should inform the Executive Secretary thereof in the manner and for the purposes specified above.
- 4.1.3. Governments of countries bringing into force a regulation relating to questions which have not been dealt with by the Working Party or its subsidiary organs should so far as possible provide for a simple procedure for the amendment of such regulation so that it can, if this is deemed necessary, be brought promptly into conformity with such international recommendations or provisions as may subsequently be prepared on the same questions.
- 4.2. Restriction on the sale of equipment, parts or accessories which have not been approved.
- 4.2.1. When motor vehicle equipment, parts or accessories are subject to approval, it is dangerous to permit non-approved equipment, parts or accessories of the same kind to be offered to the public under a name similar to that of approved articles.
- 4.2.2. Governments which subject to approval certain items of equipment, parts or accessories for motor vehicles or for road-users (such as headlights, retro-reflectors, safety belts, crash helmets for motor cycles, etc.) should consider the possibility of prohibiting the offering for sale of non-approved equipment, parts or accessories of the same kind under a name liable to be confused with that of approved articles.
- 4.3. Measures to prevent the sale of unauthorized spare parts or equipment.
- 4.3.1. For the purposes of this recommendation, "unauthorized parts or equipment" means any vehicle part or item of equipment covered directly or indirectly by a Regulation annexed to the 1958 Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts which:
  - 4.3.1.1. Either, should bear the approval mark prescribed by that Regulation but which regularly:
    - 4.3.1.1.1. Does not bear the approval mark, even though such marking on the part or item of equipment concerned is compulsory under the national regulations of the country concerned; or
    - 4.3.1.1.2. Bears an approval mark which has never been issued; or
    - 4.3.1.1.3. Bears an approval mark which was issued to a manufacturer other than the actual manufacturer of the product; or

- 4.3.1.1.4. Bears an approval mark issued to the manufacturer but for another product;
- 4.3.1.2. Or, while not required to bear the approval mark, has been recognized by a technical service responsible for approval tests as having a performance that is clearly inadequate, having regard to the requirements of the Regulation concerned and, if it bears a manufacturer's mark or trademark, has been denounced by the owner of such mark as an unauthorized product within the meaning of these Recommendations.
- 4.3.2. Governments made aware of the offering for sale within their country of parts or items of equipment not authorized under the approval regulations shall take the following measures:
  - 4.3.2.1. Obtain proof of the infringement, either:
    - 4.3.2.1.1. In the case of paragraphs 4.3.1.1. and 4.3.1.2. above, by sampling at points of sale;
    - 4.3.2.1.2. In other cases (paragraphs 4.3.1.1.2. to 4.3.1.1.4.) by reference to its own records or by request addressed to the administrative service of the country whose identifying number appears on the approval mark;
  - 4.3.2.2. If possible communicate to the competent administration(s) of the country of origin of the product (if it is not a Party to the 1958 Agreement) the information that an establishment in its country has offered for sale unauthorized parts or items of equipment;
  - 4.3.2.3. Inform the secretariat of the Economic Commission for Europe of the infringement, providing it with all information in its possession, and in particular:
    - 4.3.2.3.1. The description of the part or item of equipment;
    - 4.3.2.3.2. The approval mark (or absence of mark);
    - 4.3.2.3.3. The names and addresses of the manufacturer and/or the exporter; and
    - 4.3.2.3.4. The names and addresses of the importer and/or the distributor.
- 4.3.3. Once in possession of the particulars referred to in paragraph 4.3.2.3. above, the secretariat shall circulate the information:
  - 4.3.3.1. To the other Parties to the 1958 Agreement, and
  - 4.3.3.2. To the countries which, while not party to the Agreement, unilaterally apply the Regulation to which the unauthorized part or item of equipment is subject.



- 4.3.4. Governments made aware of the infringement either directly or through the information procedure provided for in paragraph 4.3.3. above shall;
  - 4.3.4.1. If possible take the necessary measures in accordance with their national law and without prejudice to any civil or criminal proceedings which might be initiated, to ensure that the unauthorized part or item of equipment:
    - 4.3.4.1.1. Is prevented from entering their respective countries; and
    - 4.3.4.1.2. Is withdrawn from the market if it has already been offered for sale.
  - 4.3.4.2. Inform the manufacturer of the product, if known, of the prohibition of the offering for sale of the unauthorized part or item of equipment in the territory of their respective countries.
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Annex 1

ECE METHOD OF MEASURING THE POWER OF INTERNAL COMBUSTION ENGINES  
FOR ROAD VEHICLES

(deleted)

Annex 2

TYRES - Detailed provisions 1/

1. General:
  - 1.1. Passenger cars:  
Provisions contained in Regulation No. 30.
  - 1.2. Commercial vehicles:  
Provisions contained in Regulation No. 54.
  - 1.3. Motor cycles:  
Provisions contained in Regulation No. 75.
  - 1.4. Retroreflective tyres for two wheeled vehicles:  
Provisions contained in Regulation No. 88.
2. Limit of wear.
  - 2.1. The tread of any tyre mounted on the wheel of a motor vehicle (including motor cycles) or of a trailer coupled to a motor vehicle shall show throughout its breadth and round its entire circumference a pattern the relief of which is still clearly visible; this requirement cannot be regarded as not being satisfied if the height of the relief is 1 mm.
  - 2.2. The provisions of paragraph 2.1. above do not apply to a motor vehicle which, by reason of its design, cannot exceed 20 km/h; nevertheless, the fabric of the tyres mounted on such vehicles or on its trailer shall not be showing.
  - 2.3. No tyre mounted on a motor vehicle (including motor cycles), or on a trailer coupled to a motor vehicle, may have any cut or tear on its tread or walls exposing or penetrating the fabric; this provision does not apply to punctures or minor damage.
3. Tyre pressure.  
  
Vehicle manufacturers should place, on the glove box lid or at any other clearly visible point, an indelible inscription stating the recommended pressure of the pneumatic tyres, when cold, when the vehicle is used under maximum load and, at the choice of the manufacture, when the vehicle is used under partial load and/or at certain speeds specified by him.

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1/ Continuation of paragraph 2.4. of this document.

4. Choice of pneumatic tyres and rims.
  - 4.1. Each tyre shall be mounted on one of the rims prescribed for the tyre's nominal dimensions in the national standard, in the reference work published by the European Tyre and Rim Technical Organization (ETRTO) or in the reference works published by other standardization organizations.
  - 4.2. Private (passenger) cars shall be equipped with tyre/rim combinations such that, in the event of rapid deflation of either a front or a rear tyre occurring while the laden vehicle is travelling in a straight line at a speed of 100 km/h or at 80 per cent of the maximum design speed, whichever is the lower, the tyre remains in substantially its intended position on the rim until the vehicle is brought to rest by the operation of the service brake to produce an average deceleration of at least 0.2 g.
5. Regrooving and additional grooving of pneumatic tyres.
  - 5.1. Definitions.

For the purpose of this recommendation,

    - 5.1.1. "Regrooving of tread patterns" means recutting the tread of tyres, starting from the original grooves and going deeper than the initial tread pattern;
    - 5.1.2. "Additional grooving" means making additional grooves in the tread;
    - 5.1.3. "Siping" means making additional incisions in the tread without removing any appreciable amount of material;
    - 5.1.4. "Regroovable pneumatic tyre" means a tyre manufactured with sufficient rubber to permit the regrooving of the tread pattern.
  - 5.2. Regroovable pneumatic tyres.

Regroovable pneumatic tyres must be marked on each side wall with the next symbol, at least 20 mm in diameter, moulded onto or into them:

Ⓢ
  - 5.3. General requirement.

Regrooving must be done by trained workers with proper equipment.
  - 5.4. Requirements for the regrooving of tread patterns.
    - 5.4.1. Regrooving of tyres for private (passenger) cars is prohibited.

- 5.4.2. This operation can be undertaken only on regroovable pneumatic tyres bearing the mark described in paragraph 5.2. above.
- 5.4.3. After regrooving, sufficient rubber must still be left under the new grooves to protect the cords.  
Tyre manufacturers should give in their technical documents for specialists all the particulars required to ensure that this operation is carried out in the most favourable circumstances possible.
- 5.4.4. Each decimetre of circumference of the tread obtained after regrooving must have enough grooves to make the total length of their edges at least equal to the length of the edges of the original grooves, or to 750 mm, whichever is the smaller.
- 5.4.5. The width of the recut grooves must correspond approximately to that of the original grooves.
- 5.4.6. The retreaded grooves must not contain any impediment to the run-off of water.
- 5.4.7. None of the defects mentioned below must be discernible on visual examination of the tyre after regrooving:
  - 5.4.7.1. cracks extending to the cords,
  - 5.4.7.2. cracks in the grooves or wear extending to the cords, or
  - 5.4.7.3. separation of the tread or of the side bands.
- 5.5. Requirements for additional grooving and siping of pneumatic tyres.
  - 5.5.1. The depth of the additional grooves and incisions must be not greater than that of the original or of the recut grooves.
  - 5.5.2. The additional grooves must not contain any impediment to the run-off of water.
- 6. Additional adhesion ("traction") devices for pneumatic tyres.
  - 6.1. Scope.
    - 6.1.1. This recommendation shall apply to "additional adhesion ('traction') devices", consisting of chains or other adhesion-promoting ("traction-promoting") units, suitably mounted on the wheels of a power-driven vehicle in order to enhance the adhesion of the tyres in winter conditions of use.
    - 6.1.2. It shall not apply to additional adhesion ("traction") devices which necessitate special adaptation or modification of the tyres on which they are mounted.

- 6.2. General requirements.
- 6.2.1. Additional adhesion ("traction") devices shall bear a suitable mark by which they can be fully identified.
- 6.2.2. Additional adhesion ("traction") devices shall be accompanied on delivery by a notice specifying the tyre sizes to which they can be correctly fitted and containing instructions for their use.
- 6.2.3. The adhesion-promoting units shall cover the tread of the tyre over not less than three-quarters of its width, and the additional adhesion ("traction") devices shall be so designed that at the prescribed tyre pressure and in every position of the wheel at least one operative unit of the device is in contact with the carriageway.
- 6.2.4. The adhesion-promoting units resting on the tyre tread shall at all times be able to adapt themselves laterally and longitudinally to the tyre as it rolls along on the carriageway.  
In particular, where the units take the form of chains, their links shall be small enough to intermesh well so as to be able to follow the tyre in the deformations it undergoes while rolling.
- 6.2.5. The shape of the adhesion units and their distribution over the tyre tread shall be such as to resist longitudinal and/or transverse sliding of the tyre.  
In addition, the devices shall not have any sharp projections, such as clamps, edges and the like, which might damage the surface of the carriageway.
- 6.2.6. The devices shall be fitted with a tensioning device having a reliable locking system allowing easy installation and removal.
- 6.2.7. The device shall be built in accordance with the best engineering practice; more particularly:
- 6.2.7.1. the adhesion units shall be so connected as to ensure correct positioning of links, connexion rings and hooks;
- 6.2.7.2. welds of links, rings and hooks shall be free from defects of any nature whatsoever.
- 6.2.8. The devices shall be manufactured with suitable materials capable of withstanding mechanical stresses and wear and tear occurring in use.
- 6.3. Dimensional requirements.
- In no-load static conditions the device shall meet the following requirements:

6.3.1. Maximum lateral projection.

6.3.1.1. The device shall not project beyond the wall of the tyre on either side by more than:

14 mm in tyres not exceeding 185 mm in section width;  
20 mm in tyres exceeding 185 mm but not exceeding 205 mm in section width;  
25 mm in tyres exceeding 205 mm but not exceeding 305 mm in section width;  
30 mm in tyres exceeding 305 mm in section width.

6.3.2. Maximum radial projection.

The device shall not project radially beyond the tyre tread by more than:

20 mm in tyres not exceeding 205 mm in section width;  
25 mm in tyres exceeding 205 mm but not exceeding 305 mm in section width;  
35 mm in tyres exceeding 305 mm in section width.

7. Retreading of pneumatic tyres.

7.1. Scope.

7.1.1. This recommendation shall apply to all types of retreaded tyres for private (passenger) cars and their trailers.

7.1.2. It shall not apply either:

7.1.2.1. to tyres of radial-ply construction designed for speeds exceeding 210 km/h or to tyres of diagonal-ply (bias-ply) construction designed for speeds exceeding 200 km/h; or

7.1.2.2. to tyres for very old motor vehicles, as listed in paragraph 8 below.

7.2. Definitions.

7.2.1. For the purposes of this recommendation:

7.2.1.1. "Retreaded tyre" means a tyre whose original tread has, or whose original tread and walls have, been replaced;

7.2.1.2. "Top capping" means the retreading of a tyre by replacement of the original tread only;

7.2.1.3. "Bead-to-bead remoulding" means the retreading of a tyre by replacement of the original tread walls.

7.2.2. The definitions of Regulation No. 30 annexed to the 1958 Agreement shall apply to any other notion referred to hereunder.

7.3. Labelling.

Retreaded tyres shall bear:

- 7.3.1. the trade name or mark of the retreading enterprise, as registered by the national retreading-industry association;
- 7.3.2. the tyre designation as shown in the first column of the tables listing tyre designations in Regulation No. 30;
- 7.3.3. an indication of the structural type;
  - 7.3.3.1. on diagonal-ply (bias-ply) tyres, no indication;
  - 7.3.3.2. on radial-ply tyres, the letter "R" preceding the rim diameter marking, and in addition the word "radial";
- 7.3.4. an indication of the retreaded tyres speed category as specified in Regulation No. 30.  
The speed-limit marking specified in the original new tyre size designation shall be deleted;
- 7.3.5. an indication of the retreaded tyres load category, as specified in Regulation No. 30;
- 7.3.6. the word "tubeless" if the tyre is a pneumatic tyre intended to be used without an inner tube;
- 7.3.7. the information in the national language or languages that the tyre is a retreaded tyre, and the figure "2" if the tyre is a tyre twice retreaded in accordance with the provisions of paragraph 7.4.1.4. below;
- 7.3.8. where a tyre has been retreaded with a winter pattern, the side wall of the tyre shall be marked "M+S" or "M.S" or "M&S".

7.4. Requirements.

7.4.1. Conditions governing retreading.

- 7.4.1.1. A tyre to be retreaded shall bear an indication of the year of manufacture, which must not be more than six years earlier than the year in which retreading is to be performed.
- 7.4.1.2. The carcass of a tyre to be retreaded must not require, or have undergone, any major repairs.
- 7.4.1.3. Only highway-pattern tyres may be retreaded in highway pattern.
- 7.4.1.4. A tyre may be retreaded in highway pattern only if it has not previously been retreaded.  
A tyre which has been retreaded only once may be retreaded in winter pattern.

- 7.4.1.5. A tyre may be retreaded only in its original or in a lower speed category.  
However, a tyre of the "high speed" category may be retreaded only in a category lower than its original category.
- 7.4.1.6. The load capacity of a retreaded tyre shall not exceed that originally assigned to that tyre under Regulation No. 30.
- 7.4.2. Tolerances.
- In order to cover the wide range of dimensions of casings to be retreaded, tolerances additional to those prescribed for new tyres shall be allowed for retreaded tyres:
- + 3 per cent in over-all diameter; and  
+ 2 per cent in tyre width.
- 7.4.3. Load/speed performance tests.
- A retreaded tyre shall be capable of passing the performance test prescribed in Regulation No. 30.
- 7.4.4. Tread-wear indicators.
- 7.4.4.1. The tread of a retreaded tyre shall incorporate not less than six approximately equidistant transverse rows of tread-wear indicators so as to give a visual warning when the residual depth of the main tread grooves is only 1.6 mm.
- 7.4.4.2. However, four rows of indicators shall be acceptable where the tyre is of a size designed to be fitted on a rim of a nominal diameter not exceeding 12 inches.
8. List of European tyres of old manufacture.
- 8.1. Radial-ply tyres of 400 mm nominal rim diameter:
- |             |             |
|-------------|-------------|
| 125 * R 400 | 165 * R 400 |
| 135 * R 400 | 175 * R 400 |
| 145 * R 400 | 185 * R 400 |
| 155 * R 400 |             |
- 8.2. Diagonal-ply (bias-ply) tyres of 400 mm nominal rim diameter:
- |           |           |
|-----------|-----------|
| 125 - 400 | 165 - 400 |
| 135 - 400 | 175 - 400 |
| 145 - 400 | 185 - 400 |
| 155 - 400 |           |



8.3. Higher-profile diagonal-ply (bias-ply) tyres:

4.25 - 15	4.25 - 17
5.00 - 15	4.50 - 17
7.00 - 15	5.00 - 17
	7.00 - 17
5.00 - 16	8.00 - 17
5.50 - 16	
5.75 - 16	7.00 - 18
6.00 - 16	
6.50 - 16	4.50 - 19
7.00 - 16	
7.50 - 16	
	6.00 - 21
	7.00 - 21

8.4. Diagonal-ply (bias-ply) tyres with dual designation:

4.00/4.25 - 15	4.75/5.00 - 18
4.25/4.40 - 15	5.25/5.50 - 18
5.00/5.20 - 15	6.00/6.50 - 18
5.50/5.90 - 15	
8.00/8.20 - 15	3.50/4.00 - 19
	4.47/5.00 - 19
5.00/5.25 - 16	5.25/5.50/6.00 - 19
5.25/5.90 - 16	6.50/7.00 - 19
5.50/5.75 - 16	
5.50/5.90 - 16	4.50/4.75/5.00 - 20
5.75/6.00 - 16	5.25/5.50/6.00 - 20
6.00/6.25 - 16	6.50/7.00 - 20
6.00/6.40 - 16	
6.50/6.70 - 16	4.50/4.75 - 21
7.00/7.60 - 16	5.00/5.25 - 21
4.75/5.00 - 17	
6.00/6.50 - 17.	

8.5. Very old diagonal-ply (bias-ply) tyres:

30 x 3½	815 x 105
32 x 4½	875 x 105
710 x 90	820 x 120
760 x 90	880 x 120
810 x 90	
	895 x 135.

9. Fitting of a vehicle with pneumatic tyres of different structures.
- 9.1. Pneumatic tyres of different structures shall not be fitted on the same axle of any power-driven vehicle or any trailer 1/.
- 9.2. Where a power-driven vehicle or a trailer has two axles each equipped with single wheels, there shall not be fitted on its rear axle:
- 9.2.1. bias-ply (diagonal-ply) or bias-belted tyres if radial-ply tyres are fitted on its front axle; or
- 9.2.2. bias-ply (diagonal-ply) tyres if bias-belted tyres are fitted on its front axle.
- 9.3. Where a power-driven vehicle has multiple axles (bogies), pneumatic tyres of different structures shall not be fitted on them.
- 9.4. The provisions of paragraphs 9.1. to 9.3. above may be waived temporarily if a spare wheel is used.  
The driving of the vehicle shall then be adapted, as necessary, to such abnormal conditions as may arise in consequence.
10. Marking of downgraded pneumatic tyres.
- 10.1. Scope.
- This recommendation applies to new pneumatic tyres considered by the manufacturer to fall short of the standards which first-quality pneumatic tyres should meet.
- 10.2. Definitions.
- For the purpose of this recommendation:
- 10.2.1. "DA tyres" means pneumatic tyres exhibiting imperfections of appearance which in no way affect their performance;
- 10.2.2. "downgraded pneumatic tyres" means either:
- 10.2.2.1. "downgraded pneumatic tyres limited to 100 km/h maximum road speed", i.e. pneumatic tyre exhibiting defects of appearance exceeding the limits laid down for pneumatic tyres of category 2.1. above or adversely affecting driving comfort at high speeds.  
These defects in no way diminish the performance of the tyres, in particular as regards their ability to stand up to maximum-load when moving at a road speed of not more than 100 km/h; or

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1/ The term "trailer" as used here covers both trailers and semitrailers.

- 10.2.2.2. "downgraded pneumatic tyres limited to 30 km/h maximum road speed", i.e. pneumatic tyres exhibiting defects but utilizable in complete safety at a road speed of not more than 30 km/h.
- 10.3. Markings.
- Pneumatic tyres as defined above shall have the following marking:
- 10.3.1. "DA tyres" shall bear on at least one sidewall the marking "SekunDA" or "DA", the site of this marking being left to the discretion of the tyre manufacturer.
- 10.3.2. "Downgraded pneumatic tyres limited to 100 km/h maximum road speed" shall be marked "Max. 100 km/h".
- This marking shall apply only to pneumatic tyres whose speed-category symbol is beyond the letter K.
- The speed-category symbol shall be removed from both sidewalls.
- 10.3.3. "Downgraded pneumatic tyres limited to 30 km/h maximum road speed" shall be marked "Max. 30 km/h".
- The speed-category symbol shall be removed from both sidewalls.
- 10.3.4. The markings indicated in paragraphs 10.3.2. and 10.3.3. above shall be applied by means of a branding iron on both sidewalls of the tyre, whenever possible, either on the trade name or trade mark, or on the tyre-size designation.
- 10.4. Requirements.
- 10.4.1. "DA tyres".
- The use of these tyres, which are defined in paragraph 10.2.1. and bear one of the markings specified in paragraph 10.3.1., shall not be the subject of any special restriction on their use.
- 10.4.2. "Downgraded pneumatic tyres":
- 10.4.2.1. "Downgraded pneumatic tyres limited to 100 km/h maximum road speed", defined in paragraph 10.2.2.1. and bearing the marking indicated in paragraph 10.3.2., shall be mounted only on power-driven vehicles whose maximum design speed is not more than 100 km/h or on trailers which are authorized and marked for road speed not higher than 100 km/h.

10.4.2.2. "Downgraded pneumatic tyres limited to 30 km/h maximum road speed", defined in paragraph 10.2.2.2. and bearing the marking indicated in paragraph 10.3.3., shall not be mounted on private (passenger) cars or commercial vehicles in normal use.

They shall be mounted only on agricultural tractors and machinery or work-site vehicles whose maximum design speed is limited to 30 km/h and to their trailers.

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Annex 3

ECE METHOD OF MEASURING THE FUEL CONSUMPTION OF MOTOR VEHICLES

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Annex 4

FLAMMABILITY OF MATERIALS INTENDED TO BE USED INSIDE ROAD VEHICLES 1/

1. It is recommended to Governments wishing to adopt requirements relating to the flammability characteristics of materials used in vehicles that they should, as far as possible, base them on the technical specifications set out below.
2. SCOPE
  - 2.1. The purpose of this recommendation is to establish requirements concerning the flammability characteristics of materials used in the construction of vehicles for the interior covering of:
    - 2.1.1. the interior space of vehicles;
    - 2.1.2. the interior space of trailers intended for passenger transport;
    - 2.1.3. the engine compartment of vehicles if this is within or below occupant compartment;
    - 2.1.4. the luggage compartment of vehicles intended for passenger transport;
    - 2.1.5. the goods compartment of commercial vehicles when it communicates with the interior space.
3. DEFINITIONS

For the purposes of this Recommendation:

  - 3.1. "Burning rate" means the quotient of the burnt distance, measured in accordance with this recommendation, and the time taken to burn this distance.  
It is expressed in millimetres per minute;
  - 3.2. "Composite material" means a material composed of several layers of similar or different materials held together by cementing, bonding, cladding, welding, etc.

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1/ Approved by the Group of Experts on the Construction of Vehicles at its sixty-first session (TRANS/SC1/WP29/63, paragraph 50) and by the Working Party on Road Transport at its sixty-eighth session (TRANS/SC1/305, paragraph 12); see paragraph 1.20. of this document.

When the holding together of the layers is not continuous (e.g. in the case of sewing, high-frequency welding, riveting) and individual samples can therefore be taken in accordance with chapter 5, the material shall not be considered a composite material;

- 3.3. "Interior space" means the space between certain vehicle walls; it may be any one of the spaces referred to in paragraphs 2.1.1. to 2.1.5. above.

#### 4. SPECIFICATIONS

- 4.1. Except as provided by paragraph 4.2. below no material shall be used in the interior space of a vehicle if its burn rate is greater than 250 mm/minute as determined according to the procedure described in paragraph 6.

- 4.2. Materials with a burn rate greater than 250 mm/minute may be used:

- 4.2.1. in floor trim and seat upholstery provided that the total area of the material in question is less than 300 cm<sup>2</sup> and its total volume is less than 100 cm<sup>3</sup>, and

- 4.2.2. in any other piece of trim provided that, in any area of trim measuring 625 cm<sup>2</sup>, the total area of the material in question is less than 300 cm<sup>2</sup> and its total volume is less than 100 cm<sup>3</sup>.

#### 5. TEST METHOD

##### 5.1. Principle.

A sample is held horizontally in a U-shaped holder and is exposed to the action of a defined low-energy flame for 15 s in a combustion chamber, the flame acting on the free edge of the sample.

The test determines if and when the flame goes out or the time required for the flame to travel a measured distance.

##### 5.2. Samples.

##### 5.2.1. Shape and dimensions.

- 5.2.1.1. The shape and dimensions of the sample are given in figure 6. The thickness of the sample corresponds to the thickness of the product to be tested. It must not exceed 13 mm.

When the sample so permits, it must have a constant cross section over its entire length.

- 5.2.1.2. When the shape and dimensions of a product do not permit taking a sample of a given size, the following minimum dimensions must be observed:

- 5.2.1.2.1. In this case of samples between 3 and 60 mm in width, the length must be 356 mm.  
In this case the material is tested across the width of the product.
- 5.2.1.2.2. In the case of samples between 60 and 100 mm in width, the length must be at least 138 mm.  
In this case the possible burning distance is the length of the sample, the measurement starting at the first measurement point.
- 5.2.1.2.3. Samples less than 60 mm in width and less than 366 mm in length, samples between 60 and 100 mm in width but less than 138 mm in length and samples less than 3 mm in width may not be tested according to this method.
- 5.2.2. Sampling.
- 5.2.2.1. At least five samples must be taken from the material to be tested.  
In the case of materials having different burning rates in different directions of the material (preliminary tests will show this) the five (or more) samples must be taken and placed in the test apparatus in such a manner that the highest burning rate can be measured.
- 5.2.2.2. When the material is supplied cut in given widths, a length of at least 500 mm must be cut across the entire width.  
Samples must be taken from this piece no closer than 100 mm from the edge of the material and equidistant from each other.
- 5.2.2.3. Samples must be taken in the same way from finished products, when the shape of the product so permits.  
When the thickness of the product exceeds 13 mm, it must be reduced to 13 mm by a mechanical process applied to the side opposite the side facing the interior space.
- 5.2.2.4. Composite materials (see paragraph 3.2.) must be tested as if they were a piece of homogeneous material.
- 5.2.2.5. In the case of several layers of different materials, not considered to constitute a composite material, any layer within a depth of 13 mm measured from the surface facing towards the occupant compartment shall be tested individually.
- 5.2.3. Conditioning.
- The samples must be kept for at least 24 hours but not more than seven days at a temperature of  $23 \pm 2^{\circ}\text{C}$  and a relative humidity of  $50 \pm 5$  per cent and must remain under these conditions until the time of the test.

5.3.           Apparatus.

5.3.1.           Combustion chamber (figure 1), preferably of stainless steel and having the dimensions indicated in figure 2.

5.3.1.1.       The front of the chamber comprises a fire-proof observation window, which may cover the entire front and which may serve as an access panel.

5.3.1.2.       The bottom of the chamber has ventilation holes, and the top has a vent slit on all four sides.

5.3.1.3.       The combustion chamber stands on four feet, measuring 10 mm in height.  
The chamber may have an opening at one end for insertion of the sample holder containing the sample; in the opposite end, a hole is provided for the gas line.  
Melted material is caught in a pan (see figure 3) which is placed on the bottom of the chamber between the ventilation holes and without covering them.

5.3.2.           Sample holder, consisting of two U-shaped metal plates or frames of corrosion-resistant material.  
The dimensions are given in figure 4.

5.3.2.1.       The lower plate is equipped with pins and the upper one with corresponding holes for holding the sample securely.  
The pins also serve as marks for measuring the beginning and end of the burning distance.

5.3.2.2.       A support shall be provided in the form of 0.25 mm diameter heat-resistant wires spanning the bottom frame of the sample holder at 25 mm intervals (see figure 5).

5.3.2.3.       The bottom of the sample must be 178 mm above the floor plate. The distance from the front edge of the sample holder to the end of the chamber must be 22 mm; the distance between the longer sides of the sample holder and the sides of the chamber must be 50 mm (all internal dimensions).  
(See figures 1 and 2).

5.3.3.           Gas burner.

The small flame source is provided by a Bunsen burner having an internal diameter of 9.5 mm.

It is so placed in the combustion chamber that the centre of its nozzle is 19 mm below the mid-point of the bottom edge of the open side of the sample (see figure 2).

5.3.4.           Test gas.

The gas supplied to the burner must have a calorific value of approximately 38 MJ/m<sup>3</sup> (e.g. natural gas).



5.3.5. Metal comb, at least 110 mm in length, with seven or eight smooth rounded teeth per 25 mm.

5.3.6. Stop-watch, accurate to 0.5 s.

5.3.7. Fume cupboard.

The combustion chamber may be placed in a fume cupboard provided the internal volume of the cupboard is at least 20 times, but not more than 110 times, greater than the volume of the combustion chamber and provided no single dimension (height, width or length) of the cupboard exceeds 2.5 times either of the other two dimensions.

5.3.7.1. Before the test, the vertical velocity of the air through the fume cupboard is measured 100 mm in front of and behind the intended location of the combustion chamber. The velocity must be between 0.10 and 0.30 m/s so as to avoid any possible discomfort to the operator caused by the combustion products. It is possible to use a fume cupboard with natural ventilation and an appropriate air velocity.

## 6. TEST PROCEDURE

6.1. Samples with napped or tufted surfaces are placed on a flat surface and combed twice against the nap, using the comb (paragraph 5.3.5.).

6.2. The sample is placed in the sample holder (paragraph 5.3.2.) so that the exposed side faces downwards towards the flame.

6.3. The gas flame is adjusted to a height of 38 mm, using the reference mark in the chamber, the air intake of the burner being closed.

Before the start of the tests, the flame must have burned for at least one minute in order to become stabilized.

6.4. The sample-holder is pushed into the combustion chamber so that the end of the sample is exposed to the flame and, after 15 s, the gas flow is cut off.

6.5. The measurement of the burning time starts at the moment when the leading edge of the flame passes the first measuring point. The flame propagation shall be observed on whichever side burns the fastest (upper or lower side).

6.6. Measurement of the burning time is completed when the flame reaches the last measuring point or when the flame goes out before reaching this point. If the flame does not reach the last measuring point, the burnt distance up to the point where the flame went out is measured. The burnt distance is the decomposed part of the sample whose surface or interior is destroyed by combustion.

- 6.7. If the sample does not ignite or does not continue to burn after the burner has been turned off, or if the flame goes out before reaching the first measuring point, with the result that no burning time can be measured, the test report must indicate that the burning rate is 0 mm/min.
- 6.8. When a series of tests or repeat tests are being carried out, it is necessary to ensure that the combustion chamber and sample holder have a maximum temperature of 30°C before the start of each test.

7. CALCULATION

The burning rate, B, in millimetres per minute, is given by the formula

$$B = \frac{S}{t} \times 60$$

where:

S is the burnt distance, in millimetres;  
t is the time, in seconds, to burn distance S.

8. TEST REPORT

The test report must include the following particulars:

- (a) type, marking and colour of the sample;
- (b) whether the sample was a simple or a composite material;
- (c) dimensions of the sample, including minimum thickness values;
- (d) preparation of the sample, including the method used to reduce the thickness (if latter exceeds 13 mm) in accordance with paragraph 5.2.2.;
- (e) position of sample in the product (lengthwise, across);
- (f) number of samples tested;
- (g) test results:
  - burnt distance and burning time;
  - other observations (self-extinction, etc.);
- (h) all the different calculated values of the burning rate;
- (i) special test conditions (use of fume cupboard, ventilator, etc.);
- (j) conditions different from those specified in this Recommendation;
- (k) date of test.

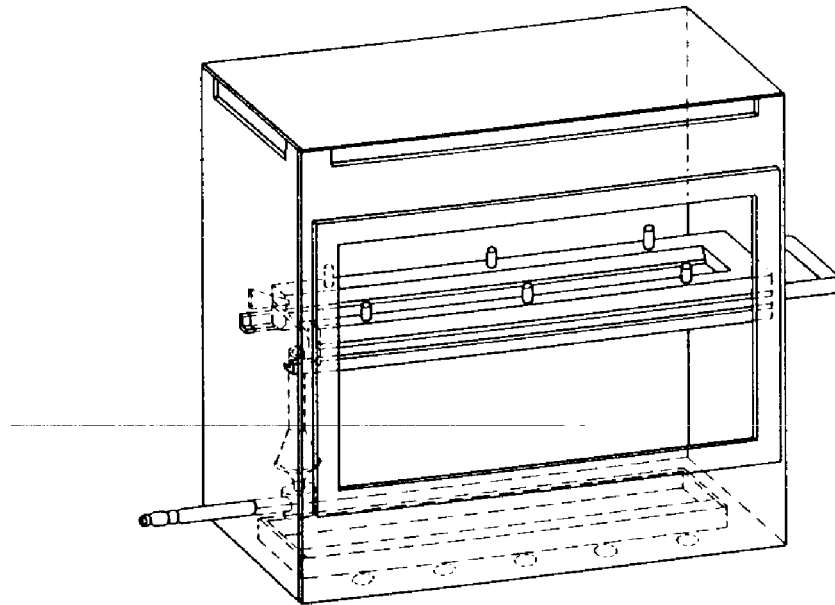


Figure 1 - Example of combustion chamber with sample holder and pan.

Dimensions in millimetres  
Tolerances according to ISO 2768

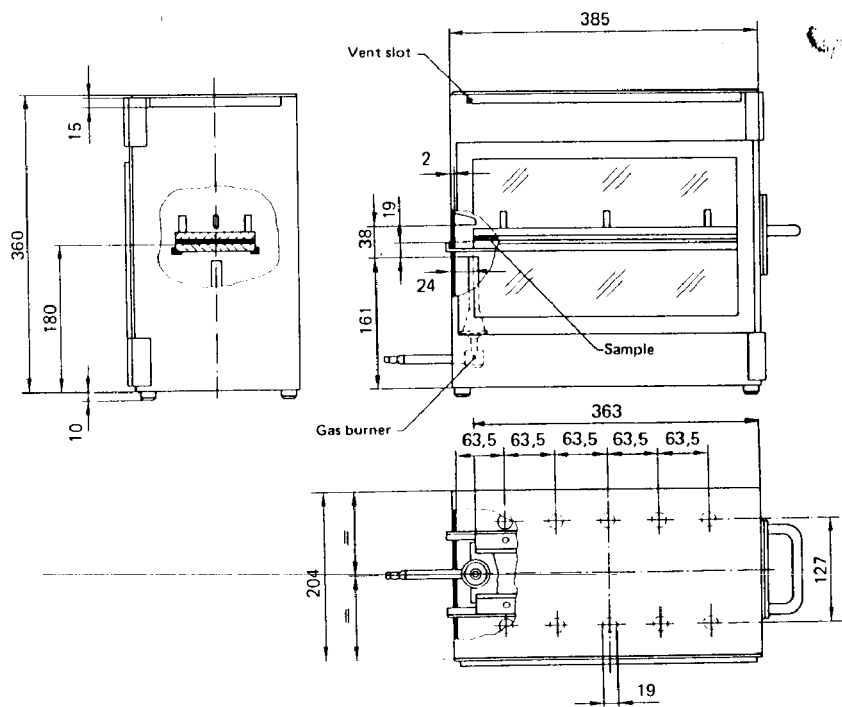


Figure 2 - Example of combustion chamber

Dimensions in millimetres  
Tolerances according to ISO 2768

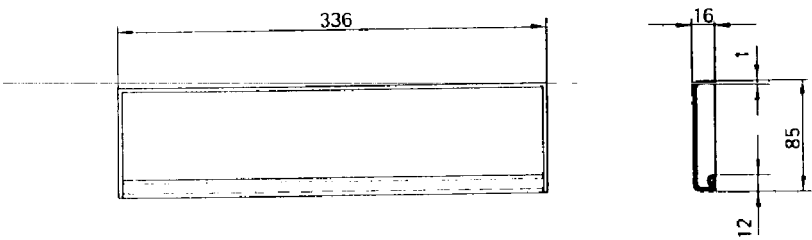


Figure 3 - Example of pan

Dimensions in millimetres  
Tolerances according to ISO 2768

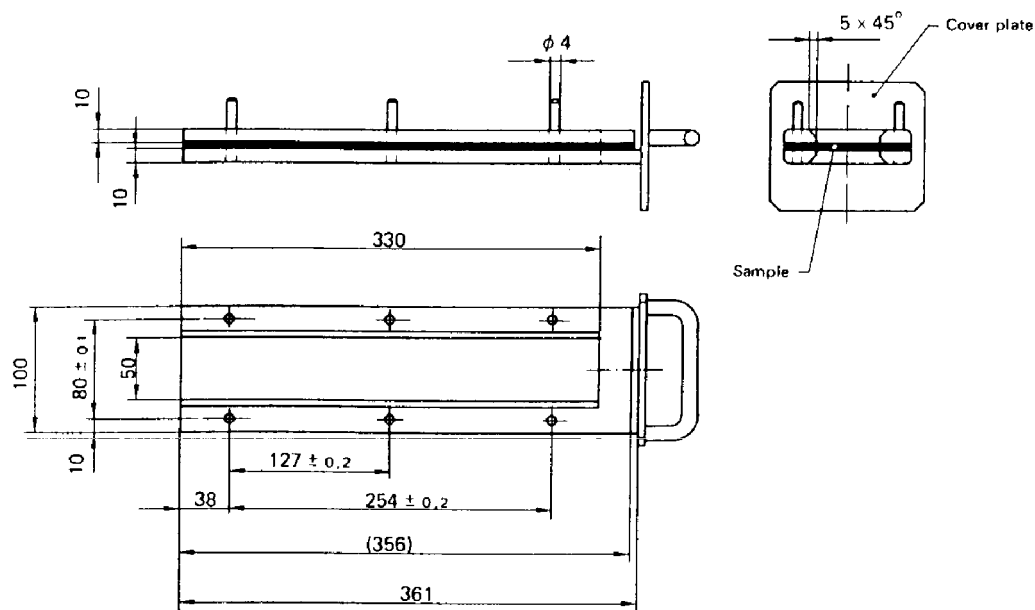


Figure 4 - Example of sample holder

Dimensions in millimetres  
Tolerances according to ISO 2768

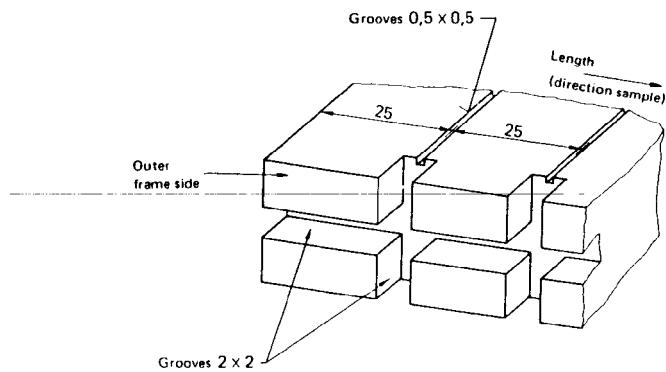


Figure 5 - Example of cross section of lower part of U-shaped frame designed to be fitted with supporting wires

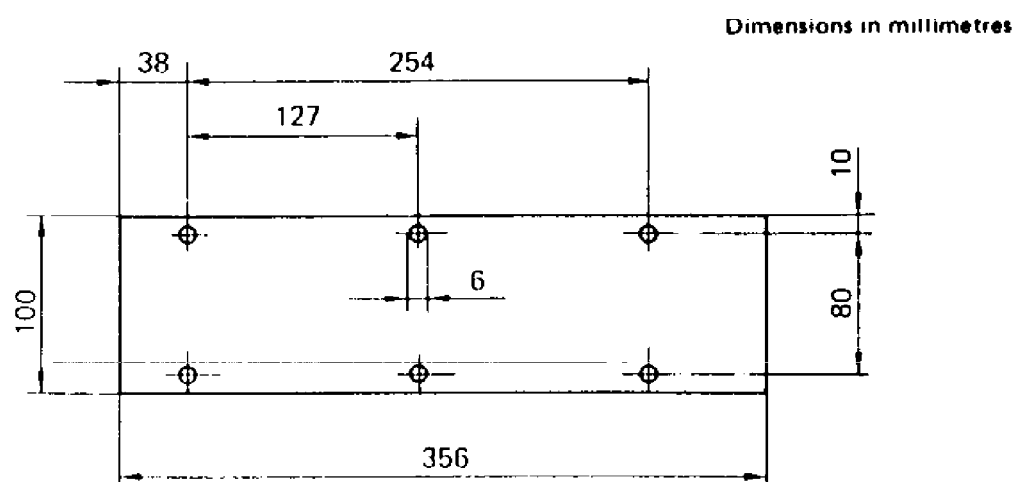


FIGURE 6 -- Sample

Annex 5

ECE TEST METHOD FOR THE DETERMINATION OF LOSS BY EVAPORATION FROM THE FUEL  
SYSTEM OF POWER-DRIVEN VEHICLES EQUIPPED WITH A POSITIVE-IGNITION ENGINE

(deleted)

Annex 6

MEASURES TO PREVENT UNAUTHORIZED MODIFICATIONS  
TO MOPEDS AND MOTOR CYCLES IN USE

1. PURPOSE OF THE RECOMMENDATION

This Recommendation is intended to reduce to the extent possible unauthorized modification to certain classes of power-driven vehicles which are subject by legislation to restrictions on their engine capacity and/or their performance and/or their maximum speed.

2. SCOPE

2.1. This Recommendation applies to:

2.1.1. Mopeds as defined in article 1 (m) of the 1968 Convention on Road Traffic and having two wheels only.

2.1.2. Mopeds within that definition but subject to other restrictions according to national legislation.

2.1.3. Derivatives of mopeds.

2.1.4. Certain motor cycles (as defined in article 1 (n) of the 1968 Convention on Road Traffic), designed and constructed in accordance with national legislations, so as to have a restricted engine capacity and/or performance and/or maximum speed.

2.1.5. Certain motor cycles of other categories, used only for limited purposes, which are designed and constructed specially to meet such limitations, in agreement with the manufacturer.

3. GENERAL SPECIFICATIONS

3.1. All vehicles offered for sale shall comply in all respects with the type approval (or the equivalent national) requirements.

3.2. The information on marking required in accordance with paragraph 4.1. below shall be annexed to the documents submitted with the application for type approval, or first registration as appropriate, of the vehicle.

4. SPECIFIC REQUIREMENTS

4.1. Marking of certain parts or components.

4.1.1. The parts or components listed below shall be durably and indelibly marked with code number(s) and/or symbol(s) given by the vehicle manufacturer or alternatively by the manufacturer of such parts or components or by the type approval authority \*/ in order to identify those parts or components. Such marking shall be visible (so far as practicable) without the necessity of dismantling the part in question or other parts of the vehicle.

4.1.2. Letters figures or symbols shall preferably be at least 5 mm in height and shall be easily readable.  
In cases where a height of 5 mm is not practicable, this dimension may be reduced but shall not be less than 3 mm.

4.1.3. The parts and components referred to in paragraph 4.1.1. above are the following:

4.1.3.1. Intake silencer (air filter or cleaner);

4.1.3.2. Carburettor or equivalent instrument;

4.1.3.3. Inlet manifold (if cast separately from the carburettor or cylinder);

4.1.3.4. Cylinder;

4.1.3.5. Cylinder head;

4.1.3.6. Crankcase;

4.1.3.7. Exhaust pipe(s);

4.1.3.8. Silencer(s);

4.1.3.9. Transmission driver member (front chain wheel (sprocket) or pulley);

4.1.3.10. Transmission driven member (rear chain wheel (sprocket) or pulley);

4.1.3.11. Speed-limitation devices.

4.2. Vehicle Manufacturer's Identification Plate.

4.2.1. A plate shall be affixed to each vehicle in a durable and permanent manner and in a visible place.  
On this plate the vehicle manufacturer shall state:

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\*/ For example, in the case of silencers.



- 4.2.1.1. His name or trade mark;
- 4.2.1.2. The type of vehicle;
- 4.2.1.3. The code number(s) or symbol(s) identifying the part or component marked in accordance with paragraph 4.1. above.  
  
(Note: a suggested model for simple correlation of the parts or components with their corresponding code number(s) or symbol(s) is shown in the appendix).
- 4.2.2. Letters, figures or symbols shall be at least 3 mm in height and shall be easily readable.
- 4.2.3. In the case of alternative parts or components being type approved (or granted an authorization) for the same vehicle, the code number(s) or symbol(s) of such alternative parts or components shall be shown on the plate.
- 5. TECHNICAL SPECIFICATIONS
- 5.1. Each vehicle shall be so designed and constructed as to comply with the specifications set out below.
  - 5.1.1. Cylinder head gasket: the maximum thickness of the cylinder head gasket shall not exceed 1.3 mm.
  - 5.1.2. Cylinder/crankcase joint: the maximum thickness of any gasket between the base of the cylinder and the crankcase shall not exceed 0.5 mm.
  - 5.1.3. The piston: the piston, when in the position at top dead centre, shall not cover the inlet port.  
This provision does not apply to those parts of the transfer port coincident with the inlet port in the case of vehicles, the engine of which is equipped with an induction system incorporating reed valve(s).
  - 5.1.4. Rotation of the piston through 180° shall not increase the performance of the vehicle nor its design maximum speed.
  - 5.1.5. In the event of the removal of the intake silencer, the design maximum speed of the vehicle shall not be increased by more than 5 km/h or 10 per cent of that speed, whichever is the lower.
  - 5.1.6. There shall be no artificial restrictions in the gas passage which can be easily removed or modified.
    - 5.1.6.1. This provision applies equally to reed or rotary valve systems, if such removal or modification causes an increase in the design maximum speed of the vehicle of more than 5 km/h or 10 per cent of that speed, whichever is the lower.

- 5.1.6.2. The valve guides of a four-stroke engine are not considered to be artificial restrictions.
- 5.1.7. The part(s) of the exhaust system inside the silencer(s) which determine(s) the effective length of the exhaust pipe shall be so affixed to the silencer(s) that it (they) cannot be removed.
- 5.1.8. In the event of a variation of the ignition timing and/or a change of the carburettor jet(s), the design maximum speed of the vehicle shall not be increased by more than 5 km/h or 10 per cent of that speed, whichever is the lower.
- 5.1.9. The design of cylinder and cylinder heads intended for different performance levels of the same basic engine shall be such that these parts cannot be fitted to an engine for which they are not appropriate; this can be obtained, for example, by different cylinder liner diameters, by different bolt patterns or different bolt diameters.
- 5.1.10. For 4-stroke engines a variation in camshaft timing shall not increase the maximum design speed above the values indicated in paragraphs 5.1.5. and 5.1.8.
- 5.1.11. For 4-stroke engines the design of the cylinder head shall be such that it cannot accommodate various camshafts intended for different performance levels of the same basic engine.
- 5.1.12. If the moped is equipped with electrical/electronic devices which limit the moped speed, the manufacturer shall provide data and evidence to the test authorities to demonstrate that modification or disconnection of the device, or its wiring system, will either not increase the maximum speed of the moped or will render the moped inoperative.

Electrical/electronic devices which cut or inhibit the spark ignition are forbidden if their disconnection results in an increase in either fuel consumption or unburnt hydrocarbons.

Electrical/electronic devices which vary the spark advance shall be designed so that the engine power, measured with the device functioning, does not differ by more than 10 per cent from the power measured with the device disconnected and with the advance set for maximum road speed.

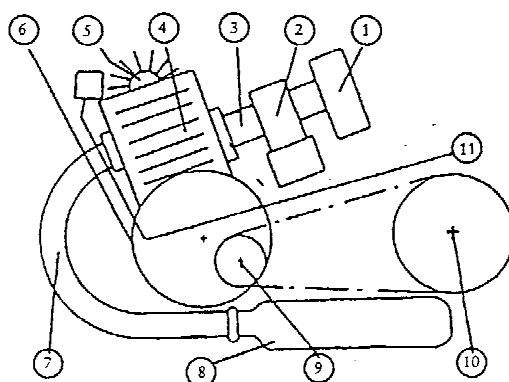
The maximum road speed shall be achieved with the spark advance set within  $\pm 5^\circ$  of the value specified for the development of maximum power.

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Annex 6 - Appendix

(see paragraph 4.2.1.3.)

TRADE NAME: .....	1. ....
VEHICLE CATEGORY: .....	2. ....
	3. ....
	4. ....
	5. ....
	6. ....
	7. ....
	8. ....
	9. ....
	10. ....
	11. ....



The diagram shows a side-view schematic of a vehicle chassis. It includes a front wheel (11), a steering knuckle assembly (1, 2, 3, 4, 5), a suspension arm (6), a shock absorber (7), a spring (8), a drive shaft (9), and a rear wheel (10). The components are numbered 1 through 11, corresponding to the list on the right.

Annex 7

CLASSIFICATION AND DEFINITION OF POWER-DRIVEN VEHICLES AND TRAILERS

1. CATEGORY L - MOTOR VEHICLES WITH LESS THAN FOUR WHEELS

1.1. Category L<sub>1</sub>:

A two-wheeled vehicle with an engine cylinder capacity in the case of a thermic engine not exceeding 50 cm<sup>3</sup> and whatever the means of propulsion a maximum design speed not exceeding 50 km/h.

1.2. Category L<sub>2</sub>:

A three-wheeled vehicle of any wheel arrangement with an engine cylinder capacity in the case of a thermic engine not exceeding 50 cm<sup>3</sup> and whatever the means of propulsion a maximum design speed not exceeding 50 km/h.

1.3. Category L<sub>3</sub>:

A two-wheeled vehicle with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm<sup>3</sup> or whatever the means of propulsion a maximum design speed exceeding 50 km/h.

1.4. Category L<sub>4</sub>:

A vehicle with three wheels asymmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm<sup>3</sup> or whatever the means of propulsion a maximum design speed exceeding 50 km/h (motor cycles with sidecars).

1.5. Category L<sub>5</sub>:

A vehicle with three wheels symmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm<sup>3</sup> or whatever the means of propulsion a maximum design speed exceeding 50 km/h.

2. CATEGORY M - POWER-DRIVEN VEHICLES HAVING AT LEAST FOUR WHEELS AND USED FOR THE CARRIAGE OF PASSENGERS

2.1. Category M<sub>1</sub>:

Vehicles used for the carriage of passengers and comprising not more than eight seats in addition to the driver's seat.

2.2. Category M<sub>2</sub>:

Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding 5 tonnes.

2.3. Category M<sub>3</sub>:

Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 tonnes.

2.4. Vehicles of categories M<sub>2</sub> and M<sub>3</sub> belong to one of the three following classes:

2.4.1. Class I 'city-bus':

A vehicle of this class has seats and spaces for standing passengers.

2.4.2. Class II 'interurban bus or coach':

A vehicle of this class may have provisions for standing passengers, but only in the gangway.

2.4.3. Class III 'touring coach':

A vehicle of this class has no provisions to carry standing passengers.

2.5. Remarks.

2.5.1. 'Articulated bus or coach' is a vehicle which consists of two or more rigid sections which articulate relative to one another; the passengers compartments of each section intercommunicate so that passengers can move freely between them; the rigid sections are permanently connected so that they can only be separated by an operation involving facilities which are normally only found in a workshop.

2.5.2. Articulated buses or coaches comprising two ore more non-separable but articulated units shall be considered as single vehicles.

2.5.3. In the case of a towing vehicle designed to be coupled to a semitrailer (tractor for semitrailer), the mass to be considered for classifying the vehicle is the mass of the tractor vehicle in running trim, increased by the mass corresponding to the maximum static vertical load transferred to the tractor vehicle by the semitrailer and, where applicable, by the maximum mass of the tractor vehicle's own load.

3. CATEGORY N - POWER-DRIVEN VEHICLES HAVING AT LEAST FOUR WHEELS  
AND USED FOR THE CARRIAGE OF GOODS

3.1. Category N<sub>1</sub>:

Vehicles used for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes.

3.2. Category N<sub>2</sub>:

Vehicles used for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes.

3.3. Category N<sub>3</sub>:

Vehicles used for the carriage of goods and having a maximum mass exceeding 12 tonnes.

3.4. Remarks

3.4.1. In the case of a towing vehicle designed to be coupled to a semitrailer (tractor for semitrailer), the mass to be considered for classifying the vehicle is the mass of the tractor vehicle in running trim, increased by the mass corresponding to the maximum static vertical load transferred to the tractor vehicle by the semitrailer and, where applicable, by the maximum mass of the tractor vehicle's own load.

3.4.2. The equipment and installations carried on certain special purpose vehicles (crane vehicles, workshop vehicles, publicity vehicles, etc.) are regarded as being equivalent to goods.

4. CATEGORY O - TRAILERS (INCLUDING SEMITRAILERS)

4.1. Category O<sub>1</sub>:

Trailers with a maximum mass not exceeding 0.75 tonnes.

4.2. Category O<sub>2</sub>:

Trailers with a maximum mass exceeding 0.75 tonnes, but not exceeding 3.5 tonnes.

4.3. Category O<sub>3</sub>:

Trailers with a maximum mass exceeding 3.5 tonnes, but not exceeding 10 tonnes.

4.4. Category O<sub>4</sub>:

Trailers with a maximum mass exceeding 10 tonnes.

4.5. Furthermore, trailers of categories  $O_2$ ,  $O_3$  and  $O_4$  are of one of the three following types:

4.5.1. 'Semitrailer':

A towed vehicle, in which the axle(s) is (are) positioned behind the centre of gravity of the vehicle (when uniformly loaded), and which is equipped with a connecting device permitting horizontal and vertical forces to be transmitted to the towing vehicle.  
One or more of the axles may be driven by the towing vehicle.

4.5.2. 'Full trailer':

A towed vehicle having at least two axles, and equipped with a towing device which can move vertically (in relation to the trailer) and controls the direction of the front axle(s), but which transmits no significant static load to the towing vehicle.  
One or more of the axles may be driven by the towing vehicle.

4.5.3. 'Centre-axle trailer':

A towed vehicle, equipped with a towing device which cannot move vertically (in relation to the trailer) and in which the axle(s) is (are) positioned close to the centre of gravity of the vehicle (when uniformly loaded) such that only a small static vertical load, not exceeding 10 per cent of that corresponding to the maximum mass of the trailer or a load of 1,000 daN (whichever is the lesser) is transmitted to the towing vehicle.  
One or more of the axles may be driven by the towing vehicle.

4.6. Remark.

In the case of a semitrailer or centre-axle trailer, the maximum mass to be considered for classifying the trailer corresponds to the static vertical load transmitted to the ground by the axle or axles of the semitrailer or centre-axle trailer when coupled to the towing vehicle and carrying its maximum load.

5. CATEGORY T - AGRICULTURAL AND FORESTRY TRACTORS

'Agricultural and forestry tractor':

A power-driven vehicle, either wheeled or tracklaying, which has at least two-axles, whose function depends essentially on its tractive power, and which is specially designed to pull, push, carry or actuate certain implements, machines or trailers intended for use in agriculture or forestry.  
Such a tractor may be arranged to carry a load and attendants.

6. CATEGORY G - OFF-ROAD VEHICLES

6.1. Definition.

Off road vehicles are considered to be the vehicles of categories M and N satisfying the requirements of this paragraph, checked under the conditions indicated in paragraphs 6.2. and 6.3.

6.1.1. Vehicles in category  $N_1$  with a maximum mass not exceeding 2 tonnes and vehicles in category  $M_1$  are considered to be off-road vehicles if they have:

at least one front axle and at least one rear axle designed to be driven simultaneously including vehicles where the drive to one axle can be disengaged;

at least one differential locking mechanism or at least one mechanism having a similar effect and

if they can climb a 30 per cent gradient calculated for a solo vehicle.

In addition, they must satisfy a least five of the following six requirements:

the front incidence angle must be at least  $25^\circ$ ;

the rear incidence angle must be at least  $20^\circ$ ;

the ramp angle must be at least  $20^\circ$ ;

the ground clearance under the front axle must be at least 180 mm;

the ground clearance under the rear axle must be at least 180 mm;

the ground clearance between the axles must be at least 200 mm.

6.1.2. Vehicles in category  $N_1$  with a maximum mass exceeding 2 tonnes or in category  $N_2$ ,  $M_2$  or  $M_3$  with a maximum mass not exceeding 12 tonnes are considered to be off-road vehicles either if all their wheels are designed to be driven simultaneously, including vehicles where the drive to one axle can be disengaged, or if the following three requirements are satisfied:

at least one front axle and at least one rear axle are designed to be driven simultaneously, including vehicles where the drive to one axle can be disengaged;

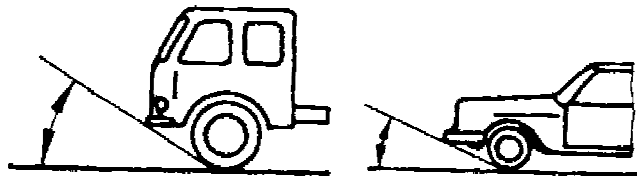
there is at least one differential locking mechanism or at least one mechanism having a similar effect;

they can climb a 25 per cent gradient calculated for a solo vehicle.

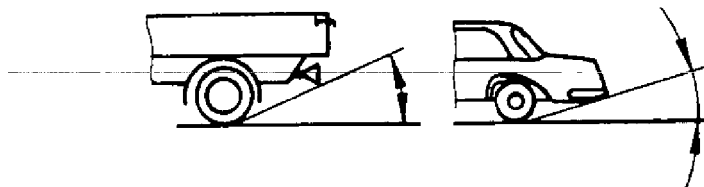


- 6.1.3. Vehicles in category  $M_3$  with a maximum mass exceeding 12 tonnes or in category  $N_3$  are considered to be off-road either if the wheels are designed to be driven simultaneously, including vehicles where the drive to one axle can be disengaged, or if the following requirements are satisfied:
- at least half the wheels are driven;
  - there is at least one differential locking mechanism or at least one mechanism having a similar effect;
  - they can climb a 25 per cent gradient calculated for a solo vehicle;
  - at least four of the following six requirements are satisfied:
    - the front incidence must be at least  $25^\circ$ ;
    - the rear incidence must be at least  $25^\circ$ ;
    - the ramp angle must be at least  $25^\circ$ ;
    - the ground clearance under the front axle must be at least 250 mm;
    - the ground clearance between the axles must be at least 300 mm;
    - the ground clearance under the rear axle must be at least 250 mm.
- 6.2. Load and checking conditions.
- 6.2.1. Vehicles in category  $N_1$  with a maximum mass not exceeding two tonnes and vehicles in category  $M_1$  must be in running order, namely with coolant fluid, lubricants, fuel, tools, spare-wheel and a driver considered to weigh a standard 75 kilograms.
- 6.2.2. Power-driven vehicles other than those referred to in paragraph 6.2.1. must be loaded to the technically permissible maximum mass stated by the manufacturer.
- 6.2.3. The ability to climb the required gradients (25 per cent and 30 per cent) is verified by simple calculation. In exceptional cases, however, the technical services may ask for a vehicle of the type concerned to be submitted to it for an actual test.
- 6.2.4. When measuring front and rear incidence angles and ramp angles, no account is taken of underrun protective devices.
- 6.3. Definitions and sketches of front and rear incidence angles, ramp angle and ground clearance.

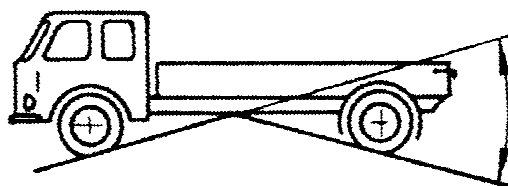
- 6.3.1. 'Front incidence angle' means the maximum angle between the ground plane and planes tangential to the tyres of the front wheels, under a static load, such that no point of the vehicle ahead of the front axle is situated below these planes and no rigid part of the vehicle, with the exception of any steps, is situated below these planes.



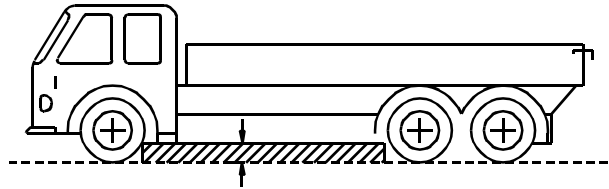
- 6.3.2. 'Rear incidence angle' means that maximum angle between the ground plane and planes tangential to the tyres of the rear wheels, under a static load, such that no point of the vehicle behind the rearmost axle is situated below these planes and no rigid part of the vehicle is situated below these planes.



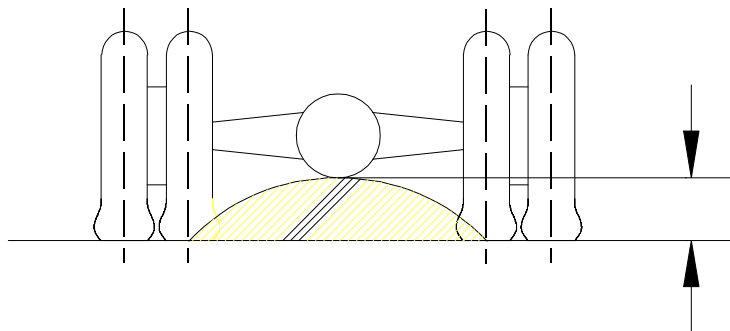
- 6.3.3. 'Ramp angle' means the minimum acute angle between two planes, perpendicular to the median longitudinal plane of the vehicle, tangential to the tyres of the front wheels and to the tyres of the rear wheels respectively, under a static load, the intersection of which touches the rigid underside of the vehicle apart from the wheels. This angle defines the steepest ramp over which the vehicle can pass.



- 6.3.4. 'Ground clearance between the axles' means the shortest distance between the ground plane and the lowest fixed point of the vehicle.  
Multi-axle bogies are considered to be a single axle.



- 6.3.5. 'Ground clearance beneath one axle' means the distance beneath the highest point of the arc of a circle passing through the centre of the tyre footprint of the wheels on one axle (the inner wheels in the case of twin tyres) and touching the lowest fixed point of the vehicle between the wheels.  
No rigid part of the vehicle may project into the shaded area of the diagram.  
Where appropriate, the ground clearance of several axles is indicated in accordance with their arrangement, for example 280/250/250.



- 6.4. Combined designation.  
  
Symbols M and N may be combined with symbol G.  
For example, a vehicle of category  $N_1$  which is suited for off-road use may be designated as  $N_1G$ .

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## Annex 8

### METHODS AND INSTRUMENTS FOR MEASURING NOISE INSIDE MOTOR VEHICLES

#### 1. MEASURING INSTRUMENTS

- 1.1. An omnidirectional sound level meter of high precision complying at least with the specifications of Publication No. 651 [1979] "Precision sound level meters" of the International Electrotechnical Commission (IEC) concerning the characteristics of sound level meters shall be used. Measurement shall be carried out with frequency weighting A and time weighting F conforming to curve A and the "fast response" time respectively.  
The type of sound level meter shall be stated in the test report.
- 1.2. The sound level meter shall be calibrated against a sound pressure calibrator immediately before and after each series of test runs.  
If the meter readings obtained from these calibrations differ by more than 1 dB, the test shall be considered invalid.
- 1.3. A suitable wind shield may be used to reduce the influence of wind on the measurements in open vehicles.  
Wind shields recommended by the sound level meter manufacturer will generally be suitable.
- 1.4. If alternative measuring equipment, including, for example, a tape recorder and/or level recorder, is used, its overall electro-acoustic performance shall conform to the relevant provisions of IEC Publication 651 [1979] for class I instruments.  
If a tape-recorder is used as part of the measuring equipment, it may be necessary to include suitable additional pre-emphasis and de-emphasis circuits for recording and reproduction to provide an adequate signal-to-noise ratio over the whole frequency range concerned.
- 1.5. The rotational speed of the engine shall be measured by an independent tachometer whose accuracy is within 3 per cent of the actual speed of rotation.

#### 2. MEASURED QUANTITIES

- 2.1. All readings of the sound level meter are to be taken with time weighting F.
- 2.2. The values to be measured at all microphone positions during type and monitoring tests are A-weighted sound pressure levels,  $L_pA$ , expressed in decibels (dB).  
If the weighting curve used is not stated, the measured values shall be expressed in dB(A).

3. CONDITIONS OF MEASUREMENT

3.1. Site.

3.1.1. The test site shall be such that the sound radiated by the vehicle to the outside contributes to the inside noise only by reflections from the road surface and not by reflections from buildings, walls or similar large objects outside the vehicle. During the period of measurement, the distance of the vehicle from large objects shall be greater than 20 m.

3.1.2. The ambient air temperature in which the vehicle is operating shall be in the range -5 to +35°C.  
The wind speed along the test track at a height of approximately 1.2 m shall not exceed 5 m/s.  
The other meteorological conditions shall be such that they do not influence the measurements.  
The speed of the wind and the direction of the wind relative to the test track shall be stated in the test report.

3.1.3. For all measurements of A-weighted sound pressure levels the lower limit of the dynamic range set by the background noise level and by the inherent noise level of the measuring equipment shall be at least 10 dB below the A-weighted sound pressure levels of the vehicle noise.

3.1.4. The test road shall be hard and as smooth and level as possible, without gaps or ripples or similar macro-irregularities of surface texture which might contribute to the sound levels inside the motor vehicle.  
The surface shall be dry and free from snow, dust, stones, leaves, etc.

3.2. Vehicle.

3.2.1. Engine and tyre conditions.

3.2.1.1. During the test, all operating conditions of the engine shall correspond to the specifications given by the manufacturer, for example, fuel, lubricating oil, timing of ignition or fuel injection pump for the test conditions.  
The engine shall be stabilized at its normal operating temperature immediately before commencing the test, e.g., by driving the vehicle for an adequate distance at a medium speed.

3.2.1.2. The tyres used shall be of a type specified by the manufacturer of the vehicle as being appropriate to the conditions under which it is normally used, and shall be inflated to the pressure recommended by the vehicle manufacturer.  
If the use of off-road tyres is optional, tyres for road use shall be fitted.  
The tyres shall be nearly new, but with a minimum wear of 300 km.

The type of tyres and inflation pressures at the time of testing shall be stated in the test report.  
The wheels of the vehicles should be statically and dynamically balanced if it is considered that wheels that are out of balance may affect the noise level inside the vehicle.

- 3.2.1.3. If the engine coolant radiators are equipped with devices such as flaps, the measurements shall be carried out with them open. Standard test conditions are with fan operating normally; if a vehicle is fitted with an automatic flap and/or fan, its operating conditions shall be stated in the test report.

3.2.2. Loading of the vehicle.

- 3.2.2.1. The vehicle shall be unladen.  
In the cabs of trucks and similar vehicles, not more than two persons (the driver and observer) shall be allowed, and in public service vehicles with more than eight seats not more than three persons shall be allowed.

3.2.3. Openings, windows, auxiliary equipment.

Openings such as skylights, all windows and ventilating inlets and/or outlets shall be closed, if possible.  
Auxiliary equipment such as windscreen wipers and heating and/or ventilating fans and air-conditioners shall not operate during the tests.  
If any auxiliary equipment is automatic, its operating condition shall be stated in the test report.

4. METHODS OF TESTING

4.1. General conditions of tests.

- 4.1.1. At least two measurements shall be made at each microphone position and for each operating condition.  
If the spread of results of the A-weighted sound pressure level obtained under any measuring condition exceeds 3 dB, further measurements shall be made until the readings of two independent successive measurements fall within a range of 3 dB;  
the mean value of these two readings shall be taken as the test result.
- 4.1.2. The value stated in the test report shall be rounded to the nearest whole decibel.
- 4.1.3. Any peak which is obviously out of character with the general sound level being read shall be disregarded.
- 4.1.4. Whenever the sound level meter reading fluctuates, the mean value of the readings shall be determined.  
Occasional extreme peaks shall be disregarded.

- 4.1.5. The presence of clearly audible pure tones or noise of distinct impulse character shall be stated additionally in the test report.
- 4.2. Acceleration test.
- 4.2.1. The procedure for the test is as follows:

The speed of the vehicle and of the engine shall be stabilized at the specified initial conditions;

When stable conditions are attained, the throttle shall be fully opened as fast as possible and held in this position until either 90 per cent of the engine speed for maximum power as specified by the manufacturer of the vehicle ("maximum power speed") or 100 km/h is reached, whichever is lower.
- 4.2.2. The initial operating conditions are specified as follows:
- 4.2.2.1. Vehicle with a manually-operated gear box.
- 4.2.2.1.1. If the vehicle is fitted with a manually-operated gear box, it shall be in the highest gear with which the test is possible without exceeding 120 km/h; the gear setting shall not be changed during the test.
- 4.2.2.1.2. If, at an engine speed of 90 per cent of maximum power speed, a road speed of 120 km/h is exceeded in top gear, a lower gear shall be selected, but not lower than third for a four-speed or more than four-speed gearbox, and not lower than second for a three-speed gear-box.

If 120 km/h is still exceeded in this lower gear, the vehicle shall be tested over the speed range 60 to 120 km/h in that gear.
- 4.2.2.1.3. The initial engine speed shall be the lowest allowing a continuously increasing engine speed during the test, but not lower than 45 per cent of the maximum power speed, unless 120 km/h is exceeded at 90 per cent of maximum power speed in the lowest gear allowed, in which case the initial engine speed shall be that corresponding to a road speed of 60 km/h.
- 4.2.3. Automatic transmission vehicle.
- 4.2.3.1. For vehicles with automatic transmission, the initial engine speed shall be stabilized as near as possible to 45 per cent of the maximum power speed.

The corresponding road speed shall be not higher than approximately 60 km/h.

4.2.4. If the setting changes before the final speed of 90 per cent of maximum power speed or 120 km/h is reached, the initial speed shall be 50 per cent of the speed at which the setting changes. If possible, kick-down mechanisms shall be made inoperative.

4.2.5. At full throttle acceleration, the maximum  $L_pA$  value occurring in the specified acceleration range shall be recorded and stated in the test report, in accordance with provisions of paragraph 4.1. above.

4.3. Stationary test.

4.3.1. Stationary tests shall be carried out in neutral gear with the engine operating at the idling speed indicated by the manufacturer.

4.3.2. The  $L_pA$  values measured under the conditions stated in paragraph 4.3.1. above constitute the result of the measurement and shall be stated in the test report.

5. MICROPHONE POSITION

5.1. Microphone position in the vehicle.

5.1.1. During the measurement no seat at which measurement is being made in the vehicle shall be occupied, with the exception of the driver's seat.

5.1.2. The microphone shall not be closer than 0.15 m to walls, upholstery or persons present.  
If an assistant is present during the measurement (see paragraph 6.2.), he must keep at a minimum distance of 1 m from the microphone.

5.1.3. The microphone shall be oriented horizontally, with the axis of maximum sensitivity (according to the manufacturer's specification) pointing in the direction in which a person occupying the seat or standing position would be looking or, if such direction is not specified, in the driving direction.

5.2. Microphone position in relation to a seat:  
setting of seats and head-restraints  
(see figure 1 in the appendix to this annex)

5.2.1. For the positioning of the microphone, in accordance with the conditions set out below, adjustable seats and head-restraints shall be set in the mid-position of the horizontal and vertical range of adjustment.  
If the back-rest of the seat is adjustable, this shall be set as near vertical as possible.

5.2.1.1. The vertical co-ordinate of the microphone shall be  $0.7 \pm 0.05$  m above the intersection of the unoccupied seat surface and the surface of the back of the seat.



- 5.2.1.2. The horizontal co-ordinate shall be:
- 5.2.1.2.1. For an unoccupied seat (position A), the median plane (plane of symmetry) of the seat;
- 5.2.1.2.2. For the driver's seat, with the driver present (position B),  $0.2 \pm 0.02$  m to the right (to the left for right-hand drive vehicles) of the median plane of the seat.
- 5.2.2. In case of doubt, a check may be made in relation to the H point of the seat.  
The H point is a reference point determined according to the procedure described in Regulation No. 46, annex 8.
- 5.2.2.1. For the determination of the H point, the reference line on the manikin described in Regulation No. 46, annex 8, is the line shown in figure 2 in the appendix to this annex.  
The reference line is a straight line which, either on a test manikin having the weight and dimensions of a fiftieth-percentile adult male or on a test manikin having identical characteristics, passes through the joint of the leg with the pelvis and the joint of the neck with the thorax.
- 5.2.2.2. The microphone shall be placed  $0.7 \pm 0.05$  m above the H point of the unoccupied seat, as measured on the reference line (see figure 2 in the appendix to this annex).
- 5.2.2.3. The horizontal co-ordinate of the microphone shall be the median plane (plane of symmetry) of the unoccupied seat.  
At the driver's seat the horizontal co-ordinate shall be  $0.2 \pm 0.02$  m to the right (to the left for right-hand drive vehicles) of the median plane of the seat.
- 5.2.2.4. If the vehicle seats are equipped with head-restraints, the distance of the microphone from the head-restraint centre shall be  $0.1 \pm 0.02$  m.
- 5.3. Microphone position for standing places.  
  
The vertical co-ordinate shall be  $1.6 \pm 0.1$  m above the floor.  
The horizontal co-ordinate shall correspond to a person standing at selected points.
6. MEASURING POSITION SELECTION
- 6.1. Measurements shall be made:
- 6.1.1. At the driver's seat;
- 6.1.2. At the permanently-used service seats (e.g., conductor's seat).

- 6.2.                    The other measuring positions shall be:
- 6.2.1.                On vehicles with a maximum of three rows of seats, in the last row in the axis of the seat which is nearest to the longitudinal axis of the vehicle (passenger compartment), preferably on the right-hand side;
- 6.2.2.                On vehicles having nine or more seats (in addition to the driver's seat), \*/ in the first row behind the driver's seat and in the last row of seats in the axis of the seat which is nearest to the longitudinal axis of the vehicle, preferably on the right-hand side.  
If there are more than three rows of seats behind the driver's seat, also in the row which is nearest to the middle point between the first and last row; \*/
- 6.2.3.                In the area intended for standing passengers, on additional suitably selected places according to the individual layout of the vehicle, on the longitudinal axis of the vehicle or on the position nearest to this axis (preferably on the right-hand side).
- 6.3.                    The exact positions of the measuring points shall be identified in the schematic drawing.
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\*/ The test laboratory may choose for vehicles of this category additional measuring points at the middle and the rear of the vehicle adjacent to the longitudinal axis of the vehicle.

Annex 8 - Appendix

MICROPHONE POSITION WITH RESPECT TO A SEAT

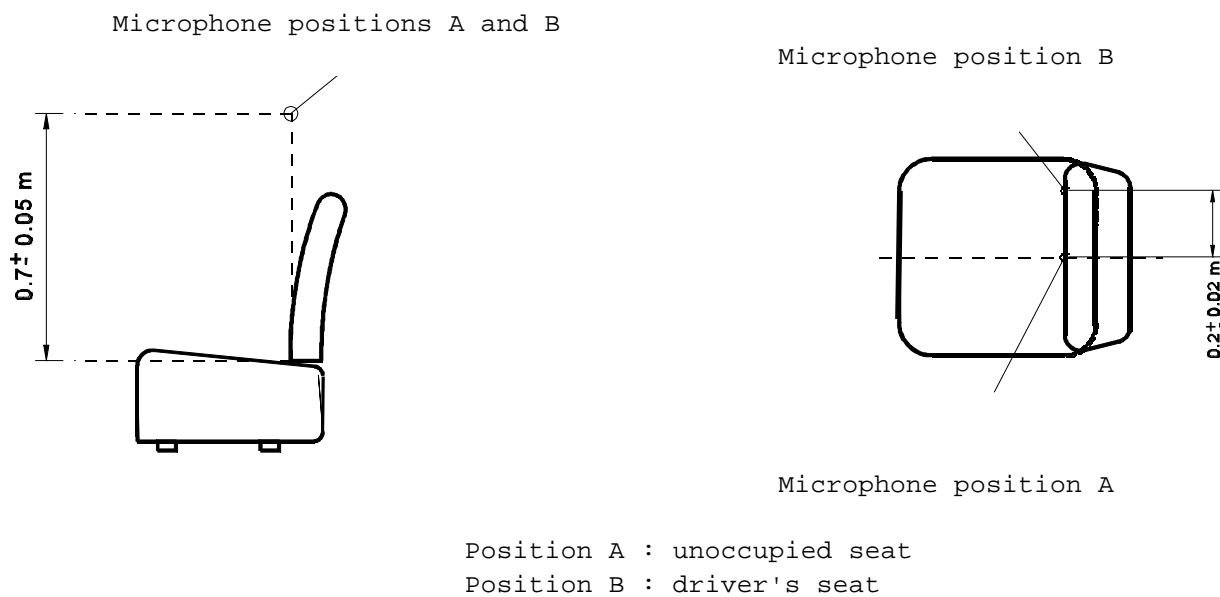


Figure 1 - see paragraphs 5.2.1.1. and 5.2.1.2.

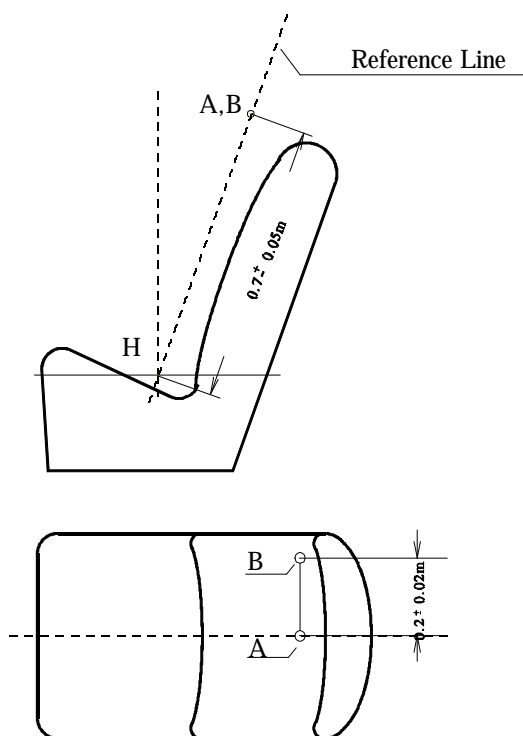


Figure 2 - see paragraphs 5.2.2.1. and 5.2.2.2.

Annex 9

INSTALLATION OF AND TECHNICAL SPECIFICATIONS  
FOR SUPPORTS FOR TWO-WHEELED MOTOR VEHICLES

1. PURPOSE OF THE RECOMMENDATION

This Recommendation is intended to ensure, so far as is reasonably practicable, that the installation and use of the supports with which two-wheeled motor vehicles are equipped do not present hazards either to the users of the vehicle or to any other road user.

2. SCOPE

This Recommendation applies to MOPEDS and MOTOR-CYCLES having two wheels only and not equipped with side-cars.

3. DEFINITIONS

3.1. "Vehicle" means a moped or a motor-cycle as defined in the Vienna Convention on Road Traffic, 1968, article 1 (m) and (n) respectively, to the exclusion of vehicles equipped with side-cars or having three wheels;

3.2. "Support" means a device securely affixed to the vehicle by means of which the vehicle can be maintained in the parked, upright (or near upright) position when it is at rest and not attended by the rider;

3.3. "Side stand" means a support which, when extended or pivoted into the open position, supports the vehicle on one side only, leaving both wheels in contact with the supporting surface;

3.4. "Centre stand" means a support which, when extended into open position, supports the vehicle by providing an area, or areas, of contact between the vehicle and the supporting surface, distributed on either side of the longitudinal median plane of the vehicle;

3.5. "Tilt" means the inclination, measured as a percentage (see figure 1 below), of the supporting surface produced by raising or lowering one side of the supporting surface in relation to the horizontal in such a manner that the intersection of the supporting surface and the horizontal plane is parallel to the longitudinal median plane of the vehicle;

3.6. "Slope" means the inclination, measured as a percentage (see figure 2 below), of the supporting surface produced by raising or lowering one side of the supporting surface in relation to the horizontal in such a manner that the intersection of the supporting surface and the horizontal plane is perpendicular to the longitudinal median plane of the vehicle;

- 3.7.            "Longitudinal median plane" of the vehicle means the longitudinal plane of symmetry of the rear wheel of the vehicle;
- 3.8.            "Unladen kerb mass" means the mass of the vehicle in running order, without occupant or load, but with fuel, coolant, lubricant, tool-kit and spare wheel (if normally provided by the manufacturer).
4.            GENERAL REQUIREMENTS
- 4.1.            Every vehicle shall be equipped with some form of support to ensure its stability at rest (for example, when it is parked) and not maintained in a static position by human or external means.
- 4.2.            Such support shall be either.
- 4.2.1.           A side stand; or
- 4.2.2.           A centre stand.
- 4.3.            This Recommendation shall neither require a vehicle to be equipped with more than one, or more than one type of, support, nor prevent a vehicle from being so equipped.
- 4.4.            Supports shall be so designed and constructed as to be:
- 4.4.1.           Free from all unnecessary sharp edges and projections 1/ which might cause injury to the rider, the passenger or third parties coming into contact with the support;
- 4.4.2.           Easy to use and precise in their action;
- 4.4.3.           Unlikely to cause permanent deformation of the supporting surface when in the open or parking position.
- 4.5.            In the case of a support which is hinged to the lower part or underside of the vehicle, the outer extremity (extremities) of the support shall, in order to place it in the closed or riding position, move towards the rear of the vehicle.
5.            SPECIAL REQUIREMENTS
- 5.1.            Side stands.
- 5.1.1.           Side stands shall possess the following characteristics:
- 5.1.1.1.           The ability to support the vehicle, in such a manner as to ensure the lateral stability of the vehicle, whether on a

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1/ Radius of curvature of not less than 2.5 mm is considered to satisfy this requirement.

horizontal supporting surface or under conditions of tilt, so that the vehicle cannot be either too easily further inclined (and hence made to overbalance, using the side stand as a fulcrum) or too easily moved into or beyond the vertical position (and hence made to overbalance and fall onto the side opposite the side stand);

- 5.1.1.2. The ability to support the vehicle in such a manner as to ensure positive positioning when the vehicle is under conditions of slope;
- 5.1.1.3. The ability to fold back into the closed or riding position automatically;
  - 5.1.1.3.1. When the vehicle is returned to the normal (vertical) position for riding, or
  - 5.1.1.3.2. As a result of the vehicle being moved forward by a deliberate action of the rider, or
  - 5.1.1.3.3. Without disturbing the equilibrium of the vehicle, if the side stand comes into contact with the supporting surface while the vehicle is moving;
- 5.1.1.4. Notwithstanding the provisions of paragraph 5.1.1.3. above, the side stand shall nevertheless be designed and constructed in such a manner that
  - 5.1.1.4.1. once moved into the open or parking position,
  - 5.1.1.4.2. with the vehicle inclined in order to bring the outer extremity of the side stand into contact with the ground, or
  - 5.1.1.4.3. when the vehicle is left unattended in the parked position,  
  
the side stand will not automatically close if the angle of inclination is inadvertently changed (for example, because the vehicle is slightly moved by a third party or because of wind pressure created by a passing vehicle).
- 5.1.2. Instead of conforming to the provisions of paragraphs 5.1.1.3. and 5.1.1.4. above, the vehicle may be equipped with a side stand which is connected to its ignition system in such a manner that the ignition system can only be activated when the side stand is in the closed or riding position.
- 5.2. Centre stands.
  - 5.2.1. Centre stands shall possess the following characteristics:
    - 5.2.1.1. The ability to support the vehicle with one wheel, both wheels or neither wheel in contact with the supporting surface in such a manner as to ensure the stability of the vehicle.

- 5.2.1.1.1. On a horizontal supporting surface;
- 5.2.1.1.2. Under conditions of tilt;
- 5.2.1.1.3. Under conditions of slope;
- 5.2.1.2. The ability to fold back into the closed or riding position automatically.
  - 5.2.1.2.1. When the vehicle is moved forward in such a manner as to disengage the centre stand from the supporting surface, or
  - 5.2.1.2.2. Without disturbing the equilibrium of the vehicle, if the centre stand comes into contact with the supporting surface while the vehicle is moving.
- 5.2.2. Instead of conforming to the provisions of paragraph 5.2.1.2. above, a vehicle to which only a centre stand is fitted may be equipped with a centre stand which is connected to its ignition system in such a manner that the ignition system can only be activated when the centre stand is in the closed or riding position.
- 5.3. All supports.
  - 5.3.1. Vehicles which are equipped in accordance with the provisions of paragraphs 5.1.2. or 5.2.2. above may in addition be equipped with a warning light, clearly discernible by the rider when seated in the riding position which, when the ignition is switched on, comes on and remains on until the support is in the closed or riding position.
  - 5.3.2. Supports shall be equipped with a retaining system to secure them in the closed or riding position.  
The system may consist of either:  
  
Two independent devices, such as two separate springs or a spring and a retaining device such as a clip, or  
  
A single device which shall be capable of operating without failure for at least  
  
10,000 cycles of normal use if the vehicle is equipped with two supports, or  
  
15,000 cycles of normal use if the vehicle is equipped with a single support.
- 6. TESTS FOR STABILITY  
  
In order to establish the ability to support the vehicle in a stable condition as specified in paragraph 5 of this Recommendation, the following tests shall be undertaken.

6.1.           Condition of the vehicle.

- 6.1.1.           The vehicle shall be at its unladen kerb mass in accordance with paragraph 3.8.
- 6.1.2.           The tyres shall be inflated to the pressure recommended by the manufacturer for these conditions.
- 6.1.3.           The transmission shall be in neutral or, in the case of automatic transmission, in the parking position if provided.
- 6.1.4.           If the vehicle is equipped with a parking brake, it shall be applied.
- 6.1.5.           The steering head shall be in the locked position.  
If the steering can be locked when turned either to the left or to the right, the tests shall be carried out with the steering head in both positions.

6.2.           Test area.

Any flat, horizontal area with a hard, dry surface, free from grit, may be used for the tests defined in paragraph 7.1. below.

6.3.           Test equipment.

- 6.3.1.           A parking platform shall be used for the tests set out in paragraph 7.2. below.
- 6.3.2.           The parking platform shall be a rigid, flat, rectangular surface capable of supporting the vehicle without significant flexing.
- 6.3.3.           The surface of the parking platform shall provide sufficient friction to prevent the vehicle from sliding in relation to the supporting surface during the tests for tilt or slope.
- 6.3.4.           The parking platform shall be so constructed as to be capable of assuming at least the inclinations to the horizontal prescribed in paragraph 7.2.2.

7.           TEST PROCEDURE

7.1.           Stability on a horizontal supporting surface.  
(Test for paragraph 5.1.1.4. above).

- 7.1.1.           With the vehicle in the test area, the side stand shall be placed in the open or parking position and the vehicle allowed to rest upon the side stand.



- [illegible]

Figure 1: Tilt

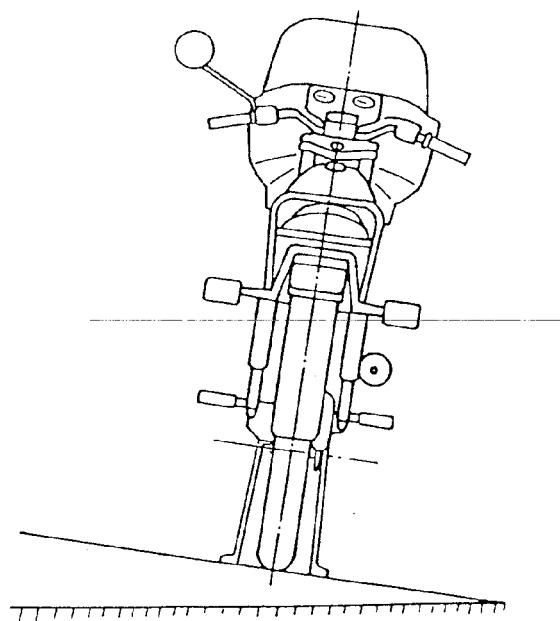
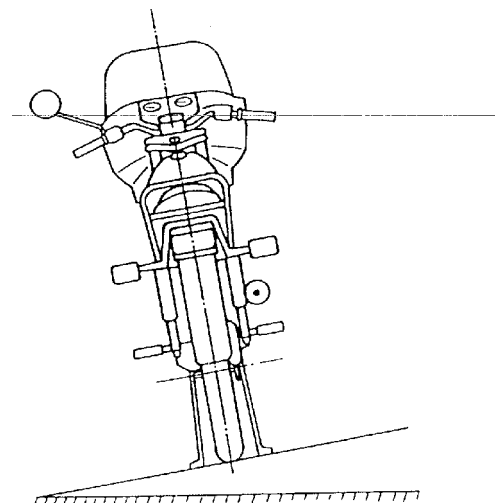
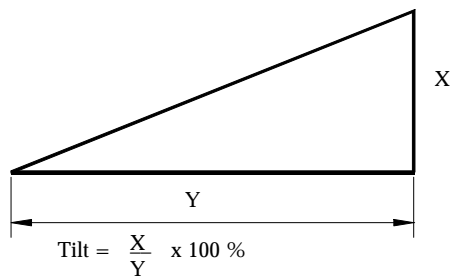


Figure 2: Slope.

Figure 2(a) Upward inclination.

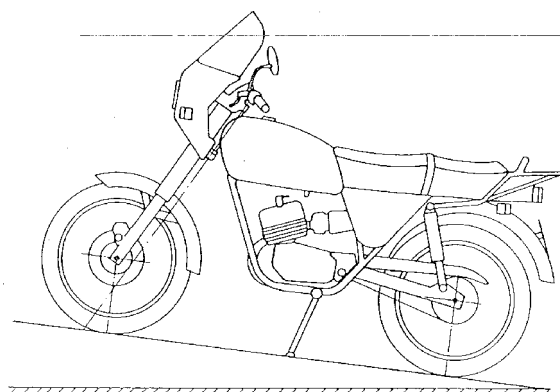
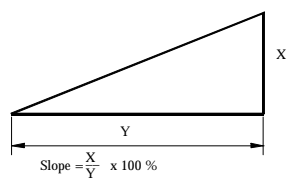
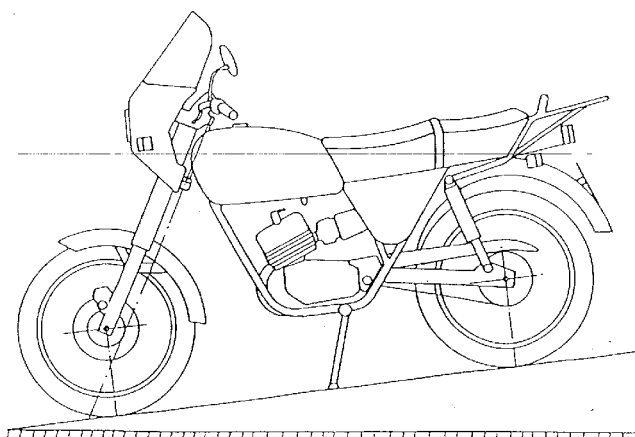


Figure 2(b) Downward inclination.



Annex 10

ANCHORAGES FOR CHILD RESTRAINTS 1/

1. It is recommended to Governments intending to adopt specific requirements relating to anchorages for child restraints used in passenger cars that they should, as far as possible, base these on the specifications set out below.
2. SCOPE  
  
The main purposes of this recommendation are:
  - 2.1. To establish requirements concerning the location and minimum strength of eight different anchorages;
  - 2.2. To define the nine arrangements described in paragraph 9 below;
  - 2.3. To provide for the vehicle marking 'ACX' 2/ to be affixed to the vehicle when the vehicle manufacturer supplies anchorages which correspond to one or more of the arrangements to which paragraph 2.2. refers.
3. GENERAL
  - 3.1. In this annex, each symbol  $P_1 - P_8$  refers to the following additional anchorages:
    - 3.1.1.  $P_1 - P_5$  Lower additional anchorages suitable for the installation of child restraints in the front passenger seat.
    - 3.1.2.  $P_6 - P_8$  Upper additional anchorages suitable for the installation of child restraints in at least two outward rear seating positions.
4. Horizontal location of the anchorages in the lateral direction.
  - 4.1. The anchorages shall be located as shown in figure 1. The plane T is the vertical longitudinal plane midway between the two lower adult seat belt anchorages for that seating position or, at the request of the vehicle manufacturer, the longitudinal median plane of that seating position.
  - 4.2. The distance between the two vertical planes parallel to plane T each passing through a different one of the anchorages  $P_7$  and  $P_8$  shall be not less than 300 mm.

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1/ See paragraph 1.7. of this document.

2/ AC means anchorage; X indicates the recommended arrangement, as listed in paragraph 9 of this annex, which has been adopted on the vehicle.

Neither of these planes shall be more than 300 mm nor less than 120 mm from plane T, but the distance from T need not be the same.

- 4.3. Neither of the two vertical planes parallel to plane T through each one of the anchorages  $P_3$  and  $P_4$  shall be more than 300 mm or less than 150 mm from plane T.  
The distance from T need not be the same.
- 4.4. The central anchorages  $P_1$ ,  $P_2$ ,  $P_5$  and  $P_6$  shall be located between the two vertical planes 40 mm on either side of plane T.
5. Longitudinal and vertical location of the upper anchorages.
- 5.1. The upper anchorages shall be located as shown in figure 2.
- 5.2. H is the H-point of the seat as defined in ECE Regulation No. 14, Revision 1, annex 4.  
HZ is the reference line defined in paragraph 5.1.2. of ECE Regulation No. 14, Revision 1.
- 5.3. CY is the horizontal plane 450 mm vertically above point H.
- 5.4. AE is a plane parallel to and 100 mm from a plane through HZ perpendicular to plane T defined in 4.1 above.
- 5.5. CR is a plane perpendicular to plane T and is above plane CY which it cuts at an angle of  $20^\circ$  at C.
- 5.6. CS is a plane perpendicular to plane T and is below plane CY which it cuts at an angle of  $20^\circ$ .
- 5.7. K is the first point of contact of the strap with the seat-back after the anchor plate, under the test conditions described in paragraph 8.6. below.
- 5.8. Plane QW is a plane perpendicular to plane T passing through the point K and cutting the plane CY at Q such that the angle YQW is  $80^\circ$ .
- 5.9. The upper anchorage shall lie either below plane CR and behind plane AE and above plane CS (i.e. within the space RVTs) or, if any part of the seat-back which is in contact with the strap under the test conditions described in paragraph 8.6. below is above plane CS, the anchorage may lie in the additional space behind plane QW.
- 5.10. The distance d (figure 3), measured along the strap from the child restraint anchorage to the vertical transverse plane tangential to the top rear surface of the seat-back at the point vertically below the strap as it passes through that plane, shall be not less than 1 metre under the test conditions described in paragraph 8.6. below.

- 5.11. The anchorage shall be so located that there is sufficient space to enable the attachment of the standard anchor plate shown in figure 5.
6. Longitudinal and vertical location of the lower anchorages.
- 6.1. The lower anchorages shall be located as shown in figure 4.
- 6.2. H is the H-point of the seat as defined in ECE Regulation No. 14, Revision 1, annex 4.
- 6.3. The anchorage  $P_1$  shall be located behind the H-point. The distance between the vertical planes, perpendicular to plane T, through the H-point and  $P_1$  shall be not less than 100 mm or more than 300 mm.
- 6.4. The anchorages  $P_2$ ,  $P_3$  and  $P_4$  shall be located in front of the H-point. The distance between the vertical planes, perpendicular to plane T, through the H-point and  $P_2$ ,  $P_3$  and  $P_4$  shall be not less than 300 mm or more than 500 mm. The distance need not be the same.
- 6.5. The anchorage  $P_5$  shall be located in front of the H-point. The distance between the vertical planes, perpendicular to plane T through the H-point and  $P_5$ , shall be not less than 800 mm.
- 6.6. The anchorage shall be so located that there is sufficient space to enable the attachment of the standard anchor plate shown in figure 5.
7. Performance in static strength tests.
- 7.1. Each anchorage shall be capable of withstanding the test force prescribed in paragraph 8 below for not less than 0.5 seconds. The maximum displacement of the anchorage during the test shall not exceed 10 mm.
- 7.2. If the test strap comes into contact with the seat-back under a forward horizontal force of 100 N applied as specified in paragraph 8.6 below, the first point of contact on the test strap shall be marked. This mark shall not move by more than 70 mm when the full test force of 7 kN is applied in accordance with paragraph 8.8. below.
8. Tests.
- 8.1. The tests may be carried out either on a vehicle structure or on a complete vehicle.

- 8.2. Windows and doors may be fitted or not and closed or not.
- 8.3. Any fitting normally provided and likely to contribute to the rigidity of the vehicle structure may be fitted.
- 8.4. The seats shall be fitted and, if intended to be moved during the normal use of the car, shall be fixed in the normal seating position using only their own adjustment or locking system.
- 8.5. All the anchorages of the same group of seats shall be tested simultaneously.  
When anchorages are provided both for child restraints requiring two upper anchorages and for those requiring a single upper anchorage, they are to be considered as two different sets of anchorages and tested separately.
- 8.6. A tractive force of 100 N shall be applied in the forward horizontal direction ( $+5^\circ$ ,  $-10^\circ$ ) in a plane parallel to the median longitudinal plane of the vehicle using the traction device described in paragraphs 8.9. and 8.10. below.  
When testing the anchorages  $P_1$ ,  $P_2$  and  $P_6$ , both ends of the test strap shall be attached to this anchorage.
- 8.7. The measurement presented in paragraph 5.10. above shall be made.  
If the test strap comes into contact with the rear seat-back, the first point of contact of the test strap with the seat-back (point K, figure 2) shall be marked on the strap.
- 8.8. The tractive force described in paragraph 8.6. shall be increased to 7 kN and shall be maintained for 0.5 seconds.  
For the anchorage  $P_5$  the test shall be similarly carried out. However, the tractive force shall be increased to only 3.5 kN and applied in a rearward direction.  
The measurements prescribed in paragraph 7.1. and 7.2. above shall be made.
- 8.9. The tractive force shall be applied through a strap of standard webbing attached to a standard anchor plate (figure 5).  
  
Equal tension shall be applied to each of the two straps for each seating position using a device which separates the straps by 300 mm, such as that shown in figure 6.
- 8.10. The strap of standard webbing shall have the following characteristics:
- 8.10.1. Material: Polyester continuous filament yarn.
- 8.10.2. Elongation: Extension  $6 \pm 1$  per cent at 5 kN and  $\leq 1/2$  per cent at 100 N, static test.
- 8.10.3. Nominal width  $48 \pm 2$  mm.

9. Recommended arrangements.

9.1. The following nine arrangements are recommended:

- 1:  $P_1 - P_8$
- 2:  $P_1, P_3, P_4, P_5, P_7$  and  $P_8$
- 3:  $P_1, P_2, P_5$  and  $P_6$
- 4:  $P_6, P_7$  and  $P_8$
- 5:  $P_7$  and  $P_8$
- 6:  $P_6$
- 7:  $P_1 - P_5$
- 8:  $P_1, P_3, P_4$  and  $P_5$
- 9:  $P_1, P_2$  and  $P_5$ .

9.2. Each of these nine recommended arrangements allows the installation of child restraints of the "SEMI-UNIVERSAL" category, type approved in conformity with ECE Regulation No. 44.

9.3. The installation on the vehicle of this category of child restraint shall be performed in conformity with ECE Regulation No. 44, using also the lower anchorages prescribed in ECE Regulation No. 14.

9.4. Anchorages for child restraints shall be fixed on the vehicle by means of M8 x 1 type bolts, for which threaded holes are required.

9.5. Child restraint anchorages are designed to withstand only those loads imposed by correctly fitted child restraint systems. Under no circumstances are they to be used for adult seat belts or harnesses.



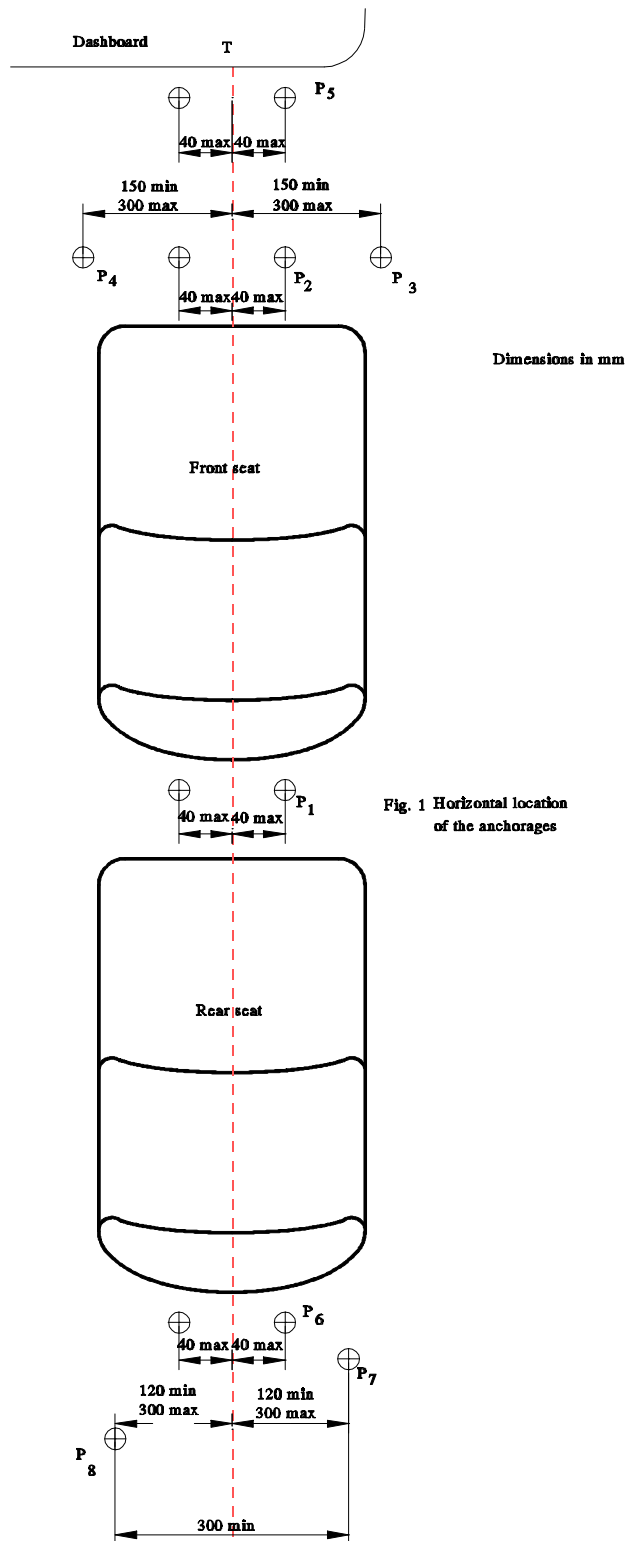


Fig. 1 Horizontal location  
of the anchorages

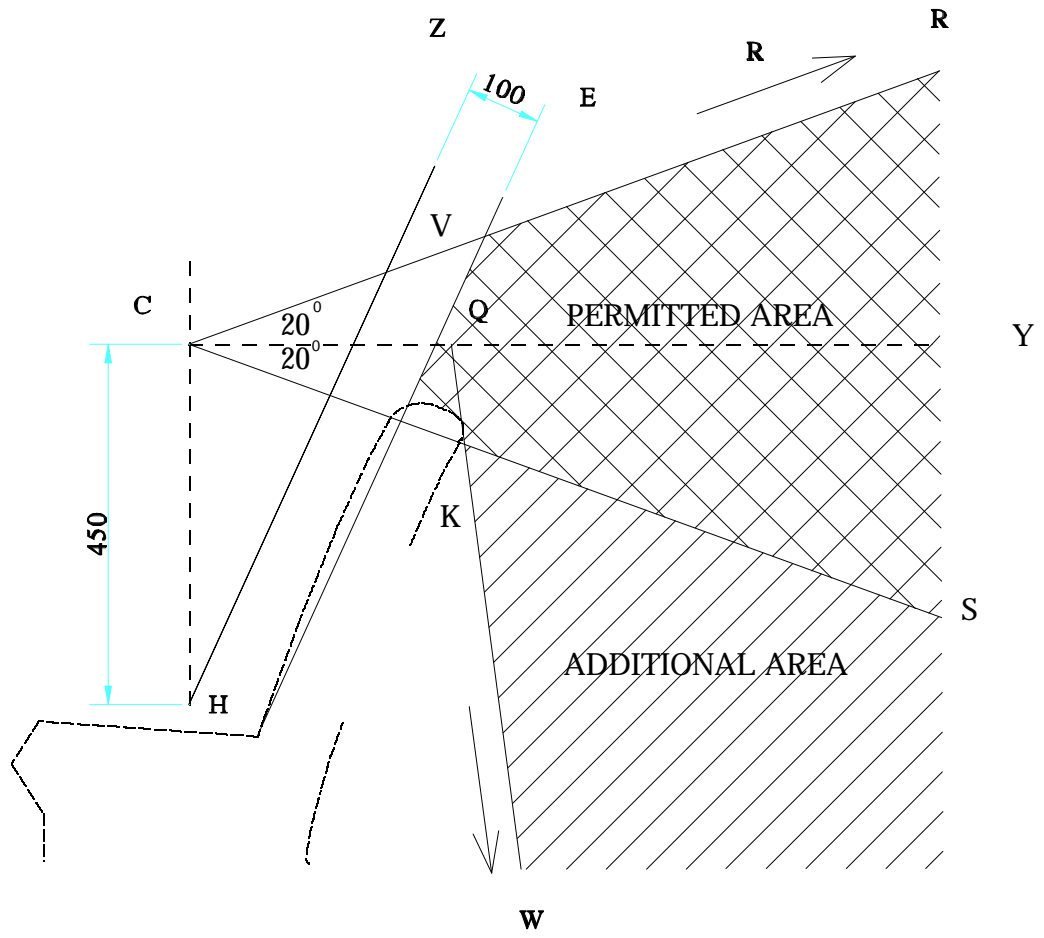


Fig. 2

Longitudinal and vertical location of the upper anchorages

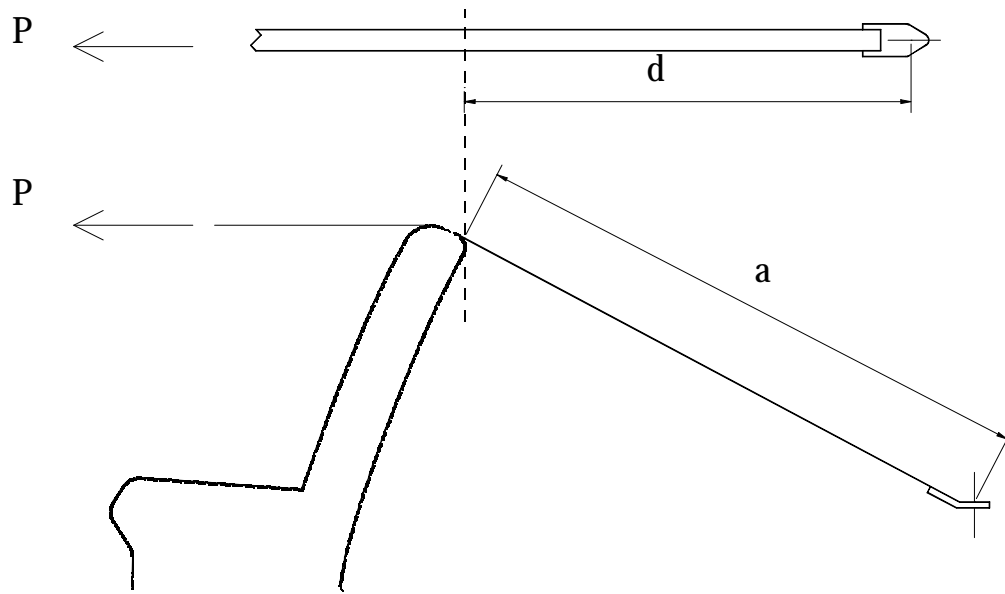


Fig. 3

Two examples of the measurement of the anchorage distance from the seat back vertical plane

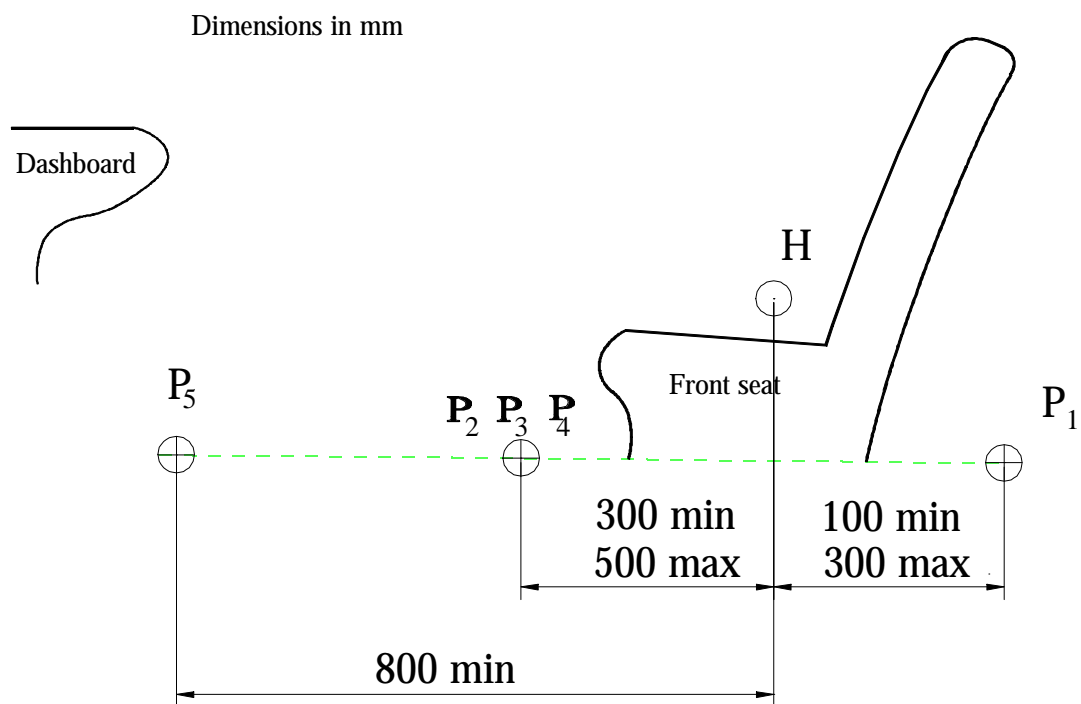


Fig. 4

Longitudinal location of the lower anchorages

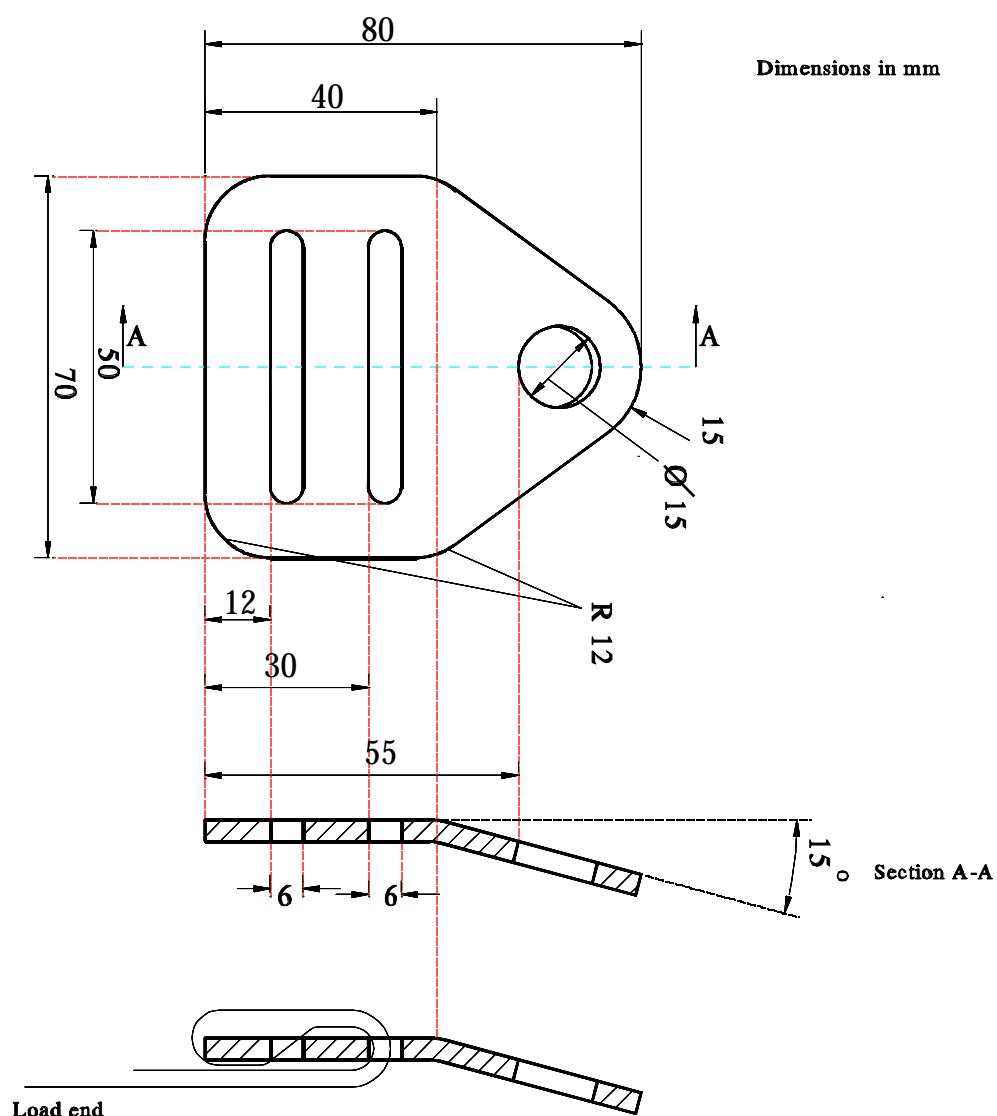


Fig. 5

Standard anchorage plate

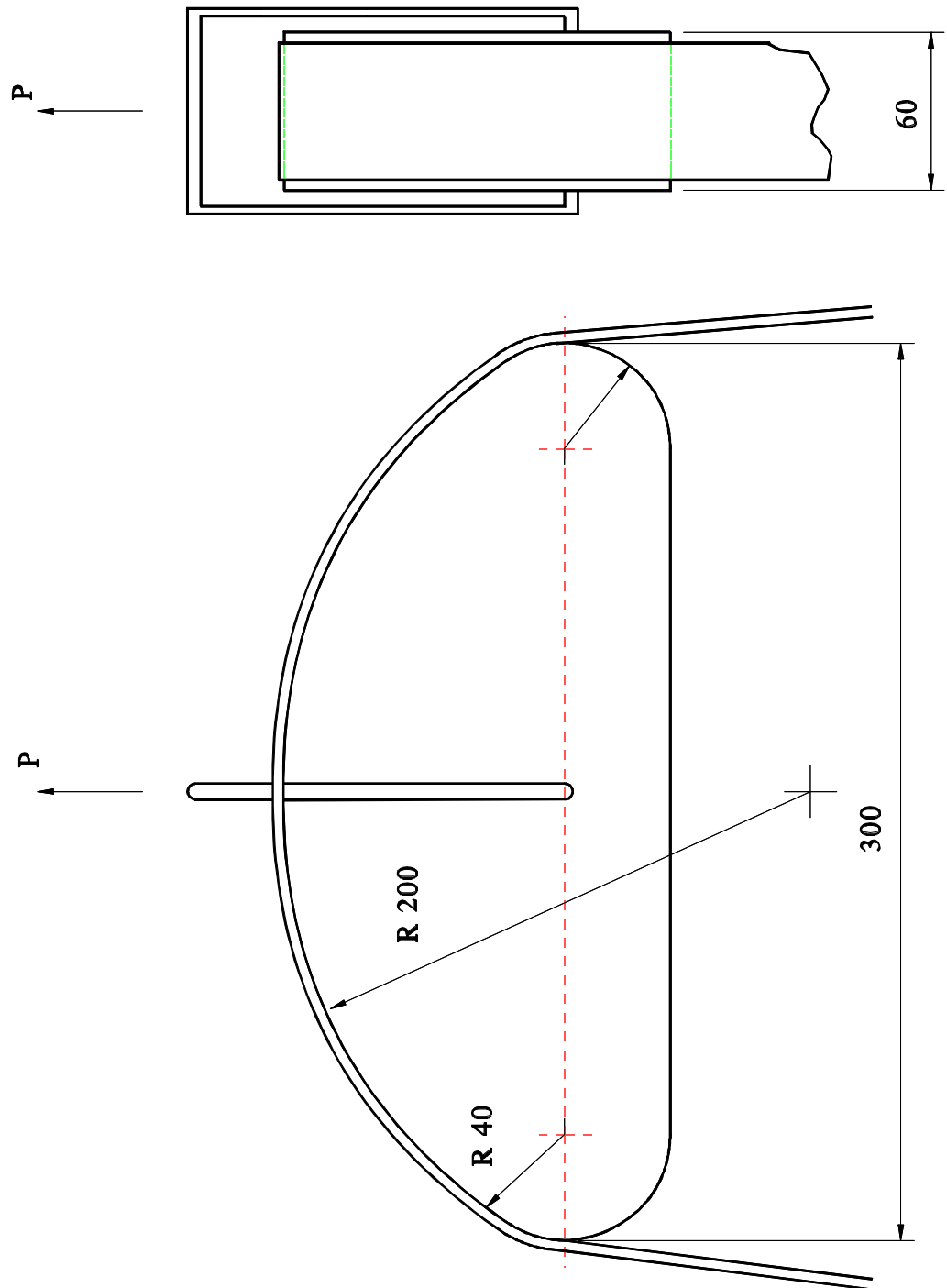


Fig. 6

Test block

Annex 11

PROTECTION OF PEDESTRIANS AND OTHER VULNERABLE ROAD USERS IN THE  
EVENT OF A (HEAD-ON) COLLISION WITH A PASSENGER CAR

1. With a view to improving the safety of pedestrians and other vulnerable road users such as cyclists and motor cyclists, the Group of Experts on the Construction of Vehicles has considered and approved a consolidated document on the work accomplished and the progress possible in this field (TRANS/SC1/WP29/R.351).
2. The following text is intended to provide motor vehicle manufacturers with guidelines concerning the design of future vehicle types and, in particular, the qualitative characteristics of the structure and deformation capacity of the front section of passenger cars; its purpose is to reduce as much as possible the severity of the injuries sustained by a person struck by the front of a vehicle travelling at a speed of up to 40 km/h.
  - 2.1. Area of initial impact \*/

The area of initial contact with the legs of the person struck should be below and forward of the conventional bumper. It should extend over a vertical height sufficient to distribute the force over the legs, preferably below the knees of an adult person.
  - 2.2. Front structure of the vehicle.
    - 2.2.1. The rear third of the bonnet, the windscreen frame and the front pillars (A) should receive particular attention as regards both their energy-absorption capacity and their form. It should not be possible for the head to strike the windscreen-wiper pivots.

Should such contact be possible, the windscreen-wiper pivots shall have a suitable protective covering.
    - 2.2.2. The bonnet leading edge should be such that the impact should not be against a hard edge but against a structure which is sufficiently large and if possible energy-absorbent.

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\*/ The following text was adopted by the Group of Experts in this connection:  
"To provide for the possibility of pedestrian impact, bumpers should be made deformable and energy-absorbent. Bumper extension in the vertical direction results in lower pressure per unit area on the lower extremities of pedestrians". (TRANS/SC1/WP29/R.351, para. 23).

- 2.2.3. An adequate deformation of the front third of the bonnet would, in particular, reduce the severity of head injuries to children.
  - 2.2.4. Rigid parts located under the bonnet should be placed some distance back so as to allow sufficient deformation of the bonnet on impact.
  - 2.3. Headlamps and other lamps.  
  
Headlamps and other front lamps should not have rigid projecting frames.  
If possible, they should be mounted slightly recessed in the bodywork.
  - 2.4. Accessories.  
  
External accessories (trimmings, spoilers, etc.) should be deformable, retractable or detachable so as to minimize the risk of injury.  
In the latter cases, these recommendations shall also apply to the residual parts.
  - 2.5. Structural elements.
    - 2.5.1. Preference should be given to structures with adequate energy-absorption capacity.
    - 2.5.2. The curvature radius of parts of the vehicle which may be impacted should be as large as possible, with due account being taken of technical requirements.
-



Annex 12

EXTERNAL PROJECTIONS OF VEHICLES OF CATEGORY L

1. PURPOSE OF THE RECOMMENDATION

This Recommendation is intended to ensure that the external projections on the vehicle are designed in such a way as to ensure that injuries, especially those caused by laceration or penetration, from which a person might suffer as a result of contact with (parts of) the vehicle, are reduced as far as reasonably practicable.

The persons envisaged are:

The user of the vehicle (rider and passenger(s)).

Other road users, not themselves in vehicles, principally pedestrians, cyclists and motor cyclists, who might come into contact with the vehicle in the event of a low speed impact.

2. SCOPE

This Recommendation applies to category L vehicles 1/.

3. DEFINITIONS

3.1. "Outer vehicle parts" means all parts which are likely to be contacted in case of a collision with people;

3.2. "Brushing" means any contact which, under certain conditions, could cause injury by laceration;

3.3. "Striking" means any contact which, under certain conditions, could cause injury by penetration;

3.4. Criteria for distinguishing between "brushing" and "striking".

3.4.1. While moving the test device (see appendix, figure A) along the vehicle in accordance with subparagraph 5.2. below, the components of the vehicle touched by the device shall be considered as either:

3.4.1.1. Group 1: those parts of components of the vehicle which brush against the test device, or

3.4.1.2. Group 2: those parts or components of the vehicle which strike against the test device.

3.4.1.3. In order unambiguously to differentiate between Group 1 and Group 2 parts or components, the following method shall be applied (Figure 1):

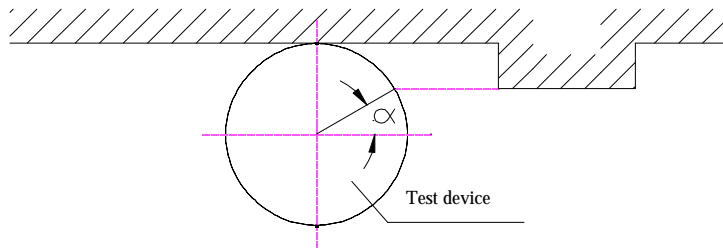


Figure 1

$\alpha > 45^\circ$  : group 1

$\alpha \leq 45^\circ$  : group 2

Thus for the fullest striking contact  $\alpha = 0^\circ$ .

3.5.                "Radius of curvature" means the approximate extent of the round as distinct from a precise geometrical form.

#### 4.                GENERAL PROVISIONS

4.1.                In any case, the outside of the vehicle shall not exhibit, directed outwards, any pointed or sharp parts or any projections of such shape, dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injury to a person hit by the vehicle or brushing against it in the event of a collision or involved in a fall from the vehicle.

4.2.                Vehicles shall be designed in such a manner that those parts with which the rider is likely to come into contact in the event of an accident shall cause as little injury as possible.

4.3.                Vehicles shall be designed so that those parts with which other road users are likely to come into contact shall meet the requirements of paragraphs 6 and 7 below, as appropriate.

4.4.                Any external projection covered by this Recommendation which is made of, or covered by, rubber or soft plastic with a rigidity below shore 60 A, shall be deemed to meet the requirements of paragraphs 6 and 7 below.

#### 5.                TEST METHODOLOGY

5.1.                Test device and conditions.

5.1.1.             The test device shall be as shown in the annex (Figure A).

5.1.2.             The test vehicle shall be parked in the straight ahead position and shall be upright.  
The handlebars (if any) shall be free to rotate through their normal range of movement.

A dummy 2/ shall be mounted on the test vehicle in the normal riding position and in such a way that it does not restrict the free movement of the handlebars (if any).

5.2. Test procedure.

The test device shall be moved from the front to the rear of the test vehicle, causing (if applicable and if they can be touched by the test device) the handlebars to turn to the full lock position.

The test device shall remain in contact with the vehicle (see appendix, figure B).

The test shall be carried out on both sides of the vehicle.

6. CRITERIA

6.1. The criteria specified in this paragraph shall not apply to those parts covered by the provisions of paragraph 7 below.

6.2. Subject to the provisions contained in paragraph 4.4. above, the following minimum criteria shall apply:

6.2.1. Requirements for Group 1.

6.2.1.1. In the case of a plate (Figure 2).

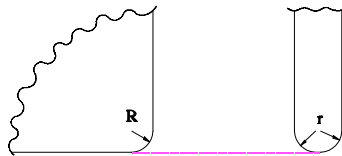


Figure 2

the corners shall have a radius of curvature (R) of at least 3 mm.

the edges shall have a radius of curvature (r) of at least 0.5 mm.

- 6.2.1.2. In the case of a shaft (Figure 3).



Figure 3

the diameter of the shaft (d) shall be at least 10 mm.

the edges at the end of the shaft shall have a radius of curvature (r) of at least 2 mm.

- 6.2.2. Requirements for Group 2.

- 6.2.2.1. In the case of a plate (Figure 2).

the corners shall have a radius of curvature (R) of at least 2 mm.

the edges shall have a radius of curvature (r) of at least 2 mm.

- 6.2.2.2. In the case of a shaft (Figure 4).

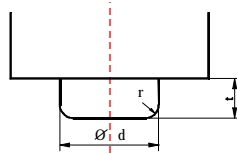


Figure 4

the length (t) shall be less than d/2, if the diameter of the shaft (d) is less than 20 mm;

the radius of curvature (r) of the edges at the end of the shaft shall be at least 2 mm, if the diameter of the shaft (d) is equal to or more than 20 mm.

7. PARTICULAR SPECIFICATIONS

- 7.1. The upper edge of the wind shield or fairing shall have a radius of curvature of at least 2 mm or shall be covered with protective material.
- 7.2. The outer ends of hand-operated clutch and brake levers shall be rounded and shall have a minimum radius of curvature of 7 mm.

- 7.3. The leading edge of the front mudguard shall have a radius of curvature of at least 2 mm.
- 7.4. Filler caps located on the upper surface of the fuel reservoir and liable to be contacted by the driver in case of a frontal collision shall not project at their rear edge, more than 15 mm 3/ above the surrounding surface; their connections to the surrounding surface shall be levelled or rounded.
- 7.5. Ignition keys shall have protective caps.  
This does not apply to collapsible keys and to keys that are flush with the surface.
- 7.6. Added ornaments shall not project more than 10 mm above the surrounding surface.  
Up to a thickness of 5 mm they shall have chamfered edges and with a thickness of over 5 mm a radius of curvature of at least 2.5 mm.

#### Notes

- 1/ In the case of vehicles of category L<sub>4</sub>, the provisions below are not applicable to the space in between the sidecar and the motor cycle and the immediate surroundings thereof.
- 2/ The dummy shall be an AM50 Percentile anthropomorphic test dummy as prescribed in 49 CFR Part 572 of the Federal Regulations in the United States of America.
- 3/ Alternative measures (e.g. a deflector ramp behind the filler neck) shall be permitted if the 15 mm requirement cannot be fulfilled.
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Annex 12 - Appendix

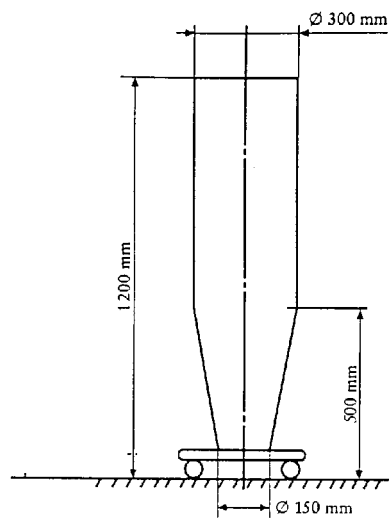
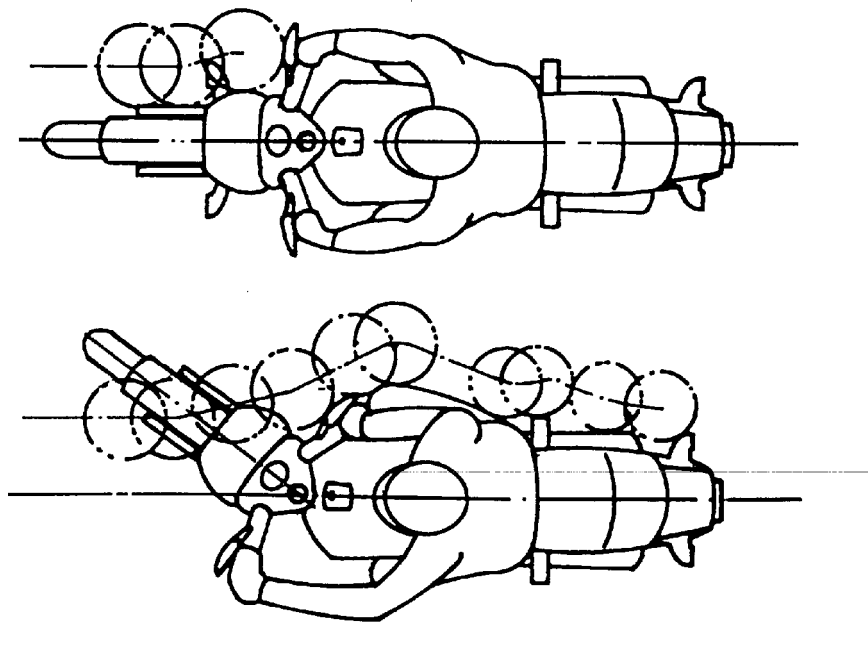


Figure A

Figure B



Annex 13

RECOMMENDATION ON THE REQUIREMENTS FOR THE INSTALLATION  
OF SAFETY-BELTS AND RESTRAINT SYSTEMS FOR ADULT OCCUPANTS  
OF MOTOR VEHICLES ON FORWARD AND REARWARD FACING SEATS

1. It is recommended to Governments intending to adopt specific requirements relating to the installation of safety-belts and restraint systems for adult occupants of power-driven vehicles that they should, as far as possible, base these on the specifications set out below.
2. SCOPE  
  
The main purpose of this Recommendation is to establish requirements concerning the installation of safety-belts and restraint systems, type approved according to Regulation No. 16, in power-driven vehicles.
3. Definition.  
  
A "front passenger seat" means any seat where the "foremost H-point" of the seat in question is in or in front of the vertical transverse plane through the drivers R-point.
4. Installation requirements.
  - 4.1. Vehicle equipment.
    - 4.1.1. With the exception of folding seats (as defined in Regulation No. 14) and seating intended solely for use when the vehicle is stationary, the seats of vehicles of categories M and N as defined in annex 7 to this Consolidated Resolution (R.E.3) (except those vehicles in categories M<sub>2</sub> and M<sub>3</sub> which are designed for both urban use and standing passengers) must be equipped with safety-belts or restraint systems which satisfy the requirements of Regulation No. 16.
    - 4.1.2. The types of safety-belts or restraint systems for each seating position where installation is required shall be those specified in the appendix to this Recommendation (non-locking retractors 1/ and manually unlocking retractors 2/ are prohibited).  
  
For all seating positions where lap belts type B are specified in the appendix, lap belts type Br3 are also permitted except in the case that, in use, they retract to such an extent as to reduce comfort in a notable way after normal buckling up.

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1/ See Regulation No. 16, Rev. 3, paragraph 2.9.1.  
(E/ECE/324-E/ECE/TRANS/505/Rev.1/Add.15/Rev.3).

2/ See Regulation No. 16, Rev. 3, paragraph 2.9.2.  
(E/ECE/324-E/ECE/TRANS/505/Rev.1/Add.15/Rev.3).

- 4.1.3. However, for outboard seating positions, other than front, of vehicles of category M<sub>1</sub>, shown in appendix 1 to this annex and marked with the symbol  $\phi$ , the installation of a lap belt of the type Br4m is allowed, where there exists a passage between a seat and the nearest side wall of the vehicle intended to permit access of passengers to other parts of the vehicle.

A space between a seat and the side wall is considered a passage if the distance between that side wall, with all doors closed, and a vertical longitudinal plane passing through the centreline of the seat concerned - measured at the R-point position and perpendicularly to the median longitudinal plane of the vehicle - is more than 500 mm.

- 4.1.4. Where no safety-belts are required, any type of safety-belt or restraint system conforming to Regulation No. 16 may be provided at the choice of the manufacturer.

A-type belts of the types permitted in appendix 1 to this annex may be provided as an alternative to lap belts for those seating positions where lap belts are specified in appendix 1 to this annex.

- 4.1.5. On three point belts fitted with retractors, one retractor must operate at least on the diagonal strap.

- 4.1.6. Except for vehicles of category M<sub>1</sub> and emergency locking retractor of type 4N 1/ may be permitted instead of a retractor of type 4 2/ where it has been shown to the satisfaction of the services responsible for the tests that the fitting of a type 4 retractor would not be practical.

- 4.1.7. For the front outboard and front centre seating positions shown in appendix 1 to this annex and marked with the symbol \*, lap belts of the type specified in appendix 1 to this annex shall be considered adequate where the windscreen is located outside the reference zone defined in annex 1 to Regulation No. 21.

As regards safety-belts, the windscreen is considered as part of the reference zone when it is capable of entering into static contact with the test apparatus according to the method described in annex 1 to Regulation No. 21.

- 4.1.8. For all seating positions in appendix 1 to this annex marked with the symbol #, lap belts of the types specified in appendix 1 to this annex must be provided where an "exposed seating position" as defined in paragraph 4.1.9. exists.

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1/ See Regulation No. 16, Rev. 3, paragraph 2.9.5.  
(E/ECE/324-E/ECE/TRANS/505/Rev.1/Add.15/Rev.3)

2/ See Regulation No. 16, Rev. 3, paragraph 2.9.4.  
(E/ECE/324-E/ECE/TRANS/505/Rev.1/Add.15/Rev.3)



4.1.9. An "exposed seating position" is one where there is no "protective screen" in front of the seat within the following defined space:

between two horizontal planes, one through the H-point and the other 400 mm above it;

between two vertical longitudinal planes which are symmetrical in relation to the H-point and are 400 mm apart;

behind a transverse vertical plane 1.30 m from the H-point.

For the purposes of this requirement "protective screen" means a surface of suitable strength and showing no discontinuities such that, if a sphere of 165 mm diameter is geometrically projected in a longitudinal horizontal direction through any point of the space defined above and through the centre of the sphere, nowhere in the protective screen is there any aperture through which the geometrical projection of the sphere could be passed.

A seat is considered to be an "exposed seating position" if the protective screens within the space defined above have a combined surface area of less than 800 cm<sup>2</sup>.

4.1.10. Every seating position marked in appendix 1 to this annex with the symbol ★, three point belts of a type specified in appendix 1 shall be provided unless one of the conditions below is fulfilled, in which case 2-point belts of a type specified in appendix 1 to this annex may be provided.

4.1.10.1. There is a seat or other parts of the vehicle conforming to Regulation No. 80, appendix 1, paragraph 3.5. directly in front; or

4.1.10.2. no part of the vehicle is in the reference zone, or capable of being in the reference zone when the vehicle is in motion, or

4.1.10.3. parts of the vehicle within the said reference zone comply with the energy absorbing requirements set out in Regulation No. 80, 01 series of amendments, appendix 6.

4.1.11. With the exception of the case covered by paragraph 4.1.12, every passenger seating position which is fitted with an airbag shall be provided with a warning against the use of a rearward-facing child restraint in that seating position. The warning label, in the form of a pictogram which may include explanatory text, shall be durably affixed and located such that it is easily visible in front of a person about to install a rearward-facing child restraint on the seat in question. An example of a possible design of the pictogram is shown in Figure 1. A permanent reference should be visible at all times, in case the warning is not visible when the door is closed.

Figure 1

Pictogram



Colours:

- o the pictogram is red
- o seat, child seat and contour line of the airbag are black
- o the word airbag as well as the airbag are white
- o the diameter of the pictogram is at least 60 mm.

- 4.1.12. The requirements of paragraph 4.1.11 shall not apply if the vehicle is fitted with a mechanism which senses automatically the presence of a rearward-facing child restraint, and ensures that the airbag will not be deployed when such a child restraint system is fitted.
- 4.1.13 In the case of seats capable of being turned to or placed in other orientations, designed for use only when the vehicle is stationary, the requirements of paragraph 4.1.1. shall only apply to those orientations designated for normal use when the vehicle is travelling on a road, in accordance with this recommendation.
- 4.2. General requirements.
- 4.2.1. Safety-belts and restraint systems shall be fixed to anchorages conforming to the specifications of Regulation No. 14.
- 4.2.2. The safety-belts and the restraint systems shall be so installed that, when properly worn, they will work satisfactorily and reduce the risk of bodily injury in the event of an accident.
- In particular they shall be so installed that:
- 4.2.2.1. The straps are not liable to assume a dangerous configuration;

- 4.2.2.2. The danger of a correctly positioned belt slipping from the shoulder of a wearer as a result of his/her forward movement is reduced to a minimum;
- 4.2.2.3. The risk of the strap deterioration by contact with sharp rigid parts of the vehicle or seat structure is reduced to a minimum;
- 4.2.2.4. The design and installation of every safety-belt provided for each seating position shall be such as to be readily available for use.  
Furthermore, where the complete seat or the seat cushion and/or the seat back can be folded to permit access to the rear of the vehicle or to goods or luggage compartment, after folding and restoring those seats to the seating position, the safety-belts provided for those seats shall be accessible for use or can be easily recovered from under or behind the seat, by one person, according to instructions in the vehicle users handbook, without the need for that person to have training or practice.
- 4.2.2.5. If the upper belt anchorage comprises an adjustment system for height which has distinct latched positions, the manufacturer has to demonstrate to the satisfaction of the Technical Service that the intermediate positioning between two latched positions shall not occur during normal use or shall not influence negatively the dynamic performance of the safety-belt system.
- 4.2.2.6. The Technical Service conducting the tests may assess the above provision by following the procedure described below:
- 4.2.2.6.1. Conditioning.  
  
The adjustable upper anchorage, the webbing and the retractor of a belt of a type approved according to Regulation No. 16 shall be installed on a rigid test rig as indicated in Figure 2 and positioned as on the vehicle.  
  
Then it will be checked if it is possible to position manually the adjustable upper anchorage between two locking positions.  
  
If it is not possible to obtain such an intermediate position, it will not be necessary to carry out the following additional test.  
  
If this intermediate position may be obtained, the test described in paragraph 4.2.2.6.2. will be carried out.
- 4.2.2.6.2. Test method.  
  
The length of the strap will be such that, during the test, the length of webbing reeled up on the retractor varies between 150 and 450 mm.

The free end of the strap shall then be drawn over a distance of 300 mm at a frequency of 0.5 Hz.

Five back-and-forth motions shall be made in this way. The test will then be stopped in order to determine if the adjustable anchorage of the upper loop is locked at an adjacent position to that at the beginning of the test.

In this case (locking) the upper adjustable anchorage will be considered satisfactory.

In the contrary case, a dynamic test shall be carried out of the safety-belt and its upper anchorage in the intermediate position, according to the provisions given in Regulation No. 16, paragraph 7.7.; during this test the adjustable anchorage shall move to an adjacent locked position and remain in that position.

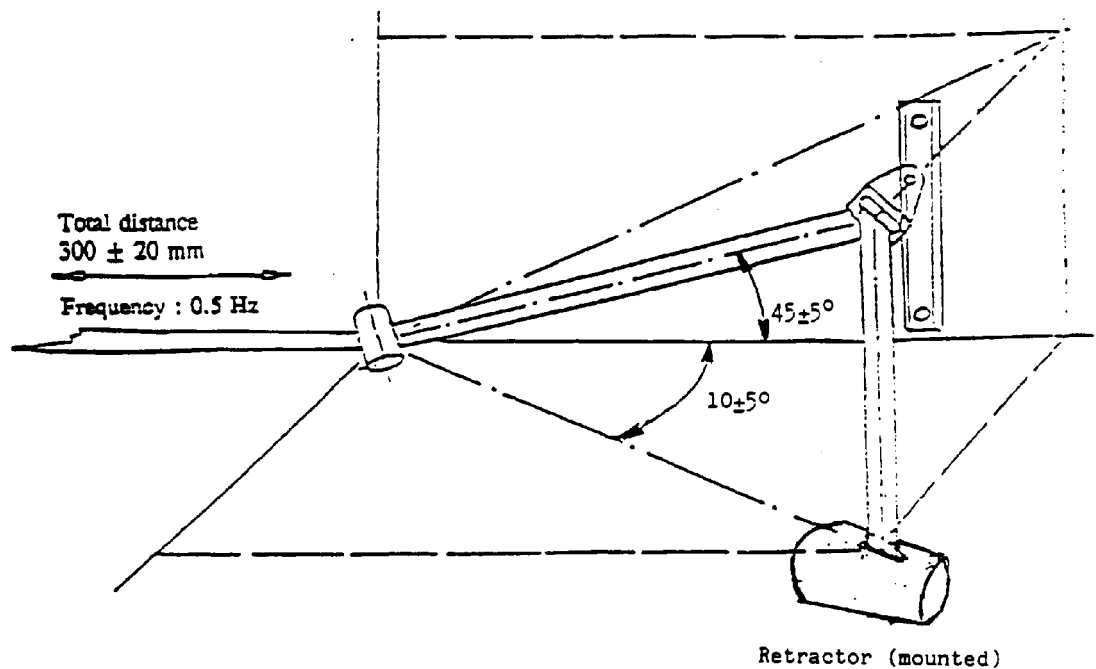


Figure 2 : Test of an adjustable upper anchorage.

- 4.3. In addition to the requirements of paragraph 4.1., Governments may accept for certain vehicle types other types of safety-belts or restraint systems, provided that they are approved according to the prescriptions of Regulation No. 16 and fixed to anchorages conforming to the requirements established in Regulation No. 14.
- 4.4. Special requirements for rigid parts incorporated in safety-belts or restraint systems.
- 4.4.1. Rigid parts, such as buckles, adjusting devices and attachments, shall not increase the risk of bodily injury to the wearer or to other occupants of the vehicle in the event of an accident.
- 4.4.2. The device for releasing the buckle shall be clearly visible to the wearer and within his easy reach and shall be so designed that it cannot be opened inadvertently or accidentally.
- The buckle shall also be located in such a position that it is readily accessible to a rescuer needing to release the wearer in an emergency.
- The buckle shall be so installed that, both when not under load and when sustaining the wearer's weight, it is capable of being released by the wearer with a single simple movement of either hand in one direction.
- In the case of safety-belts or restraint systems for front outboard seating positions, the buckle shall also be capable of being locked in the same manner.
- A check shall be made to ensure that, if the buckle is in contact with the wearer, the contact surface satisfies the requirements of paragraph 6.2.2.1. of Regulation No. 16 (Rev.3).
- 4.4.3. When the belt is being worn, it shall either adjust automatically to fit the wearer or be so designed that the manual adjusting device is readily accessible to the wearer when seated and is convenient and easy to use.
- It shall also be possible for it to be tightened with one hand to suit the build of the wearer and the position of the vehicle seat.
- 4.4.4. Safety-belts or restraint systems incorporating retractors shall be so installed that the retractors are able to operate correctly and stow the strap efficiently.
- 4.4.5. The Technical services shall verify that, with the buckle tongue engaged in the buckle and no occupant in the seat:

- 4.4.5.1. the possible slack in the belt does not prevent the correct installation of child restraint systems recommended by the manufacturer, and
- 4.4.5.2. in the case of 3-point belts, a tension of at least 50N can be established in the lap section of the belt by external application of tension in the diagonal section of the belt.

5. Compatibility with child restraint systems.

- 5.1. The vehicle manufacturer shall include in the vehicle handbook advice on the suitability of each passenger seat position for the carriage of children up to 12 years old (or up to 1.5 m tall), or the fitting of child restraint systems. This information shall be given in the national language, or at least one of the national languages, of the country in which the vehicle is offered for sale.

For each forward-facing passenger seat position, the manufacturer shall either:

- (a) Indicate that the seat position is suitable for child restraints of the "universal" category (see para. 5.2. below);
- (b) Provide a list of restraint systems of the "semi-universal", "restricted" or "vehicle-specific" categories, suitable for that vehicle seat position, indicating the mass group(s) for which the restraints are intended;
- (c) Provide a built-in child restraint, indicating the mass group(s) for which the restraint is intended and the corresponding configuration(s);
- (d) Provide any combination of (a), (b) and (c), or
- (e) Indicate the mass group(s) of the children which shall not be carried in that seat position.

If a seat position is only suitable for use with forward-facing child restraint systems, this shall be indicated.

A table in a suitable format for this information is given in appendix 3 to this annex.

- 5.2. A "universal" category child restraint means a child restraint approved to the "universal" category of ECE Regulation No. 44, 03 series of amendments. Seat positions which are indicated by the vehicle manufacturer as being suitable for the installation of child restraints of the "universal" category shall comply with the provisions of appendix 2 to this annex.

Appendix 1: Safety-belt installation showing the belt types and retractor types

TABLE SHOWING <i>MINIMUM</i> REQUIREMENTS FOR SAFETY BELTS AND RETRACTORS					
VEHICLE  CATEGORY	FORWARD FACING SEATING POSITIONS				REAR FACING  SEATING  POSITIONS
	OUTBOARD SEATING POSITIONS		CENTRE SEATING POSITIONS		
	FRONT	OTHER THAN FRONT	FRONT	OTHER THAN FRONT	
M1	Ar4m	Ar4m Br4m Ø	B, Br3, Br4m or A, Ar4m*	B, Br3, Br4m	B, Br3, Br4m
		Para. 4.1.3. lap belt permitted if seat is inboard of a passageway	Para. 4.1.7. lap belt permitted if the windscreen is not in the reference zone		
M2 ≤ 3.5 tonnes	Ar4m, Ar4Nm	Ar4m, Ar4Nm	Ar4m, Ar4Nm	Ar4m, Ar4Nm	Br3, Br4m, Br4Nm
M2 > 3.5 tonnes	Br3, Br4m, Br4Nm or Ar4m, Ar4Nm ★	Br3, Br4m, Br4Nm or Ar4m, Ar4Nm ★	Br3, Br4m, Br4Nm or Ar4m, Ar4Nm ★	Br3, Br4m, Br4Nm or Ar4m, Ar4Nm ★	Br3, Br4m, Br4Nm
M3	See § 4.1.10 for conditions when a lap belt is permitted	See para. 4.1.10. for conditions when a lap belt is permitted	See para. 4.1.10. for conditions when a lap belt is permitted	See para. 4.1.10. for conditions when a lap belt is permitted	
N1	Ar4m, Ar4Nm	B, Br3, Br4m, Br4Nm or none #	B, Br3, Br4m, Br4Nm or A, Ar4m, Ar4Nm *	B, Br3, Br4m, Br4Nm or none #	None
		Para. 4.1.8. and 4.1.9. lap belt required in exposed seating positions	Para. 4.1.7. lap belt permitted if the windscreen is not in the reference zone	Para. 4.1.8. and 4.1.9. lap belt required in exposed seating positions	
N2	Br3, Br4m, Br4Nm or A, Ar4m, Ar4Nm*	B, Br3, Br4m, Br4Nm or none #	B, Br3, Br4m, Br4Nm or A, Ar4m, Ar4Nm*	B, Br3, Br4m, Br4Nm or none #	None
N3	Para. 4.1.7. lap belt permitted if the windscreen is outside the reference zone and for the driver's seat	Para. 4.1.8. and 4.1.9. lap belt required in exposed seating positions	Para. 4.1.7. lap belt permitted if the windscreen is not in the reference zone	Para. 4.1.8. and 4.1.9. lap belt required in exposed seating positions	

**A:** 3-point (lap and diagonal) belt  
**3:** automatically locking retractor  
**\*:** Refers to para. 4.1.7. of this annex

**B:** 2-point (lap) belt  
**4:** emergency locking retractor  
**#:** Refers to paras. 4.1.8. and 4.1.9. of this annex

**r:** retractor  
**N:** higher response threshold  
**Ø:** Refers to para. 4.1.3. of this annex

**m:** emergency locking retractor with multiple sensitivity (see Regulation No. 16, paragraphs 2.14.3. to 2.14.5.)  
**★:** Refers to para. 4.1.10. of this annex

**Note:** In all cases S-type belts may be fitted in place of an A or B type belt, provided anchorages complying with Regulation No. 14 are used.

Annex 13 - Appendix 2

PROVISIONS CONCERNING THE INSTALLATION OF "UNIVERSAL"  
CATEGORY CHILD RESTRAINT SYSTEMS INSTALLED WITH  
THE SAFETY BELT EQUIPMENT OF THE VEHICLE

1. General

- 1.1. The test procedure and the requirements in this appendix shall be used to determine the suitability of seat positions for the installation of child restraints of the "universal" category.
- 1.2. The tests may be carried out in the vehicle or in a representative part of the vehicle.

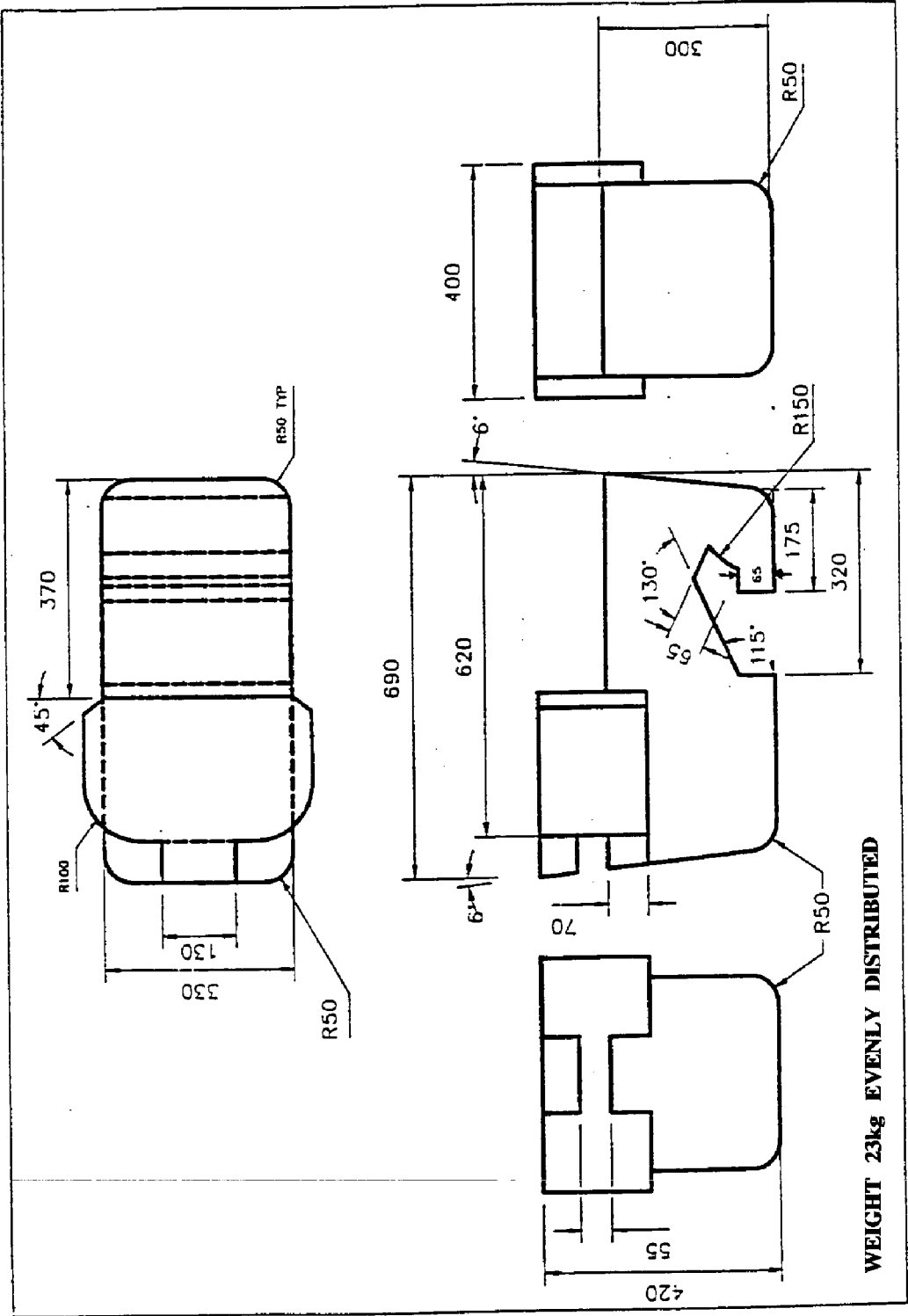
2. Test procedure

- 2.1. Adjust the seat to its fully rearward and lowest position.
- 2.2. Adjust the seat-back angle to the manufacturer's design position. In the absence of any specification, an angle of 25 degrees from the vertical, or the nearest fixed position of the seat-back, should be used.
- 2.3. Set the shoulder anchorage to the lowest position.
- 2.4. Place a cotton cloth on the seat-back and cushion.
- 2.5. Place the fixture (as described in figure 1 of this appendix) on the vehicle seat.
- 2.6. If the seating position is intended to accommodate a forward-facing or rearward-facing universal restraint system, proceed according to paragraphs 2.6.1., 2.7., 2.8., 2.9. and 2.10. If the seating position is intended to accommodate only a forward-facing universal restraint system, proceed according to paragraphs 2.6.2., 2.7., 2.8., 2.9. and 2.10.
  - 2.6.1. Arrange the safety belt strap around the fixture in approximately the correct position as shown in figures 2 and 3, then latch the buckle.
  - 2.6.2. Arrange the safety belt lap strap approximately in the correct position around the lower part of the fixture of 150 mm radius as shown in figure 3, then latch the buckle.
- 2.7. Ensure that the fixture is located with its centreline on the apparent centreline of the seating position  $\pm 25$  mm with its centreline parallel with the centreline of the vehicle.
- 2.8. Ensure that all webbing slack is removed. Use sufficient force to remove the slack, do not attempt to tension the webbing.

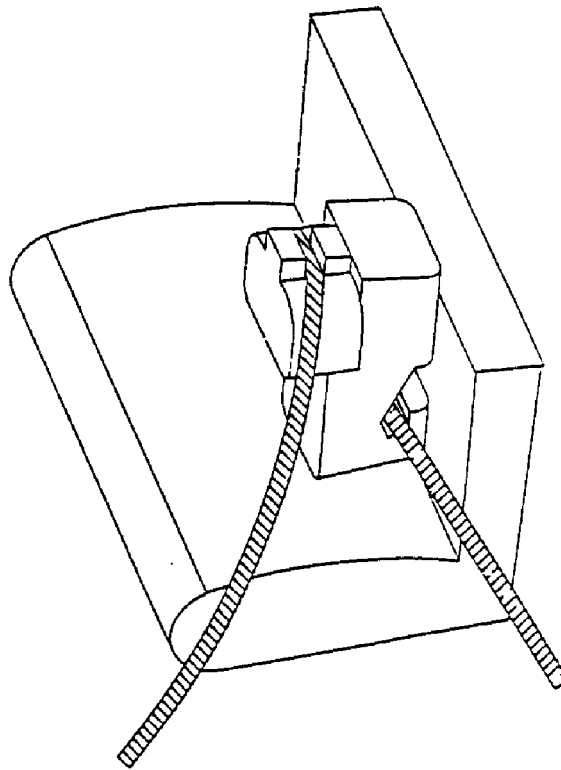


- 2.9. Push rearwards on the centre of the front of the fixture with a force of  $100\text{ N} \pm 10\text{ N}$ , applied parallel to the lower surface, and remove the force.
- 2.10. Push vertically downwards on the centre of the upper surface of the fixture with a force of  $100\text{ N} \pm 10\text{ N}$ , and remove the force.
3. Requirements
- 3.1. The base of the fixture shall contact both the forward and rearward parts of the seat cushion surface. If such contact does not occur due to the belt access gap in the test fixture, this gap may be covered in line with the bottom surface of the test fixture.
- 3.2. The lap portion of the belt shall touch the fixture on both sides at the rear of the lap belt path (see figure 3).
- 3.3. Should the above requirements not be met with the adjustments indicated in paragraphs 2.1., 2.2. and 2.3., the seat, seat-back and safety belt anchorages may be adjusted to an alternative position designated by the manufacturer for normal use at which the above installation procedure shall be repeated and the requirements again verified and met.

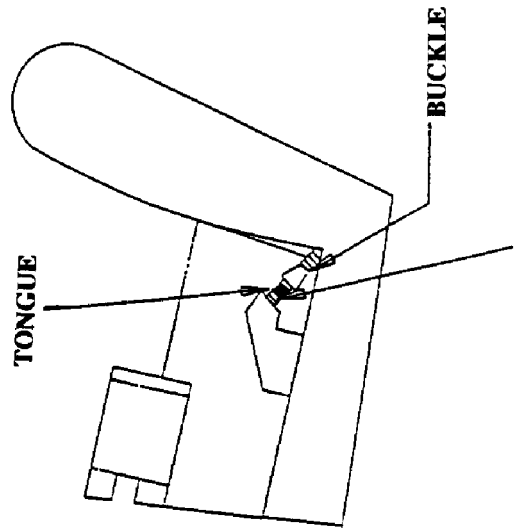
Figure 1: Specifications of the fixture



**FIGURE 2**  
**INSTALLATION OF FIXTURE ONTO VEHICLE SEAT**  
(see paragraph 2.6.1.)



**FIGURE 3**  
**CHECK FOR COMPATIBILITY**  
(see paragraphs 2.6.1. and 3.2.)



**Note:** THE SEAT BELT WEBBING  
MUST CONTACT THE CURVED EDGE  
ON BOTH SIDES OF THE FIXTURE

**LAP BELT ONLY SHOWN**

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Annex 13 - Appendix 3

TABLE OF VEHICLE HANDBOOK INFORMATION ON CHILD RESTRAINT  
SUITABILITY FOR VARIOUS SEATING POSITIONS

Mass Group	Seating position				
	Front Passenger	Rear Outboard	Rear Centre	Intermediate Outboard	Intermediate Centre
O - Up to 10 kg (0-9 months)					
O+ - Up to 13 kg (0-2 years)					
I - 9 to 18 kg (9 months - 4 years)					
II & III - 15 to 36 kg (4-12 years)					

Key of letters to be inserted in the above table:

- U = Suitable for "universal" category restraints approved for use in this mass group.
- UF = Suitable for forward-facing "universal" category restraints approved for use in this mass group.
- L = Suitable for particular child restraints given on attached list. These restraints may be of the "specific vehicle", "restricted" or "semi-universal" categories.
- B = Built-in restraint approved for this mass group.
- X = Seat position not suitable for children in this mass group.

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Annex 14

REQUIREMENTS FOR INSTALLATION OF REAR MARKING PLATES  
ON SLOW-MOVING VEHICLES (BY CONSTRUCTION) AND THEIR TRAILERS

1. It is recommended to the Governments to require on slow-moving vehicles which, by construction, cannot travel faster than 30 km/h, "Rear marking plates for slow-moving vehicles and their trailers" conforming to Regulation No. 69 and the specific requirements relating to the scope of that Regulation and in accordance with the requirements for installation of rear marking plates given in this annex.

2. Scope

The main purpose of this Recommendation is to establish requirements for installation, arrangement, position and geometric visibility of rear marking plates on slow-moving vehicles and their trailers which, by construction, cannot travel faster than 30 km/h. It increases the visibility and permits an easy identification of these vehicles.

3. Number

At least one.

4. Arrangement

The rear marking plate(s) shall be type approved and meet the requirements of ECE Regulation No. 69.

The apex of a rear marking plate shall be directed upwards.

Every part of a rear marking plate shall lie within 5° of a transverse vertical plane at right angles to the longitudinal axis of the vehicle and shall face to the rear.

5. Position

In width: If there is only one rear marking plate, it must be on the opposite side of the median longitudinal plane of the vehicle to the direction of traffic prescribed in the country of registration.

In height: Above the ground, not less than 250 mm (lower edge), not more than 1,500 mm (upper edge).

In length: At the rear of the vehicle.

6. Geometric visibility

Horizontal angle : 30° inwards and outwards, covering by  
indispensable constructional parts of the vehicle  
up to 10% of the rear marking plate surface is  
permitted;

Vertical angle : 15° above and below the horizontal;

Orientation : rearwards.

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Annex 15

REQUIREMENTS FOR INSTALLATION OF REAR MARKING PLATES  
ON HEAVY AND LONG VEHICLES

1. It is recommended to the Governments to apply on vehicles specified in paragraph 2 of this annex "Rear marking plates for heavy and long vehicles" conforming to Regulation No. 70 and the specific requirements relating to the scope of that Regulation and in accordance with the requirements for installation of rear marking plates given in this annex.

2. Scope

The main purpose of this Recommendation is to establish requirements for installation, arrangement, position and geometric visibility of rear marking plates for heavy and long vehicles. It increases the visibility and permits an easy identification of these vehicles.

- 2.1. Heavy motor vehicles (trucks and tractors)

The installation of rear marking plates for heavy motor vehicles according to the provisions of this annex is required for vehicles of category N3 with the exception of tractors for semi-trailers and for articulated buses of Classes II and III.

- 2.2. Long vehicles (trailers and semi-trailers)

The installation of rear marking plates for long vehicles, according to the provisions of this annex, is required for the following vehicles:

Categories O<sub>1</sub> to O<sub>3</sub> - trailers / semitrailers exceeding 8 m in length  
(including the drawbar)

All vehicles of category O<sub>4</sub>.

3. Number

One, two, or four.

4. Arrangement

Every rear marking shall be fitted such that the lower edge is horizontal. Every part of a rear marking shall lie within 5° of a transverse vertical plane at right angles to the longitudinal axis of the vehicle and shall face to the rear. The set of marking plates shall be arranged symmetrically with respect to the median longitudinal plane of the vehicle.

The rear marking plates shall be type approved and meet the requirements of ECE Regulation No. 70 with the following classification:

(a) For heavy vehicles (trucks and tractors):

Class 1 - alternate, oblique stripes of red fluorescent and yellow retro-reflective materials;

Class 3 - alternate, oblique stripes of red retro-reflective and yellow retro-reflective materials.

(b) For long vehicles (trailers and semi-trailers):

Class 2 - yellow retro-reflective centre with a red fluorescent border;

Class 4 - yellow retro-reflective centre with a red retro-reflective border.

5. Position

In width: No individual specifications

In height: Above the ground, not less than 250 mm (lower edge), nor more than 2,100 mm (upper edge).

6. Geometric visibility

Horizontal angle: 30° inwards and outwards

Vertical angle: 15° above and below the horizontal

Orientation: rearwards.

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