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Proposal for a

COUNCIL DIRECTIVE

on the approximation of the laws of the Member
States relating to safety belts and restraint
systems of motor vehicles

Proposal for a

COUNCIL DIRECTIVE

on the approximation of the laws of the Member
States relating to head restraints of seats of
motor vehicles

(submitted to the Council by the Commission)



EXPLANATORY MEMORANDUM

I. INTRODUCTION

Acting on a proposal from the Commission the Council included in the General Programme of 28 May 1969 for the elimination of technical obstacles to trade in the Community the type approval of motor vehicles. Among the matters to be dealt with under that procedure by Special Directives are safety belts and other restraint systems, and head restraints. Moreover, the Council undertook in the Community Action Programme for industrial policy of 21 December 1973 to adopt directives relating to these devices before 1 January 1976, together with the Directive on seat-belt anchorages which the Commission sent to it in August this year¹⁾.

As part of their endeavours to enhance the safety of persons using motor vehicles, most of the Member States have brought in laws and administrative provisions on seat belts and head restraints. These national provisions generally differ from each other, however. Moreover, they do not take sufficient account of recent technical advances in the field. These disadvantages make it urgently necessary to adopt Community requirements which could not only eliminate technical obstacles to the free movement of the abovementioned vehicles and accessories but also provide motorists with maximum protection combined with comfort, having regard to the present state of the art.

The proposed Directives lay down technical requirements for the manufacture, checking and fitting of seat belts and other restraint systems and of head restraints. They are moreover intended to complete the series of directives relating to the internal appointments of motor vehicles. The proposal for a Directive on seat belts and restraint systems are based more particu-

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1) COM(74)1121 of 22 July 1974

larly on the proposal for a Directive on seat-belt anchorages which lays down essential requirements for the effective installation of such devices in cars. The technical requirements in these proposals for Directives were formulated in close collaboration with the Member States' experts, representatives of the trade associations concerned and of consumers' organizations, from all of whom they have received a wide measure of agreement.

II. COMMENTS ON THE PROPOSALS FOR DIRECTIVES

1. Seat belts and restraint systems

1.1. General

Despite the sustained efforts by Europe's carmakers to increase the active safety level of their vehicles - which have undoubtedly attained and unrivalled level in that respect - road traffic statistics have become increasingly disquieting in recent years. Today it is measures concerned with passive safety, particularly those designed to restrain car occupants, which provide the most effective means of reducing the numbers killed and injured.

The most important of such restraint devices, and one which is in sufficiently wide use to enable its effects on the statistics to be assessed, is the safety belt. All publications on the subject agree that suitable and properly-worn safety belts can reduce the risk of physical injuries in the event of an accident by at least one half. Thus, given 100% use by motorists, about 13 000 deaths could be averted annually in the Community.

Moreover, Australian statistics - which are still provisional and therefore to be treated with great caution - confirm that such expectations are well founded; and Australia is the only country so far with three years' experience of compulsory wearing of seat belts (and even, in the State of Victoria, four years).

A study which the Commission recently had made under contract¹⁾ showed, however, that the various types of belt are not equal in respect of the degree of protection and user comfort provided. Only three-point ("lap and diagonal") belts afford the greatest degree of protection in all accident conditions. Diagonal belts are least good and lap belts provide an acceptable degree of protection only for the occupants of the rear seats of a vehicle. Wearer comfort is a key problem with safety belts, indeed, the cause of their only drawback: too often seats belts if fitted are wrongly worn - generally with too much slack - or not used at all. The solution lies in the fitting of retractors, i.e., means of rewinding the straps.

This proposal for a Directive takes account of these statements. It is based on the finding that the aim must be to achieve the highest possible rate of seat-belt use, irrespective of the matter of compulsory wearing of seat belts, one that cannot be settled within the scope of Community type approval. Moreover, the same philosophy informed the preparation of the proposal for a Directive on seat-belt anchorages, with particular regard to the zones where these anchorages are installed.

1.2. Compulsory installation requirements

The proposed Directive provides that all seats in cars shall be fitted with safety belts or other restraint systems whose functioning, e.g., buckle opening, will be standardized as far as possible.

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1) G.M. MACKAY "A review of car restraint systems - report to the Commission of the European Communities, May 1973"

Front seats shall be fitted with three-point belts or other restraint systems embodying such belts. The devices fitted to the side front seats shall also be provided with retractors and shall be such that the belt can be put on and the buckle locked and unlocked with one hand. These requirements, which are characteristic of those systems having, according to the literature, the highest rate of use, are of particular importance for these seats which the statistics show as having the highest current occupancy factor. The fact that retractors automatically adjust belts to their wearers eliminates the danger of their being worn too slack, which normally results in the risk of the occupant - especially the driver - despite wearing his or her belt, colliding with rigid parts of the vehicle in the event of an accident. The fitting of retractors at these seats also provides a solution to the problem of accessibility to the controls, one which will also come under consideration as part of Community type approval and will be very difficult to solve with static belts.

The matter of retractor reliability - which is sometimes questioned - is settled by the very stringent requirements in the proposal.

In order to ensure that all front-seat occupants in cars are given optimum and equitable protection, provision is made for the compulsory fitting of three-point belts on centre front seats, although this position does not figure significantly in accident statistics - in Europe fewer than 1 % of those killed or injured had occupied those seats and only a very small number of the cars produced have them. In this case retractors will be optional.

The rear seats of cars shall be fitted with lap belts at least. Three-point belts and retractors will be optional in cars with appropriate anchorages. This requirement is considered essential although present statistics reveal that the cost/benefit ratio of such a step is not high owing to the low occupancy rate of these seats. Those statistics, however,

take no account of the fact that restraining devices on the rear seats are not of benefit solely to their occupants but also to those of the front seats. Recent accident studies show that under certain conditions unrestrained rear-seat occupants may cause serious - even fatal - injuries to those in the front seats who had belted up.

Moreover, it is certainly not mistaken, in view of the current development in the economic situation in Europe, to forecast increasing occupancy rates for the rear seats of cars.

1.3. Restraint systems

All car manufacturers of any size are currently developing restraint systems more advanced than seat belts. They generally have as a common feature: the principle of protecting car occupants without their having to take any action, e.g., putting on and buckling a belt. Owing to the great variety of these systems (passive systems, as they are termed), which at present exist only in prototype form, it is very difficult at the present time to formulate manufacturing and test requirements which are both specific enough to ensure that the users are given greater safety than with seat belts and broad enough not to hamper the future development of these systems.

Systems are already on the market, however, consisting for example of seats with attached safety belts which are offered as optional equipment for the front seats of certain cars. Like the proposal for a Directive on anchorages, therefore, this proposal describes test requirements for such systems. These provisions can then be extended - in step with technical progress in the field - to cover more advanced systems as soon as they have attained production status.

1.4. Test requirements

Safety belts and restraint systems as defined in this proposal for a Directive must undergo a dynamic test during which they must withstand the forces due to a dummy weighing about 75 kg subjected to an acceleration of up to 32 g. Before this, test belts and restraint systems - including their mechanical components - will be conditioned by exposure to the most severe conditions that they are likely to experience in service, e.g., extremes of temperature and humidity, dust-laden and corrosive atmospheres, etc...

1.5. Conclusions

Altogether, its requirements put the proposed Directive well ahead of national provisions on the subject. Up to now none of the Member States has requirements in force making it compulsory, for example, to fit safety belts or other forms of restraint system at all seats and retractors at side front seats. Given the technical information now available, the proposed requirements ensure optimum protection for the users of the types of equipment defined in the Directive. The Commission therefore hopes that their implementation will result almost immediately in a major reduction in the number of motorists killed or injured in road traffic accidents.

Furthermore, it should be noted that the proposed measures are likely to have a favourable effect on research, at Community level, designed to produce rational solutions to other problems connected with passive safety in motor vehicles, e.g., control layouts and safety windscreens. In the latter case, in particular, the provisions in the attached Directive should make it even easier for a decision to be reached in favour of the proposal (1) sent to the Council by the Commission in 1972, the aim of which is to make the fitting of laminated glass the general practice.

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(1) COM(72)981 final of 15 September 1972

2. Head restraints, integral and otherwise

2.1. General

This proposal for a Directive lays down requirements for the manufacture and strength-testing of the said item. Taking into account the information which is available the Commission does not consider it possible, at this time, to introduce prescriptions concerning the compulsory fitting of head restraints in all vehicles.

In point of fact the results of the studies published so far do not warrant the conclusion that head restraints are certain to prevent the characteristic forms of injury that public opinion attributes to the lack of them, particularly in the event of accidents causing an impact from the rear. These studies generally assign a cost/benefit ratio to head restraints which is not sufficiently high.

On these grounds, the Commission plans to take action to improve the available knowledge - which has already enabled it to establish the present proposal - both in the analysis of the consequence of accidents for occupants of vehicles with and without head restraints and in the tests to be specified for the control of the efficiency of head restraints. It will take these new factors into account at a suitable date for the adaptation of the present directive. With regard to vehicle seats, the Commission will propose, if necessary, that they are equipped with devices enabling the firm attachment of head restraints which are specially designed for the type of seat in question. This could be carried out either by the adaptation to the technical progress of the Council directive 74/403/EEC on the strength of seats and their anchorages, or in the framework of later directives dealing with the whole system seat-occupant restraint.

Hitherto none of the Member States has brought provisions into force making it compulsory to fit head restraints in motor vehicles, nor even informed the Commission of its intention of doing so. On the other hand, several Member States have brought in different provisions on the testing of head restraints. Not only are these provisions liable to create obstacles to trade, but they have also failed to prevent the marketing by accessory manufacturers of head restraints which are ineffective and even dangerous.

On these grounds it is essential that harmonized and stringent requirements for the checking of head restraints be brought into force as soon as possible.

2.2. Test requirements

Head restraints integral with seats or attached to them shall undergo a static test during which they must withstand a force corresponding to the weight of the human head subjected to an acceleration of the order of 20 g.

The advantages of this test are its simplicity and reproducibility and - above all - in the fact that it makes absolutely certain that head restraints which are not sufficiently well attached to the seat back will be eliminated. In this case a dynamic test will be meaningful only when anthropomorphic dummies become available which are representative of the behaviour of the cervical vertebrae in the event of an impact. This problem, too, will be subject of the above mentioned studies.

III. LEGAL PROVISIONS COMMON TO BOTH PROPOSALS FOR A DIRECTIVE

Article 1 to 6 institute EEC type approval procedure for safety belts and restraint systems, and head restraints for the adult occupants of motor vehicles. Through this procedure, the Directives are designed to permit the free movement of the items in question within the Community by forbidding the Member States to object to their marketing when they comply with the requirements in respect of manufacture and testing set out in the Annexes and when they bear the EEC type-approval mark, the model of which is shown in Annexes III and V respectively. The procedure provides for a system of reciprocal notification of any issue, refusal, withdrawal or extension of type approval.

Articles 8 and 9 of the Directive on seat belts (and Articles 7 and 8 of the Directive on head restraints) bring these Directives, and the requirements relating to safety belts and restraint systems and to head restraints, into the EEC type-approval procedure. Since some of the new Member States are at present without a national type-approval procedure, provision must be made to ensure that vehicles complying with the requirements of these Directives may be operated in those States.

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Article 10 of the Directive on seat belts (and Article 9 of the Directive on head restraints) defines the scope of these Directives. By analogy with the Directive on anchorages their scope is confined to vehicles of category M₁ having a maximum design speed exceeding 25 km/h, i.e., private cars and vehicles derived from them.

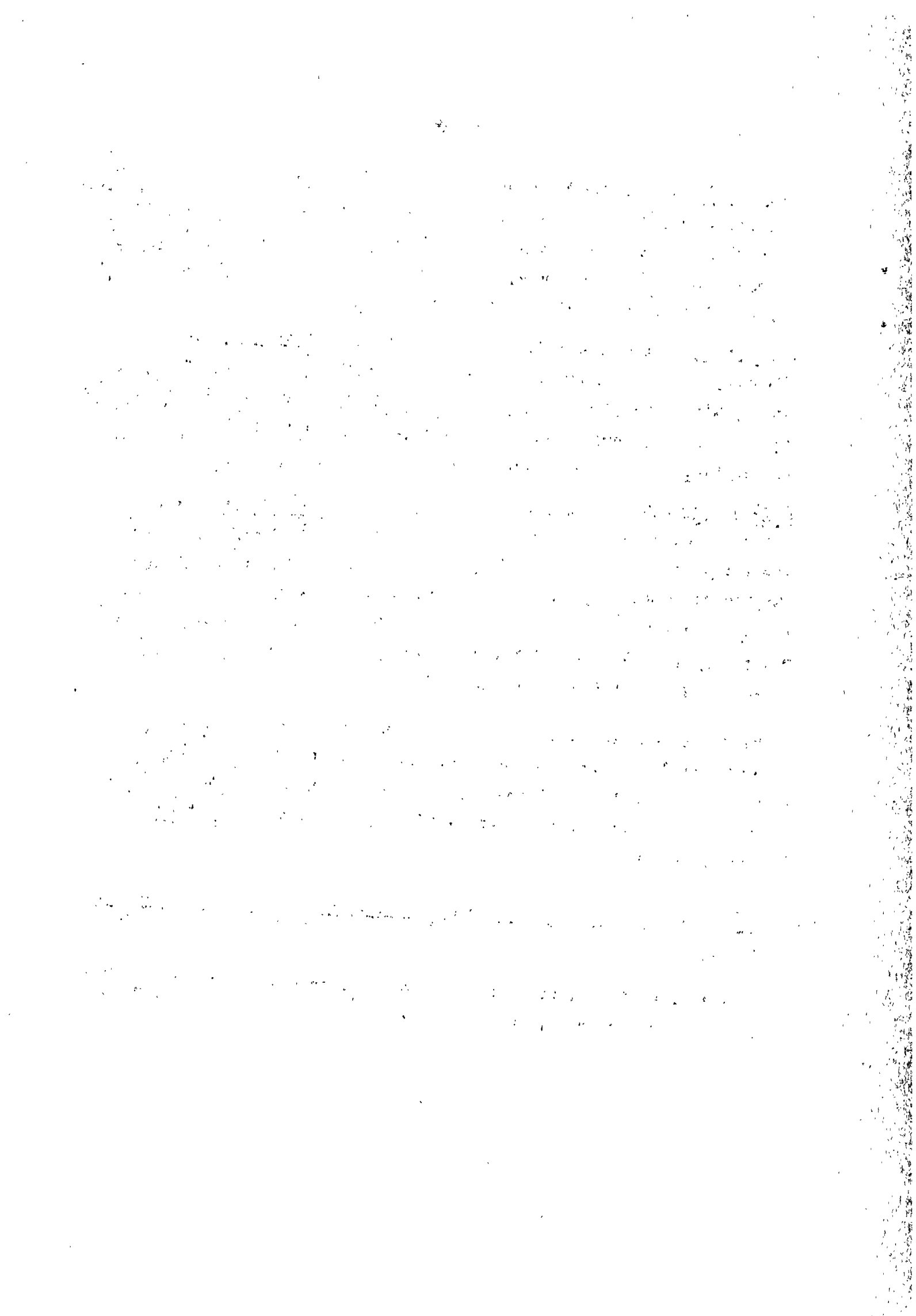
Article 11 of the Directive on seat belts (and Article 10 of the Directive on head restraints) provides for the procedure for adjusting the requirements of the Annexes to technical progress, which procedure is laid down in Article 13 of the Council Directive of 6 February 1970 on the type approval of motor vehicles and their trailers.

Article 12 of the Directive on seat belts (and Article 11 of the Directive on head restraints) provides for two time limits; before the first, namely, 1 April 1976, the Member States shall adopt and publish the provisions needed in order to comply with the Directives. They may do this at any time before that date. The second time limit - 1 July 1976 - is the date from which all the Member States must apply the common rules (Paragraph 1).

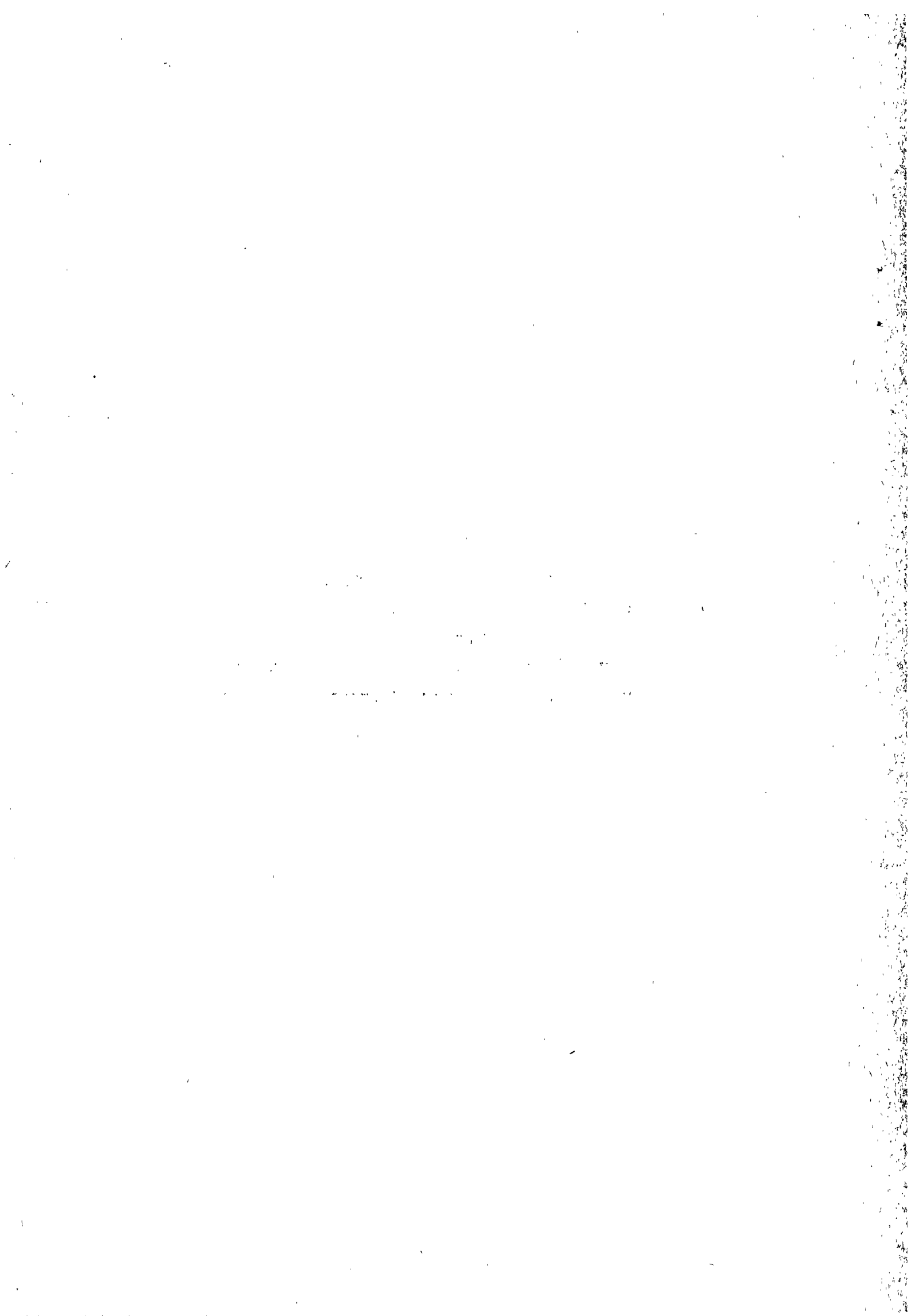
Also, the Commission must be informed within a reasonable time of any draft provisions formulated by the Member States and relating to the field covered by the Directive; the purpose of this is to enable the Commission to make its comments, if any, on the said draft provisions (Paragraph 2).

IV. CONSULTATION OF THE EUROPEAN PARLIAMENT AND THE ECONOMIC AND SOCIAL COMMITTEE

The opinion of both these bodies must be obtained, pursuant to Article 100, second paragraph, of the EEC Treaty.



PROPOSAL FOR A COUNCIL DIRECTIVE
on the approximation of the laws of the Member States
relating to
safety belts and restraint systems of motor vehicles



THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community and in particular Article 100 thereof;

Having regard to the proposal from the Commission;

Having regard to the opinion of the European Parliament;

Having regard to the opinion of the Economic and Social Committee;

Whereas the technical requirements which motor vehicles must satisfy pursuant to national laws relate, inter alia, to seat belts and restraint systems;

Whereas these requirements differ from one Member State to another; and whereas there is a consequent need for the same requirements to be adopted by all the Member States, either in addition to or instead of their present regulations, in particular with a view to permitting the operation, in respect of each type of vehicle, of the EEC type-approval procedure instituted by Directive 70/156/EEC of the Council of 6 February 1970 on the approximation of the laws of the Member States relating to the type approval of motor vehicles and their trailers (1);

Whereas the common requirements for the interior of the passenger compartment, the layout of the controls, the roof and backrest and rear part of the seats were determined by Directive 74/60/EEC of the Council of 17 December 1973 (2); and whereas those for the internal fittings relating to the protection of the driver from the steering mechanism in the event of an impact were determined by Directive 74/297/EEC of the Council of 4 June 1974 (3); and whereas those relating to the strength of the seats and their anchorages were determined by Directive

(1) O.J. no L 42 of 23 February 1970, p. 1

(2) O.J. no L 38 of 11 February 1974

(3) O.J. no L 165 of 20 June 1974

74/408/EEC of the Council of 22 July 1974 (1); and whereas those relating to anchorages for safety belts were determined by Directive /EEC of the Council of 19 (2); whereas the other requirements relating to internal fittings, in particular those relating to head restraints and the identification of the controls, will be determined subsequently;

Whereas rules governing seat belts and restraint system shall comprise not only requirements relating to their design but also to their fitting in vehicles;

Whereas a harmonized type-approval procedure for seat belts and restraint systems will enable each Member State to establish compliance with the common requirements for manufacture and testing and to inform the other Member States accordingly by sending a copy of the type-approval document drawn up in respect of each equipment of this kind; whereas the placing of an EEC type-approval mark on all equipments manufactured in conformity with the approved type obviate the need for technical checking in this respect in the other Member States;

Whereas the chief aim of the harmonized requirements is to promote road safety and; whereas to this end, as regards the vehicles to referred to by this Directive, there is reason to make it compulsory to fit them with safety belts or restraint systems;

Whereas the approximation of national laws relating to motor vehicles embraces mutual recognition by the Member States of checks carried out by each of them on the basis of the common requirements; whereas such a system if it is to operate properly presupposes that these requirements be applied by all the Member States from the same date;

HAS ADOPTED THIS DIRECTIVE :

(1) O.J. no L 221, 12.8.1974

(2) COM(74)1121, 22.8.1974

Article 1

1. Each Member State shall approve any type of safety belt and restraint system which satisfies the construction and testing requirements laid down in point 2 of Annex I, and in the Annexes IV to XII.
2. The Member State which has granted the EEC component type approval shall take the measures required in order to verify, in so far as is necessary and if need be in co-operation with the competent authorities in the other Member States that production models conform to the approved type. Such verification shall be effected by means of spot checks.

Article 2

Member States shall issue to the manufacturer, or to his authorized representative, an EEC component type-approval mark which shall conform to the model shown in Annex III for each type of safety belt and restraint system which they approve pursuant to Article 1.

Member States shall take appropriate measures to prevent the use of marks liable to create confusion between safety belts and restraint systems which have been type-approved pursuant to Article 1 and other devices.

Article 3

1. No Member State may prohibit the placing on the market of safety belts and restraint systems on grounds relating to their construction or method of functioning if they bear the EEC component type-approval mark.

2. Nevertheless, a Member State may prohibit the placing on the market of safety belt and restraint systems bearing the EEC component type-approval mark which, by their design, do not conform to the approved prototype.

That State shall inform the other Member States and the Commission forthwith of the measures taken, specifying the reasons for its decision.

Article 4

The competent authorities of each Member State shall within one month send to the competent authorities of the other Member States a copy of the component type-approval certificates completed for each type of safety belt and restraint system which they approve or refuse to approve.

Article 5

1. If the Member State which has granted EEC component type-approval finds that a number of safety belts and restraint systems bearing the same EEC component type-approval mark do not conform to the type which it has approved, it shall take the necessary measures to ensure that production models conform to the approval type. The competent authorities of that State shall advise those of the other Member States of the measures taken, which may, where necessary, extend to withdrawal of EEC component type-approval. The said authorities shall take the same measures if they are informed by the competent authorities of another Member States of such failure to conform.
2. The competent authorities of Member States shall inform each other within one month of any withdrawal of EEC component type-approval, and of the reasons for such measure.

Article 6

All decisions taken pursuant to the provisions adopted in implementation of this Directive which refuse or withdraw component type-approval for safety belts and restraint system or prohibit their use shall set out in detail the reasons on which they are based. A decision shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the law in force in the Member States and of the time limits allowed for the exercise of such remedies.

Article 7

Every vehicle conforming to article 10 shall be equipped with safety belts or restraint systems complying with the prescriptions of Annex I, in particular of point 3.1 and Annexes IV and XIII.

Article 8

No Member States may refuse to grant EEC type approval or national type approval of a vehicle on grounds relating to the safety belts or restraint systems with which it is equipped, if these bear the EEC component type approval mark and are fitted in accordance with the requirements laid down in point 3 of Annex I.

Article 9

No Member States may refuse or prohibit the sale, registration, entry into service or use of a vehicle on the grounds relating to the safety belts or restraint systems with which it is equipped if these bear the EEC component type approval mark and are fitted in accordance with the requirements laid down in point 3 of Annex I.

Article 10

For the purpose of this Directive "vehicle" means any motor vehicle of category M1 (as defined in Annex I of the Directive 70/156/EEC of the Council) intended for use on the road, having at least four wheels and a maximum design speed exceeding 25 km/h.

Article 11

The amendments necessary for adjusting the provisions of this Directive, so as to take account of the technical progress shall be adopted in accordance with the procedure laid down in Article 13 of the Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of Member States relating to the type-approval of motor vehicles and their trailers.

Article 12

1. The Member States shall adopt and publish the provisions needed in order to comply with this Directive before 1 April 1976 and shall forthwith inform the Commission thereof. They shall apply these provisions from 1 July 1976.

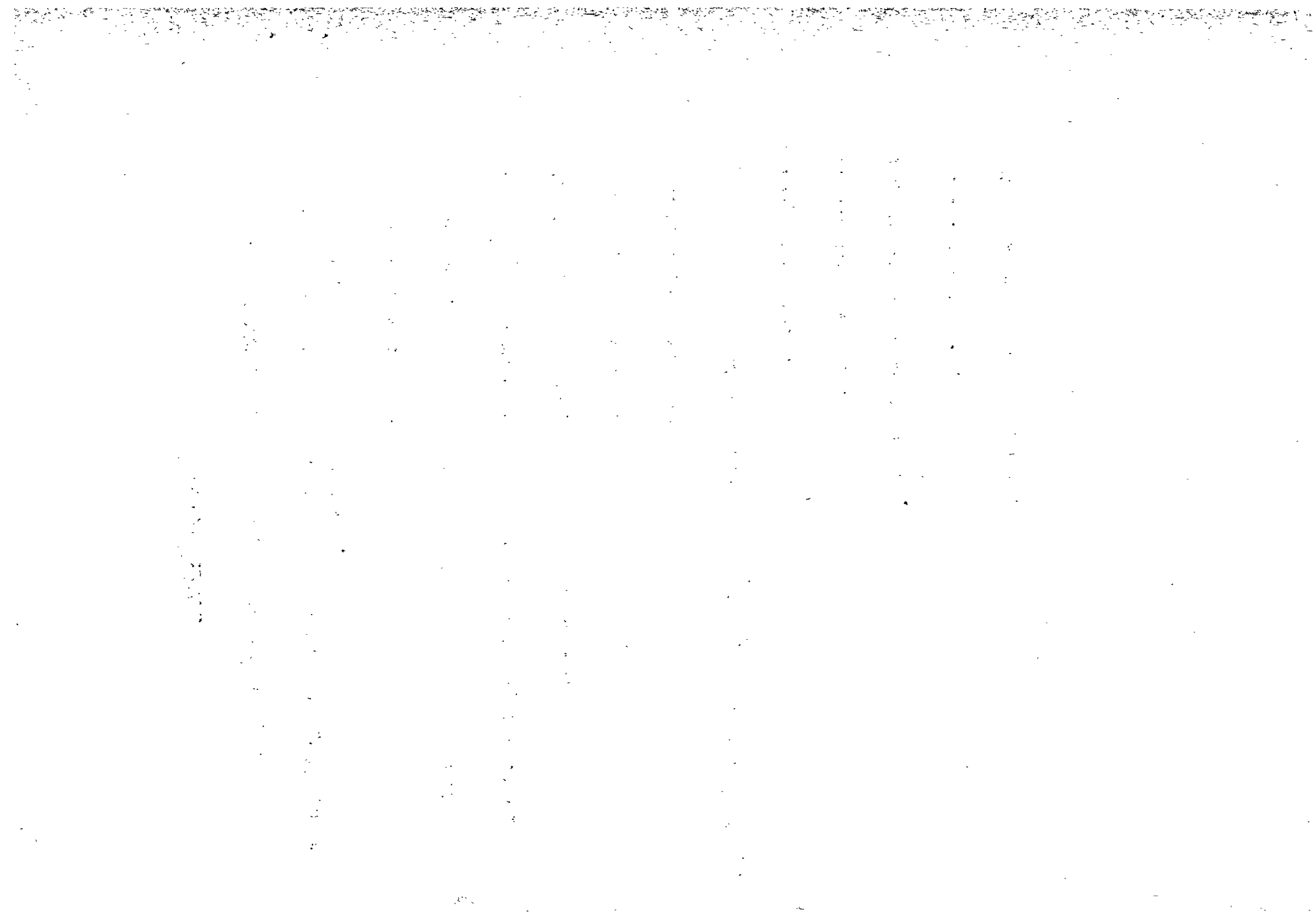
2. As soon as this Directive has been notified, the Member States shall take care to inform the Commission, in sufficient time to enable it to submit its comments, of any draft laws, regulations or administrative provisions which they intend to adopt in the field covered by the Directive.

Article 13

This Directive is addressed to the Member States.

LIST OF ANNEXES

- I. Scope, definitions, EEC type approval and installation.
- II. Communication concerning the approval or refusal or withdrawal of approval of a type of safety bel.
- III. EEC type-approval mark.
- IV. An example of apparatus to test durability of retractor mechanism.
- V. An example of apparatus to test locking of emergency locking retractors.
- VI. An example of apparatus for dust resistance test.
- VII. Description of trolley, seat and anchorages.
- VIII. Description of manikin.
- IX. Description of curve of trolley's deceleration as a function of time.
- X. Instructions.
- XI. Dual buckle test.
- XII. Abrasion and microslip tests.
- XIII. Corrosion test.
- XIV. Chronological order of tests.



ANNEX I

SCOPE, DEFINITIONS, EEC-APPROVAL AND INSTALLATION

0. SCOPE

The present directive requirements applies to safety belts and restraint systems which are designed for installation in vehicles defined in article 10 and are intended for separate use, i.e. as individual equipment, by adults occupying seats facing forward.

1. DEFINITIONS

For the purpose of this Directive :

- 1.1. "safety belt (seat belt, belt)" means an arrangement of straps with a securing buckle, adjusting devices and attachments which is capable of being anchored to a power-driven vehicle and is designed to diminish the risk of injury to its wearer, in the event of collision or of abrupt deceleration of the vehicle, by limiting the mobility of the wearer's body. Such an arrangement is generally referred to as a "belt assembly", which term also embraces any device for absorbing energy or for retracting the belt;
- 1.1.1. "lap belt" means a belt which passes across the front of the wearer's pelvic region;
- 1.1.2. "diagonal belt" means a belt which passes diagonally across the front of the chest from the hip to the opposite shoulder;
- 1.1.3. "three-point belt" means any belt assembly anchored at three points and comprising a combination of a lap belt and a diagonal belt;
- 1.1.4. "harness belt" means a belt assembly comprising a lap belt and shoulder straps;

Annex I

- 1.2. "belt type" means belts differing substantially from one another;;the differences may relate in particular to:
 - 1.2.1. rigid parts (buckle, attachments, retractor, etc.),
 - 1.2.2. the material, weave, dimensions, and colour of the straps, or
 - 1.2.3. the geometry of the belt assembly;
- 1.3. "strap" means a flexible component designed to hold the body and to transmit stresses to the belt anchorages;
- 1.4. "buckle" means a quick-release device enabling the wearer to be held by the belt. The buckle may incorporate the adjusting device;
- 1.5. "belt adjusting device" means a device enabling the belt to be adjusted according to the requirements of the individual wearer and to the position of the seat. The adjusting device may be part of the buckle or be a retractor;
- 1.6. "attachments" means parts of the belt assembly, including the necessary securing components, which enable it to be attached to the belt anchorages;
- 1.7. "energy absorber" means a device designed to disperse energy independently of or jointly with the strap and forming part of a belt assembly;
- 1.8. "retractor" means a device to accommodate part or the whole of the strap of a safety belt;
 - 1.8.1. "non-locking retractor" means a retractor from which the strap is extracted to its full length by a small external force and which provides no adjustment for assembly length,

Annex I

- 1.8.2. "manually unlocking retractor" means a retractor requiring the manual operation of a device by the user to unlock the retractor in order to obtain the desired strap extraction and which locks automatically when the said operation ceases,
- 1.8.3. "automatically locking retractor" means a retractor allowing extraction of the strap to the desired length and which, when the buckle is fastened, automatically adjusts the strap to the wearer. Further extraction of the strap is prevented without voluntary intervention by the wearer;
- 1.8.4. "emergency locking retractor" means a retractor which during normal driving conditions does not restrict the freedom of movement by the wearer of the safety belt. Such a device has length adjusting components which automatically adjust the strap to the wearer and a locking mechanism actuated in an emergency by :
- 1.8.4.1. deceleration of the vehicle or extraction of the strap relative to the retractor or other automatic means (single sensitivity), or
- 1.8.4.2. a combination of any of these factors (multiple sensitivity);
- 1.9. "belt anchorages" means the parts of the vehicle structure or seat structure or any other part of the vehicle to which the safety belt assemblies are to be secured;
- 1.10. "vehicle type as regards safety belts and restraint systems" means a category of powerdriven vehicles which do not differ in such essential respects as the dimensions, lines and materials of components of the vehicle structure or seat structure or any other part of the vehicle to which the safety belts and the restraint systems are attached;

Annex I

- 1.11. "restraint system" ("system") means a system combining a seat¹ affixed to the structure of the vehicle by appropriate means and a safety belt for which at least one anchorage is located on the seat structure;
- 1.12. "seat" means a structure which may or may not be integral with the vehicle structure complete with trim, intended to seat one adult person. The term covers both an individual seat or part of a bench seat intended to seat one person;
- 1.13. "group of seats" means either a bench-type seat or seats which are separate but side by side (i.e. fixed so that front seat anchorages of one of these seats are in line with the front of rear anchorages of the other or between the anchorages of the other seat) and accommodate one or more seated adult person;
- 1.14. "bench seat" means a structure complete with trim, intended to seat more than one adult person;
- 1.15. "adjustment system" means the complete device by which the seat or its parts can be adjusted to a position suited to the morphology of the seated occupant; this device may, in particular, permit of :
- 1.15.1. longitudinal displacement,
- 1.15.2. vertical displacement,
- 1.15.3. angular displacement;
- 1.16. "seat anchorage" means the system by which the seat assembly is secured to the vehicle structure, including the affected parts of the vehicle structure;
- 1.17. "seat type" means a category of seats which do not differ in such essential respects as :
- 1.17.1. the shape, dimensions and materials of the seat structure,
- 1.17.2. the types and dimensions of the seat lock adjustment and locking systems,
- 1.17.3. the type and dimensions of the belt anchorage on the seat, of the seat anchorage and of the affected parts of the vehicle structure;

- 1.18. "displacement system" means a device enabling the seat or one of its parts to be displaced angularly or longitudinally, without a fixed intermediate position, to facilitate access by passengers;
- 1.19 "locking system" means a device ensuring that the seat and its parts are maintained in the position of use.

2. EEC TYPE APPROVAL

2.1. APPLICATION FOR APPROVAL

- 2.1.1. The application for approval of a type of safety belt shall be submitted by the holder of the trade mark or by his representative. In the case of restraint systems, the application for approval of a type of restraint system shall be submitted by the holder of the trade mark or by his representative or by the manufacturer of the vehicle in which it is to be installed or by his representative.
- 2.1.2. It shall be accompanied by :
- 2.1.2.1 a technical description in triplicate of the belt type, specifying the straps and other materials used and accompanied by drawings of these items and in the case of retractors, installation instructions for the sensing device; the drawings must show the position intended for the approval number and the additional symbol(s) in relation to the rectangle of the approval mark. The description shall mention the colour of the model submitted for approval, and specify the vehicle type(s) for which this belt type is intended.

Annex I

In the case of a restraint system the description shall include : drawings of the vehicle structure and of the seat structure, adjustment system and attachments on an appropriate scale showing the sites of the seat anchorages and belt anchorages and reinforcements in sufficient detail; together with a specification of the materials used which may affect the strength of the seat anchorages and belt anchorages; and a technical description of the seat anchorages and the belt anchorages.

2.1.2.2. five samples of the type of the belt and,

2.1.2.3. in the case of safety belts with retractors, an additional belt assembly, and

2.1.2.4. a ten-metre length of each type of strap used in the type of belt.

2.1.3. In the case of restraint systems, two samples which may include two of the samples of belts required at under point 2.1.2.2. and at the option of the manufacturer, a vehicle representative of the vehicle type to be approved, or the part or parts of the vehicle considered essential by the technical service conducting approval tests for testing the restraint system shall be submitted to the service.

2.2. MARKINGS

The samples of a belt type or type of restraint system submitted for approval in conformity with the provisions of point 2.1.2.2. above shall be clearly and indelibly marked with the manufacturer's name, initials or trade name or mark.

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2.3. GENERAL SPECIFICATIONS

2.3.1. Each sample submitted in conformity with point 2.1.2.2. above shall meet the specifications set forth in points 2.3. to 2.7.

2.3.2. The belt or the restraint system shall be so designed and constructed that, when correctly installed and properly used by an occupant, its satisfactory operation is assured and it reduces the risk of bodily injury in the event of an accident.

2.4. RIGID PARTS

2.4.1. General

2.4.1.1. The rigid parts of the safety belt, such as buckles, adjusting devices, attachments and the like shall not have sharp edges liable to cause wear or breakage of the straps by chafing.

2.4.1.2. All parts of a belt assembly liable to be affected by corrosion shall be suitably protected against it. After undergoing the corrosion test presented in point 2.7.2. below, they shall not exhibit any deterioration likely to impair the proper functioning of the device nor any significant corrosion visible to the unaided eye of a qualified observer.

2.4.1.3. Rigid parts intended to absorb energy or to be subjected to or to transmit a load shall not be fragile.

2.4.1.4. All rigid items and plastic parts, except those which are not liable to become trapped under a seat or in a door of a motor vehicle, shall be subjected to the cold impact test specified in point 2.7.5.4. below. After test, if any visible cracks are present in any plastic cover or retainer of rigid item the complete plastic part shall then be removed and the remaining assembly shall then be assessed against its continued security. If the remaining assembly is still secure, or if no visible cracks are present, it will then be further assessed, against the test requirements specified in points 2.4.2., 2.4.3. and 2.6.

2.4.2. Buckle

2.4.2.1. The buckle shall be so designed as to preclude any possibility of incorrect use. This means, inter alia, that it must not be possible for the buckle to be left in a partially-closed condition. The procedure for opening the buckle must be clearly evident. Whenever the buckle is likely be in contact with the wearer the width of the contact surface of the buckle shall not be less than 46 mm.

2.4.2.2. The buckle, even when not under tension, shall remain closed whatever its position. It must not be possible to release it with a force less than 1 daN.

The buckle shall be easy to use and to grasp; it shall be capable of being released when under the tension specified in point 2.7.8.2. below.

The buckle shall be released by pressing either a button or a similar device. The surface to which this pressure must be applied shall have for devices which are in the depressed position :

- enclosed, an area of not less than 4.5cm² and a width of not less than 15mm;

- non enclosed an area of not than 2.5cm² and a width of not less than 10 mm.

The buckle release area shall be coloured red. No other part of the buckle shall be of this colour.

- 2.4.2.3. The buckle shall be capable of withstanding repeated operation and shall before the dynamic test in point 2.7.7. undergo 500 opening and closing cycles. The springs of closing buckles shall, in addition, be actuated 4,500 times in conditions of normal use.
- 2.4.2.4. The buckle when tested in accordance with point 2.7.5.3. below shall operate normally.
- 2.4.2.5. The force required to open the buckle in the test as prescribed in point 2.7.8. below shall not exceed 6 daN.
- 2.4.2.6. The buckle shall be tested for strength as prescribed in point 2.7.5.1. and 2.7.5.5. as appropriate. It must not break, be seriously distorted or become detached under the tension set up by the prescribed load.
- 2.4.2.7. In the case of buckles which incorporate a component common to two assemblies, the strength and release tests of points 2.7.7. and 2.7.8. shall be complied with when the part of the buckle pertaining to one assembly is engaged in the mating part pertaining to the other, if it is possible for the buckle to be so assembled in use.
- 2.4.3. Belt adjusting device
- 2.4.3.1. Two samples of each belt adjusting device shall be tested in accordance to the requirements of 2.7.3.7. The strap slip shall not exceed 25 mm for each sample of adjusting device and the sum of shifts for all the adjusting devices shall not exceed 40 mm.
- 2.4.3.2. All of the adjustment devices shall be tested for strength as prescribed in point 2.7.5.1. They must not break or become detached under the tension set up by the prescribed load.

2.4.3.3. When tested in accordance with point 2.7.5.6. the force required to operate any manual device shall not exceed 5 daN.

2.4.4. Attachments

The attachments shall be tested for strength as prescribed in points 2.7.5.1. and 2.7.5.2. They must not break or become detached under the tension set up by the prescribed load.

2.4.5. Retractors

Retractors shall fulfil the requirements specified below.

2.4.5.1. Manually unlocking retractors

2.4.5.1.1. The strap of a safety belt assembly equipped with a manually unlocking retractor shall not move more than 25 mm between locking positions of the retractor.

2.4.5.1.2. The strap of a safety belt assembly shall extract from a manually unlocking retractor within 6 mm of its maximum length when a tension of not less than 14 N and not more than 22 N is applied to the strap in the normal direction of the pull.

2.4.5.1.3. The strap shall be withdrawn from the retractor, and allowed to retract repeatedly by the method described in point 2.7.6.1. until 5000 cycles have been completed. The retractor shall then be subjected to the corrosion test given in point 2.7.2. followed by the dust test given in point 2.7.6.3. It shall then satisfactorily complete a further 5000 cycles of withdrawal and retraction, at the end of which it shall still meet the requirements of points 2.4.5.1.1. and 2.4.5.1.2. After the above tests the retractor shall operate correctly and still stow the strap efficiently.

2.4.5.2 Automatically locking retractors

- 2.4.5.2.1. The strap of a safety belt assembly equipped with an automatically locking retractor shall not move more than 30 mm between locking positions of the retractor. After a rearward movement of the wearer, the belt must either remain at its initial position or return to that position automatically on subsequent forward movements of the wearer.
- 2.4.5.2.2. If the retractor is part of a lap belt, the retracting force of the strap shall be not less than 7 N when measured in the free length between the manikin and the retractor in accordance with point 2.7.6.4. If the retractor is part of an upper torso restraint, the retracting force of the strap shall be not less than 2 N and not more than 7 N when similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between manikin and the guide or pulley. If the assembly incorporates a device that, upon manual or automatic operation, prevents the strap from being completely retracted, such a device shall not be operated when these requirements are assessed.
- 2.4.5.2.3. The strap shall be withdrawn from the retractor and allowed to retract repeatedly by the method described in point 2.7.6.1. until 5000 cycles have been completed. The retractor shall then be subjected to the corrosion test given in point 2.7.2. followed by the dust test given in point 2.7.6.3. It shall then satisfactorily complete a further 5000 cycles of withdrawal and retraction at the end of which it shall still meet the requirements of points 2.4.5.2.1. and 2.4.5.2.2. above. After the above test the retractor shall still function correctly and stow the strap efficiently.

2.4.5.3. Emergency locking retractor

- 2.4.5.3.1. An emergency locking retractor shall satisfy the conditions given below when tested in accordance with point 2.7.6.2:

- 2.4.5.3.1.1. It shall have locked when the vehicle deceleration reaches a value of 0.45g;
- 2.4.5.3.1.2. It shall not lock at strap accelerations measured in the direction of the extraction of less than 0.8g;
- 2.4.5.3.1.3. It shall not lock when its actuating device is tilted to angles of 12° or less in any direction from the installation position specified by its manufacturer;
- 2.4.5.3.1.4. It shall lock when its actuating device is tilted to angles of 27° more in any direction from the installation position specified by its manufacturer.
- 2.4.5.3.2. An emergency locking retractor with multiple sensitivity, one of which is strap sensitivity, shall when tested in accordance with point 2.7.6.2., in addition to meeting the above requirements, lock when the strap acceleration is greater than 1.2g, measured in the direction of the extraction.
- 2.4.5.3.3. In each of the tests mentioned in points 2.4.5.3.1. and 2.4.5.3.2. above, the amount of strap movement which may occur before the retractor locks, shall not exceed 50mm starting at the length given in point 2.7.6.2.1.
- 2.4.5.3.4. If the retractor is part of a lap belt, the retracting force of the strap shall be not less than 7 N when measured in the free length between the manikin and the retractor in accordance with point 2.7.6.4. If the retractor is part of an upper torso restraint, the retracting force of the strap shall be not less than 2 N and not more than 7 N when similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between the manikin and the guide or pulley. If the assembly incorporates a device that upon manual or automatic operation prevents the strap from being completely retracted, such a device shall not be operated when these requirements are assessed.

2.4.5.3.5. The strap shall be withdrawn from the retractor and allowed to retract repeatedly by the method described in point 2.7.6.1. until 40,000 cycles have been completed. The retractor shall then be subjected to the corrosion test given in point 2.7.2. followed by the dust test prescribed in point 2.7.6.3. It shall then satisfactorily complete a further 5,000 cycles after which it shall still meet the requirements of points 2.4.5.3.1., 2.4.5.3.2, 2.4.5.3.3. and 2.4.5.3.4 above. After the above tests the retractor shall still function correctly and stow the strap efficiently.

2.5. STRAPS FOR BELTS OR RESTRAINT SYSTEMS

2.5.1. General

2.5.1.1. The characteristics of the straps shall be such as to ensure that their pressure on the wearer's body is distributed as evenly as possible over their width and that they do not twist even under tension. They shall have energy-absorbing and energy-dispersing capacities.

2.5.1.2. The width of the strap under a load of 980 daN shall be not less than 46 mm. This dimension shall be measured during the breaking-strength test prescribed in point 2.7.4, and without stopping the machine.

2.5.2. Strength after room-conditioning

In the case of the two strap samples conditioned in conformity with point 2.7.3.1. the breaking load of the strap, determined as prescribed in point 2.7.4. below, shall be not less than 1,470 daN. The difference between the breaking loads of the two samples shall not exceed 10 per cent of the greater of the breaking loads measured.

2.5.3. Strength after special conditioning

In the case of the two strap samples conditioned in conformity with one of the provisions of point 2.7.3. (except 2.7.3.1) below, the breaking load of the strap shall be not less than 75 per cent of the average of the loads determined in the test referred to in point 2.5.2. and not less than 1,470 daN. The competent authority may dispense with one or more of these tests if the composition of the material used or information already available renders the test or tests superfluous.

2.6. BELT ASSEMBLY

2.6.1 Requirements for dynamic testing

2.6.1.1 The belt assembly or restraint system shall be subjected to a dynamic test in conformity with point 2.7.7. below.

2.6.1.2 The dynamic test shall be performed on two belt assemblies which have not previously been under load, except in the case of belt assemblies forming part of restraint systems when the dynamic test shall be performed on the restraint systems intended for one group of seats which have not previously been under load. The buckles of the belt assemblies to be tested shall have met the requirements of point 2.4.2.3. above. In the case of safety belts with retractors, the retractor shall have been subjected to the test for durability of the mechanism given in point 2.7.6.1., the corrosion test given in point 2.7.2. and the test for dust resistance given in point 2.7.6.3. During the test the following requirements shall be met:

2.6.1.2.1 No part of the belt assembly or a restraint system affecting the restraint of the occupant shall break and no buckle or locking system or displacement system shall release; and

2.6.1.2.2. the forward displacement of the manikin shall be between 80 and 200 mm at pelvic level in the case of lap belts. In the case of other types of belts, the forward displacement shall be between 80 and 200 mm at pelvic level and between 100 and 300 mm at chest level. These displacements are the displacements in relation to the measurement points shown in annex VIII, figure 6.

2.6.1.3. In the case of a restraint system:

2.6.1.3.1. The movement of the chest reference point may exceed that specified in 2.6.1.2.2. if it can be shown either by calculation or a further test that no part of the torso or the head of the manikin used in the dynamic test would have come into contact with any forward rigid part of the vehicle other than the chest with the steering assembly, if the latter meets the requirements of the Council directive 74/297/EEC of 4 June 1974 and provided contact does not occur at a speed higher than 24 km/h. For this assessment the seat shall be considered to be in the position specified in 2.7.7.1.5.

2.6.1.3.2. In the case of a two door car the displacement and locking systems enabling the occupants of the rear seats to leave the vehicle must still be operable by hand after the dynamic test.

2.6.2. Strength after resistance to abrasion test

2.6.2.1. For both samples conditioned in compliance with 2.7.3.6., the breaking strength shall be assessed as prescribed in points 2.5.2. and 2.7.5. It must be at least equal to 75 % of the breaking strength average determined during tests on unabraded parts and not less than the minimum load specified for the item being tested. Difference between breaking strength of the two samples must not exceed 20 % of the highest measured breaking strength.

2.6.2.2. The items to be tested and the tests which may be appropriate are indicated in the following table. A new sample shall be used for each test.

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	Type 1 test	Type 2 test	Type 3 test
Attachment	-	-	x
Guide or Pulley	-	x	-
Buckle-loop	-	x	x
Adjusting device	x	x	x
Parts sewn to the strap	-	-	x

2.7. TESTS

2.7.1. Use of samples submitted for approval of a type of belt or restraint system (see annex XIII)

2.7.1.1. Two belt assemblies are required for the assembled-belt test, for the buckle-opening test and for the cold impact test.

2.7.1.2. One belt assembly shall be used as a source of samples of belt components for the corrosion and buckle-strength tests.

2.7.1.3. Two belt assemblies are required for the abrasion test and the micro-slip test.

2.7.1.4. The additional belt assembly mentioned in point 2.1.2.3. shall be used for the corrosion test.

2.7.1.5. The sample of strap shall be used for testing the breaking strength of the strap. Part of this sample shall be preserved so long as the approval remains valid.

2.7.1.6 The technical service responsible for approval testing shall be entitled to ask for a number of samples additional to these referred to in points 2.1.2.2., 2.1.2.3. and 2.1.2.4. above.

2.7.2. Corrosion test

2.7.2.1. A complete safety belt assembly shall be positioned in a test chamber as prescribed in Annex XIII. In the case of an assembly incorporating a retractor, the strap shall be unwound to full length less 300 ± 3 mm. Except for short interruptions that may be necessary, for example, to check and replenish the salt solution, the exposure test shall proceed continuously for a period of fifty hours.

2.7.2.2. On completion of the exposure test the assembly shall be gently washed, or, dipped in clean running water with a temperature not higher than 38°C to remove any salt deposit that may have formed and then allowed to dry at room temperature for 24 hours before inspection in accordance with point 2.4.1.2.

2.7.3. Conditioning of straps for the breaking-strength test

Samples out from the strap, as referred to in point 2.1.2.3. above shall be conditioned as follows :

2.7.3.1. Room-conditioning

The strap shall be kept for a minimum 24 hours in an atmosphere having a temperature of $20 \pm 5^{\circ}\text{C}$ and a relative humidity of 65 ± 5 per cent. If the test is not carried out immediately after conditioning, the specimen shall be placed in a hermetically-closed receptacle until the test begins. The breaking load shall be determined within five minutes after removal of the strap from the conditioning atmosphere or from the receptacle.

2.7.3.2. Light-conditioning

2.7.3.2.1. The provisions of Recommendation ISO/R 105-1959, "Test for colour fastness of textiles", as amended by addendum I (ISO/R 105-1959/A1 - 1963) and addendum II (ISO/R 105/II - 1963), shall apply.

The strap shall be exposed to light for the time necessary to produce fading of Standard Blue Dye No 7 to a contrast equal to grade 4 on the grey scale.

2.7.3.2.2. After exposure the strap shall be kept for a minimum of 24 hours in an atmosphere having a temperature of $20 \pm 5^{\circ}\text{C}$ and a relative humidity of 65 ± 5 per cent. The breaking load shall be determined within 5 minutes after removal of the strap from the conditioning installation.

2.7.3.3. Cold-conditioning

2.7.3.3.1. The strap shall be kept for a minimum of 24 hours in an atmosphere having a temperature of $20 \pm 5^{\circ}\text{C}$ and a relative humidity of 65 ± 5 per cent.

2.7.3.3.2. The strap shall then be kept for $1\frac{1}{2}$ hours on a plane surface in a low-temperature chamber in which the air temperature is $-30 \pm 5^{\circ}\text{C}$. It shall then be folded and the fold shall be loaded with a mass of 2 kg previously cooled to $-30 \pm 5^{\circ}\text{C}$. When the strap has been kept under load for 30 minutes in the same low-temperature chamber, the mass shall be removed and the breaking load shall be measured within five minutes after removal of the strap from the low-temperature chamber.

2.7.3.4. Heat-conditioning

2.7.3.4.1. The strap shall be kept for 3 hours in a heating cabinet in an atmosphere having a temperature of $60 \pm 5^{\circ}\text{C}$ and a relative humidity of 65 ± 5 per cent.

2.7.3.4.2. The breaking load shall be determined within five minutes after removal of the strap from the heating cabinet.

2.7.3.5. Exposure to water

2.7.3.5.1. The strap shall be kept fully immersed for 3 hours in distilled water, at a temperature of $20 \pm 5^{\circ}\text{C}$, to which a trace of a wetting agent has been added. Any wetting agent suitable for the fibre under test may be used.

2.7.3.5.2. The breaking load shall be determined within ten minutes after removal of the strap from the water.

2.7.3.6. Resistance to abrasion tests

2.7.3.6.1. The samples to be submitted to the abrasion test shall be kept for a minimum of 24 hours in an atmosphere having a temperature of $20 \pm 5^{\circ}\text{C}$ and relative humidity of 65 ± 5 per cent. The ambient temperature during testing shall be between 15 and 30°C .

2.7.3.6.2. The abrasion test will be performed on every device in which the strap is in contact with a rigid part of the belt. The setting on the test device will approximatively maintain the relative position of strap and contact area.

2.7.3.6.3. In the table below are listed the general conditions for each test.

	Load No	Frequency Hz	Cycles number	Shift cm
Type 1 test	50	0,5	5 000	30 ± 2
Type 2 test	5	0,5	45 000	30 ± 2
Type 3 test (x)	0- 50	0,5	45 000	-

(x) see 2.7.3.6.4.3.

The shift given in the fifth column of this table represents the amplitude of a back-and-forth motion applied to the strap.

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2.7.3.6.4. Particular test conditions

2.7.3.6.4.1. Type 1 test : for cases where the strap slides through an adjusting device

A 50 N load shall be maintained on one end the strap--the other end of the strap shall be attached to a device giving the strap a horizontal back and forth motion.

The adjusting device shall be placed on the horizontal strap so that the strap remains under tension.

(see Annex XII, figure 1)

2.7.3.6.4.2. Type 2 test : for cases where the strap changes direction in passing through a rigid part.

During this test, the angles of the straps shall be maintained as shown in Annex XII, figure 2.

The 5 N load shall be maintained during the test.

2.7.3.6.4.3. Type 3 test : for cases where the strap is fixed to a rigid part by sewing or similar means

The total back and forth motion shall be 300 ± 20 mm but the 50 N load shall only be applied during a shift of 100 ± 20 mm for each half period.

(see Annex XII, figure 3).

2.7.3.7. Micro-slip test (see Annex XII, figure 3)

2.7.3.7.1. The samples to be submitted to the micro-slip test shall be kept for a minimum of 24 hours in an atmosphere having a temperature of $20 \pm 5^{\circ}\text{C}$ and a relative humidity of 65 ± 5 per cent.

The test shall be carried out at a temperature between 15 and 30°C .

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- 2.7.3.7.2. The adjusting device shall be placed on a vertical strap. The other end of the strap shall pass over a horizontal deflector roller with its axis parallel to the plane of the section of strap. The strap, after passing over the roller shall be horizontal. A 50N load shall be applied to the strap by a mass attached to the adjusting device with another suitable length of strap.
- 2.7.3.7.3. The adjusting device being tested shall be arranged in such a way that the middle of it, in the highest position to which it can be raised, is 300 ± 5 mm from a supporting table so that the 50 N mass is itself $100 \text{ mm} \pm 5$ mm from that support.
- 2.7.3.7.4. The duration of the test shall be 1,000 cycles at a cycling rate of 0.5 cycles per second and a total travel of 300 ± 20 mm. The 50 N load shall be applied only during a shift of 100 ± 20 mm for each half period.
- 2.7.4. Test of breaking strength of strap (static test)
- 2.7.4.1. The test shall be carried out each time on two new samples of strap, of sufficient length, conditioned in conformity with one of the provisions of p.2.7.3.
- 2.7.4.2. Each strap shall be gripped between the clamps of a tensile-testing machine. The clamps shall be so designed as to avoid breakage of the strap at or near them. The speed of traverse shall be about 100 mm/min. The free length of the sample between the clamps of the machine at the start of the test shall be $200 \text{ mm} \pm 40$ mm.
- 2.7.4.3. When the load reaches 980 daN, the width of the strap shall be measured without stopping the machine.

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2.7.4.4. The tension shall then be increased until the strap breaks, and the breaking load shall be noted.

2.7.4.5. If the strap slips or breaks at or within 10 mm of either of the clamps, the test shall be invalid and a new test shall be carried out on another sample.

2.7.5. Test of belt components incorporating rigid parts

2.7.5.1. The buckle and the adjusting device shall be connected to the tensile-testing apparatus by the parts of the belt assembly to which they are normally attached, and the load shall then build up to 980 daN, except in the case of retractors having a pulley or strap guide at the upper belt anchorage. If the buckle or the adjusting device is part of the attachment, the buckle or adjusting device shall be tested with the attachment, in conformity with point 2.7.5.2. below. Where a retractor is tested as an adjusting device, the length of strap remaining wound on the reel shall be the length resulting from locking with the strap unwound as close as possible to full length less 450 mm.

2.7.5.2. The attachments shall be tested in the same manner as prescribed in point 2.7.5.1. above, but the load shall be 1,470 daN and shall, subject to the provisions of the second sentence of point 2.7.7.1. below, be applied in the least favourable conditions likely to occur in a vehicle in which the belt is correctly installed. In the case of retractors the test shall be performed with the strap completely unwound from the reel.

2.7.5.3. Two samples of the complete belt assembly shall be placed in a refrigerated cabinet at $-10^{\circ} \pm 1^{\circ}$ C for two hours. The mating parts of the buckle shall then be coupled manually together before being removed from the refrigerated cabinet.

- 2.7.5.4. Two samples of the complete belt assembly shall be placed in a refrigerated cabinet at $-10^{\circ} \pm 1^{\circ}$ C for two hours. The rigid items and plastic parts under test shall then be laid in turn upon a flat rigid steel surface (which has been kept with the samples in the refrigerated cabinet) placed on the horizontal surface of a compact rigid block with a mass of at least 100 kg, and within thirty seconds of being removed from the refrigerated cabinet, an 18 kg steel mass shall be allowed to fall under gravity through 300 mm into the test sample. The impact face of the mass shall take the form of a convex surface with a hardness of at least 45 HRC having a transverse radius of 10 mm and a longitudinal radius of 150 mm. One test sample shall be tested with the axis of the curved bar in line with the strap and the other sample shall be tested at 90° to the strap.
- 2.7.5.5. Buckles having parts common to two safety belts shall be loaded as to simulate the conditions of use in the vehicle with the seats in the mid-position of their adjustment. The direction of application of the load shall be established according to point 2.7.7.1. below. A load of 1470 daN shall be applied simultaneously to each. A suitable apparatus for the above test is shown in Annex XI.
- 2.7.5.6. When testing any manual adjusting device, the strap shall be drawn steadily through that device, having regard for the normal conditions of use, at a rate of approximately 100 mm/s and the maximum force measured to the nearest N after the first 25 mm of strap movement. The test shall be carried out in both directions of strap travel through the device, the strap being cycled ten times prior to the measurement.
- 2.7.6. Additional tests for retractors
- 2.7.6.1. Durability of retractor mechanism

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- 2.7.6.1.1. The strap shall be withdrawn and allowed to retract for the required number of cycles at a rate of not more than 30 cycles per min. In the case of emergency locking retractors, a snatch to lock the retractor shall be introduced at each fifth cycle. The snatches shall occur in equal numbers at each of five different extractions, namely, 90, 80, 75, 70 and 65 per cent of the total length of the strap on the retractor. However, where more than 900 mm is provided, the above percentages shall be related to the final 900 mm of strap which remain in the retractor.
- 2.7.6.1.2. A suitable apparatus for the tests specified in point 2.7.6.1.1. above is shown in annex IV.
- 2.7.6.2. Locking of emergency locking retractors
- 2.7.6.2.1. The retractor shall be tested for locking, when the strap has been unwound to a full length less than 300 mm \pm 3 mm.
- 2.7.6.2.1.1. In the case of a retractor actuated by strap movement, the extraction shall be in the direction in which it normally occurs when the retractor is installed in a vehicle.
- 2.7.6.2.1.2. When retractors are being tested for sensitivity to vehicle decelerations, they shall be tested at the above extraction, in both directions along two mutually perpendicular axes, which shall be horizontal were the retractor to be installed in a vehicle as specified by the safety belt manufacturer. One of these test directions shall be chosen by the technical service conducting the approval test to give the most adverse conditions with respect to actuation of the locking mechanism.

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2.7.6.2.2. A suitable apparatus for the tests specified in point 2.7.6.2.1. above is described in annex V. The design of any such apparatus shall ensure that the required acceleration is given at an average rate of increase of acceleration equal to or higher than 10 g per second.

2.7.6.2.3. For testing the requirements of 2.4.5.3.1.3. and 2.4.5.3.1.4., the retractor shall be mounted on a horizontal table and the table tilted with a speed not exceeding 2° per second until locking base occurred. The test shall be repeated in other directions to ensure that the requirements are fulfilled.

2.7.6.3. Dust resistance

2.7.6.3.1. The retractor shall be positioned in a test chamber as described in annex VI. It shall be mounted in an orientation similar to that in which it is mounted in the vehicle. The test chamber shall contain dust as specified in point 2.7.6.3.2. below. 500 mm of the strap shall be extracted from the retractor and kept extracted, except that it shall be subjected to ten complete cycles of retraction and withdrawal within one or two minutes after each agitation of the dust. For a period of five hours, the dust shall be agitated every twenty minutes for five seconds by compressed air free of oil and moisture at a gauge pressure of 5.5 ± 0.5 bars, entering through an orifice, 1.5 ± 0.1 mm in diameter.

2.7.6.3.2. The dust used in the test described in point 2.7.6.3.1. above shall consist of about 1 kg of dry quartz. The particle size distribution shall be as follows :

- a) passing 150 μ m aperture, 104 μ m wire diameter : 99 %;
- b) passing 105 μ m aperture, 64 μ m wire diameter : 76 to 86 %;
- c) passing 75 μ m aperture, 52 μ m wire diameter : 60 to 70 %.

2.7.6.4. Withdrawal and retracting forces

2.7.6.4.1. The withdrawal and retracting forces shall be measured with the safety belt assembly fitted to a dummy as for the dynamic test prescribed in point 2.7.7. The strap tension shall be measured at the points of contact with (but just clear of) the manikin while the strap is being withdrawn or retracted at the approximate rate of 0.6 m per minute.

2.7.7. Dynamic test of the belt assembly or of the restraint system

2.7.7.1. The belt assembly shall be mounted on a trolley equipped with the seat and the anchorages defined in Annex VII. However, if the belt assembly is intended for a specific vehicle or for specific types of vehicle, the distances between the manikin and the anchorages shall be determined by the service conducting the tests, either in conformity with the instructions for fitting supplied with the belt or in conformity with the data supplied by the manufacturer of the vehicle.

2.7.7.1.1. In the case of belt assemblies forming part of a restraint system, the system shall be mounted on the part of the vehicle structure to which it is normally fitted and this part shall be rigidly attached to the test trolley in the way prescribed below.

2.7.7.1.2. The method used to secure the vehicle during the test shall not be such as to strengthen the anchorages of the seats or safety belts or to lessen the normal deformation of the structure. No forward part of the vehicle shall be present which by limiting the forward movement of the manikin excepting the foot, would reduce the load imposed on the restraint system during the test. The parts of the structure eliminated can be replaced by parts of equivalent strength provided they do not hinder the forward movement of the manikin.

Annex I

- 2.7.7.1.3. A securing device shall be regarded as satisfactory if it produces no effect on an area extending over the whole width of the structure and if the vehicle or the structure is blocked or fixed in front at a distance of not less than 500 mm from the anchorage of the restraint system. At the rear the structure shall be secured at a sufficient distance rearwards of the anchorages to ensure that the requirements of paragraph 2.7.7.1.2. above are fulfilled.
- 2.7.7.1.4. The seats shall be fitted and shall be placed in the position for driving use chosen by the technical service conducting approval tests to give the most adverse conditions with respect to strength, compatible with installing the manikin in the vehicle. The positions of the seats shall be stated in the report. The seat back, if adjustable for inclination, shall be locked as specified by the manufacturer or, in the absence of any specification, to a actual seat back angle as near as possible to 25 °.
- 2.7.7.1.5. For the assesment of the requirements in 2.6.2.3.1. the seat shall be regarded in its most forward driving or travelling position appropriate to the dimensions of the manikin.
- 2.7.7.1.6. All the seats of any group of seats shall be tested simultaneously.
- 2.7.7.2. The belt assembly shall be attached to the manikin specified in Annex VIII as follows : a board 25 mm thick shall be placed between the back of the manikin and the seat back. The belt shall be firmly adjusted to the manikin. The board shall then be removed and the manikin placed so that its back is in contact along its length with the seat back. If the buckle is of the eccentric type it shall lock only through the action of its springs; it shall no be forced or snapped into the locked position.
- If a metal-to-metal- buckle is used, a check shall be made to ensure that the mode of engagement of the two parts entails no risk of reducing the reliability of locking or the strength of the buckle.

Annex I

- 2.7.7.3. The free ends of the straps shall extend sufficiently far beyond the adjusting devices to allow for slip.
- 2.7.7.4. The trolley shall then be so propelled that at the moment of impact its free running speed is $50 \text{ km/h} \pm 1 \text{ km/h}$ and the manikin remains stable. The stopping distance of the trolley shall be $40 \text{ cm} \pm 5 \text{ cm}$. The trolley shall remain horizontal throughout deceleration. The deceleration of the trolley shall be achieved by using the apparatus prescribed in Annex VII or any other device giving equivalent results. This apparatus shall comply with the performance specified in Annex IX.
- 2.7.7.5. The trolley speed immediately before impact and the maximum forward displacement of the manikin shall be measured.
- 2.7.7.6. After impact, the belt assembly or restraint system and its rigid parts shall be inspected visually, without opening the buckle, to determine whether there has been any failure or breakage. In the case of restraint systems it shall also be ascertained, after the test, whether the parts of the vehicle structure which are attached to the trolley have undergone any visible permanent deformation. If there is any such deformation this shall be taken into account in any calculation made in accordance with point 2.6.2.3.1.

2.7.8. Buckle-opening test

- 2.7.8.1. Belt assemblies which have already undergone the dynamic test in conformity with point 2.7.7. above shall be used for this test.
- 2.7.8.2. After the test prescribed in point 2.7.7. above, a load of 66 daN shall be applied horizontally to the manikin in order to load the belt assembly, and the force needed to open the buckle when it is so loaded shall be measured.

./.

Annex I

- 2.7.8.3. The buckle-opening force shall be applied by a spring-balance or other measuring device in the manner and direction normal for opening the buckle.
- 2.7.8.4. The buckle-opening force shall be measured and any failure of the buckle noted.
- 2.7.8.5. After the buckle-opening test, the components of the belt assembly or restraint-system which have undergone the tests prescribed in point 2.7.7. shall be inspected and the extent of the damage sustained by the belt assembly or restraint system in the dynamic test shall be recorded in the test report.

2.7.9. Test report

The test report shall record the results of all the tests in point 2.7. above and in particular the trolley speed, the maximum forward displacement of the manikin, the place - if it can be varied - occupied by the buckle during the test, the buckle-opening force, and any failure or breakage. If by virtue of point 2.7.7.1. the anchorages prescribed in Annex VII have not been respected, the test report shall describe how the belt assembly or the restraint system is installed and shall specify important angles and dimensions. The report shall also mention any distortion or breakage of the buckle that has occurred during the test. In the case of a restraint system the test report shall also specify the manner of attaching the vehicle structure to the trolley, the position of the seats, and the inclination of the seat backs. If the forward displacement of the manikin has exceeded the values prescribed in paragraph 2.6.2.2. above the report shall state whether the requirements in paragraph 2.6.2.3.1. are met.

2.8. CONFORMITY OF PRODUCTION

2.8.1. The rate of the spot checks mentioned in article 1, paragraph 2, shall be such that the tests prescribed in point 2.8.3. below are effected on at least one in 2,500 safety belts and restraint systems produced of each approved type with a minimum frequency of one and a maximum frequency of 50 for any twelve months of production.

2.8.2. Belts offered or to be offered for sale shall be used for the tests.

2.8.3. The belts selected for verification of conformity with an approved type shall undergo such tests as may be chosen by the competent authority from among those described in points 2.6. and 2.7. above.

2.8.4. If one of the samples fails the test to which it has been submitted, a test shall be carried out on three further samples. In the event of one of them also failing, the provisions of article 3, paragraph 2, will be applied.

2.9. INSTRUCTIONS : Every safety belt shall be accompanied by the instructions referred in Annex X.

3. INSTALLATION REQUIREMENTS

3.1. VEHICLE EQUIPMENT

Every vehicle concerned by the specifications of the present Directive shall be equipped with the following types of safety belts or restraint systems incorporating such types of belts :

3.1.1. at front outboard seating positions, with three point belts incorporating retractors ;

3.1.2. at front central seating positions, with three point belts incorporating retractors or not ;

3.1.3. at rear seating positions, with lap belts or three point belts incorporating retractors or not.

3.2. GENERAL REQUIREMENTS

3.2.1. Safety belts and restraint systems installed in vehicles shall be fixed to anchorages complying with the specifications of the Council directive 75/ /EEC of 1975.

3.2.2. Safety belts and restraint systems shall be so installed that, when properly worn by the occupants, their satisfactory operation is assured and they reduce the risk of bodily injury in the event of an accident.

In particular, they shall be so installed that :

3.2.2.1. the straps are not liable to assume a dangerous configuration,

3.2.2.2. the risk of the belt slipping from the shoulder of the wearer when worn correctly is reduced to a minimum,

3.2.2.3. the risk of strap damage due to contact with sharp rigid parts of the vehicle or seat structure is reduced to a minimum.

3.3. SPECIAL REQUIREMENTS FOR RIGID PARTS INCORPORATED IN SAFETY BELTS OR RESTRAINT SYSTEMS

3.3.1. The rigid parts, such as buckles, adjusting devices, attachments shall not increase the risk of bodily injury to the wearer or to all occupants of the vehicle in the event of an accident.

3.3.2. The device for releasing the buckle shall be clearly visible and accessible to the wearer without being capable to be operated inadvertently and accidentally. The buckle shall also be situated in such a position as to be readily accessible to a rescuer needing to release the occupant in an emergency.

The buckle shall be so installed that it is capable of being released by the wearer both when not under tension and when retaining his weight 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 engaged in the same manner.

- ./ 3.3.2. It shall be verified that, if the buckle may contact the wearer the width of the contact surface of the buckle is not narrower than 46 mm.
- 3.3.3. The belt after being put on by the wearer, shall either adjust automatically to fit him or be such that the manual adjusting device shall be readily accessible to the seated wearer and shall be convenient and easy to use. It shall also allow the belt to be tightened with one hand to suit the size of the wearer and the position of the vehicle seat.
- 3.3.4. Safety belts or restraint systems incorporating retractors shall be so installed that the retractor operate correctly and stows the strap efficiently.

ANNEX II

MODEL FOR AN EEC COMPONENT TYPE APPROVAL
CERTIFICATE

(Max. format : A4 (210 x 297 mm))

Name of
competent authority

Notification concerning the grant, refusal, withdrawal of
EEC component type approval or the grant, refusal, withdrawal
of extension of EEC component type approval of a type of
safety belt or restraint system.

APPROVAL N° :

1. Restraint system with/Three-point belt/Lap belt/Special type
belt/fitted with energy absorber/retractor type belt (x).
2. Trade name or mark
3. Manufacturer's designation of the type of
belt or restraint system
4. Manufacturer's name
5. If applicable, name of his representative
6. Address
7. Submitted for approval on
8. Technical service conducting approval tests
9. Date of test report issued by that service
10. Number of test report issued by that service
11. Approval granted/refused (x) for general use/for use in a particular
vehicle or in particular types of vehicle (x).
12. Position and nature of the marking
13. Place
14. Date
15. Signature
16. The following documents, bearing the approval number shown above, are
attached to this communication :
 - drawings, diagrams and plans of the safety belt, including
any energy absorber or retractor fitted;
 - drawings, diagrams and plans of the restraint system, the vehicle
structure and the seat structure, as well as of the adjustment
system and the attachments, including any energy absorbent or
retractor fitted;
 - photographs of the safety belt.

(x) Strike out what does not apply.

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ANNEX III

EEC TYPE-APPROVAL MARK

1. MISCELLANEOUS

1.1. The type-approval mark shall consist of :

1.1.1. a rectangle framing the letter "e" followed by the distinguishing number of letters of the country issuing the type-approval (1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 6 for Belgium, 11 for the United Kingdom, 12 for Luxembourg, DK for Denmark and IRL for Ireland);

1.1.2. the type-approval number, located below the rectangle;

1.1.3. the following additional symbol or symbols above the rectangle :

1.1.3.1. the letter "A" in the case of a three-point belt, the letter "B" in the case of a lap belt and the letter "S" in the case of a special type belt.

1.1.3.2. the symbols referred to in point 1.1.3.1 above shall be supplemented by the following additional markings :

1.1.3.2.1. the letter "e" in the case of a belt with an energy absorber,

1.1.3.2.2. the letter "r" in the case of a belt with a retractor, followed by the number of the type of retractor used, in accordance with paragraph 2.3. above, and the letter "m" if the retractor used is an emergency locking retractor with multiple sensitivity.

1.1.3.3. the symbols referred to in point 1.1.3.1. above shall be preceded by the letter "Z" when the safety belt is part of a restraint system.

1.2. The particulars referred to in point 1.1. shall be clearly legible and be indelible, and may be affixed either by means of a label or by direct marking. The label or marking shall be resistant to wear.

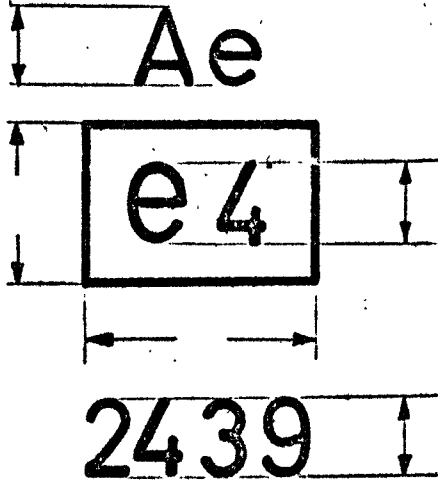
SECRET

CONFIDENTIAL

[The following text is extremely faint and illegible due to the quality of the scan. It appears to be a multi-paragraph document.]

2. SKETCHES OF EEC TYPE-APPROVAL MARKS

2.1.



The belt bearing the above approval mark is a three-point belt ("A") fitted with an energy absorber (e) and approved in the Netherlands (e 4) under the number 2439.

2.2.

Br4m



2439

The belt bearing the above approval mark is a lap belt ("B") fitted with a retractor, type 4, with multiple sensitivity and approved in the Netherlands (e 4) under the number 2439.

2.3.

ZSe



2439

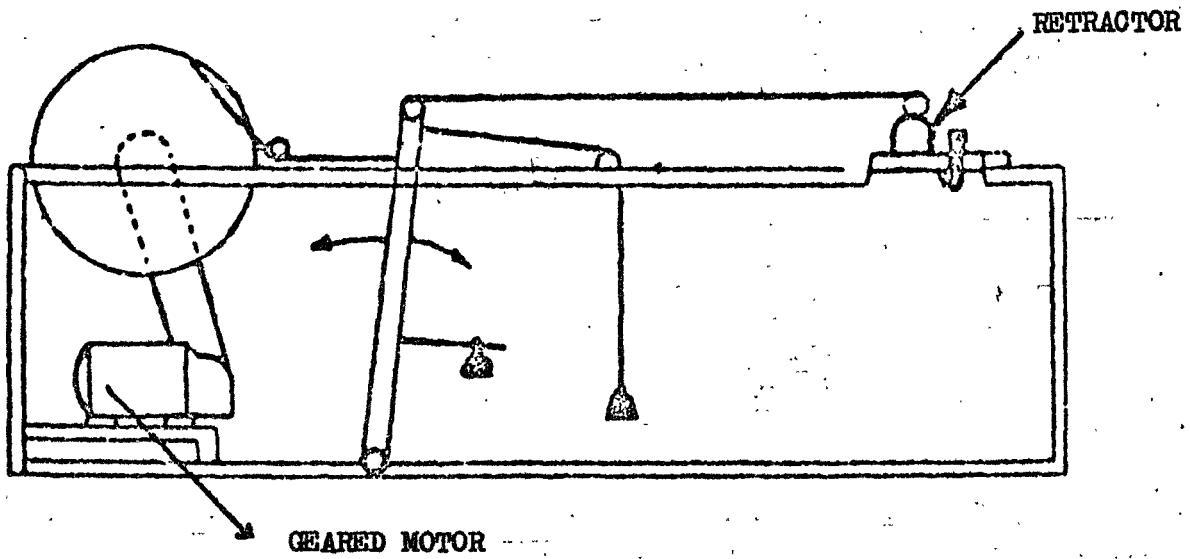
The belt bearing the above approval mark is a special type ("S") fitted with an energy absorber (e) being part of a restraint system (Z) and approved in the Netherlands (e 4) under the number 2439.

Note

The approval number and additional symbol(s) must be placed close to the rectangle and either above or below the "e" or to left or right of that letter. The digits of the approval number must be on the same side of the "e" and orientated in the same direction. The additional symbol(s) must be diametrically opposite the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

ANNEX IV

EXAMPLE OF AN APPARATUS TO TEST DURABILITY OF RETRACTOR MECHANISM



ANNEX V

EXAMPLE OF AN APPARATUS TO TEST LOCKING OF EMERGENCY LOCKING RETRACTORS

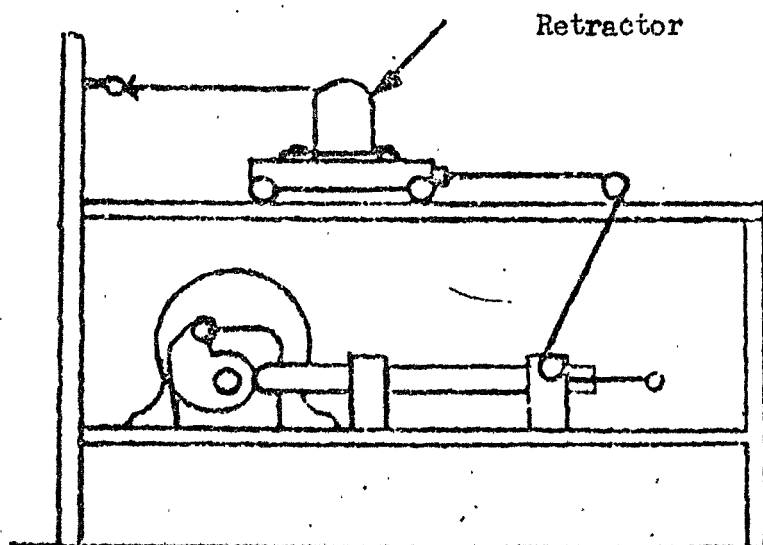
A suitable apparatus is illustrated in the figure and consists of a motor-driven cam, the follower of which is attached by wires to a small trolley mounted on a track. The cam follower incorporates a "lost motion" device which absorbs any movement should the reel lock before the full stroke of the follower is completed. The cam design and motor speed combination is such as to give the required acceleration at a rate of increase of acceleration as specified in point 2.7.6.2.2 of Annex I, and the stroke is arranged to be in excess of the maximum permitted webbing movement before locking.

On the trolley a carrier is mounted which can be swivelled to enable the retractor to be mounted in varying positions relative to the direction of movement of the trolley.

When testing retractors for sensitivity to strap movement the retractor is mounted on a suitable fixed bracket and the strap is attached to the trolley.

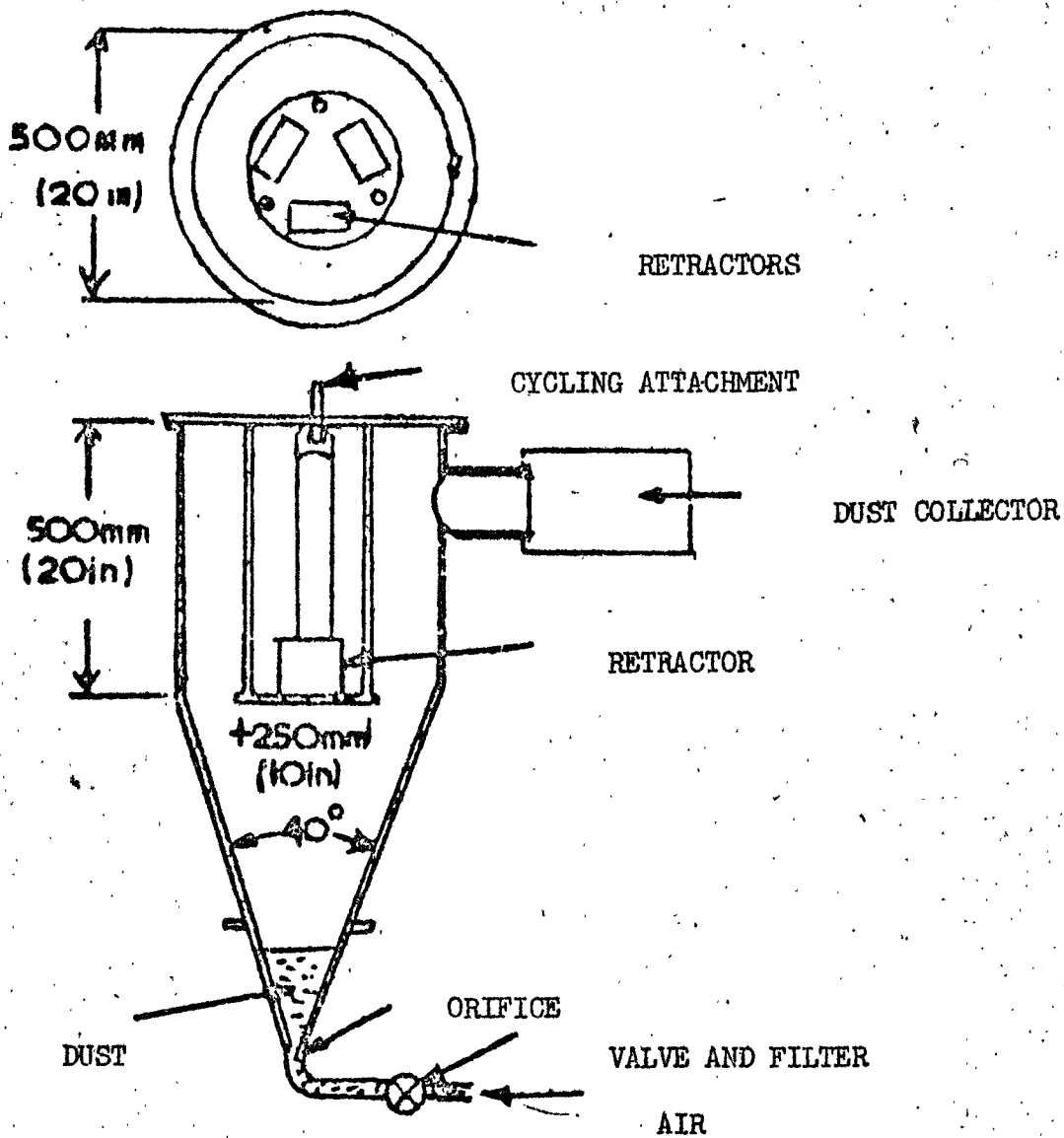
When carrying out the above tests any brackets, etc. supplied by the manufacturer shall be incorporated in the test installation to simulate as closely as possible the intended installation in a vehicle.

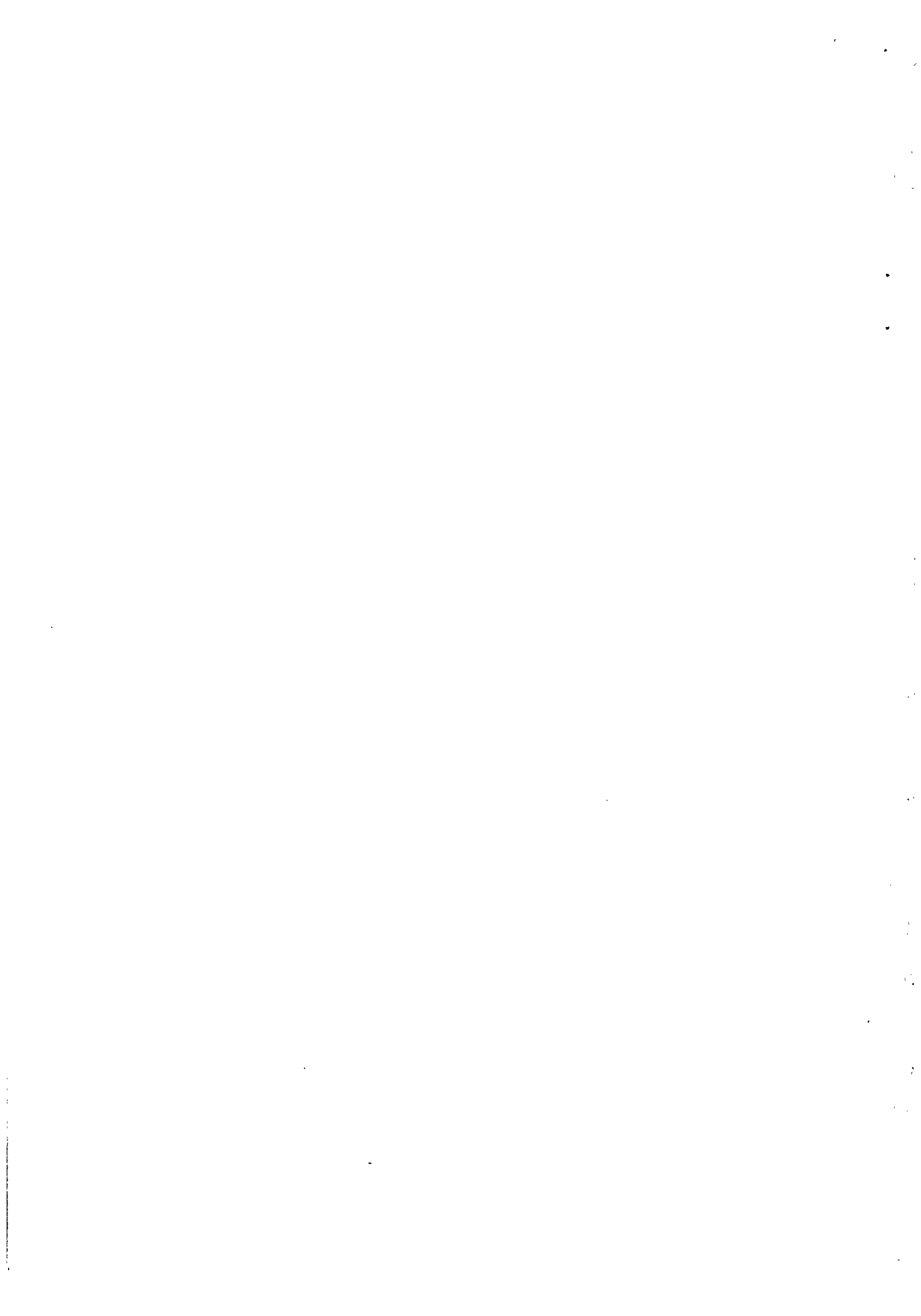
Any additional brackets, etc., that may be required to simulate the installation as intended in a vehicle shall be provided.



ANNEX VI

EXAMPLE OF AN APPARATUS FOR DUST RESISTANCE TESTS





ANNEX VII

DESCRIPTION OF TROLLEY, SEAT AND ANCHORAGES

1. TROLLEY

For tests on safety belts the trolley, carrying the seat only, shall weigh 400 ± 20 kg. For tests on restraint systems the trolley with the attached vehicle structure shall weigh 800. However, if necessary, the total mass of the trolley and vehicle structure may be increased by increments of 200 kg. In no case shall the total mass differ from the nominal value by more than ± 40 kg.

2. SEAT

Except in the case of tests on restraint systems, the seat shall be of rigid construction and present a smooth surface. The particulars given in the diagram appended to this annex shall be respected, care being taken that no metal part can come into contact with the belt.

3. ANCHORAGES

The anchorages shall be positioned as shown in Figure 1. The points, which correspond to the arrangement of the anchorages, show where the ends of the belt are to be connected to the trolley or to the load transducer, as the case may be. The structure carrying the anchorages shall be rigid. The upper anchorage must not be displaced by more than 0.2 mm in the longitudinal direction when a load of 98 daN is applied to it in that direction. The trolley shall be so constructed that no permanent deformation shall occur in the parts bearing the anchorages during the test.

4. STOPPING DEVICE

This device consists of two identical absorbers mounted in parallel, except in the case of restraint systems when four absorbers shall be used for a nominal mass of 800 kg. If necessary, an additional absorber shall be used for each 200 kg increase of nominal mass.

Each absorber comprises:

- an outer casing formed from a steel tube;
- a polyurethane energy-absorber tube;
- a polished-steel olive-shaped knob penetrating into the absorber; and
- a shaft and an impact plate.

The dimensions of the various parts of this absorber are shown in the diagrams reproduced in Figure 2. The characteristics of the absorbing material are given in Table 1. Immediately before each test the tubes shall be maintained at a temperature between 15 and 30° C without use for a minimum of 12 hours.

The requirements which the stopping device must meet are given in Annex IX. Any other device giving equivalent results can be accepted.

T A B L E 1

CHARACTERISTICS OF THE ABSORBING MATERIAL
(ASTM Method D 735 unless otherwise stated)

Shore hardness A : 95 ± 2

Breaking strength : $R_b \geq 350 \text{ kg/cm}^2$

Minimum elongation : $A_b \geq 400 \%$

Module at 100 % elongation : $\geq 110 \text{ kg/cm}^2$

at 300 % elongation : $\geq 240 \text{ kg/cm}^2$

Low-temperature brittleness (ASTM Method D 736) :

5 hours at $-55 \text{ }^\circ\text{C}$

Compression set (Method B) :

22 hours at $70 \text{ }^\circ\text{C} \leq 45 \%$

Density at $25 \text{ }^\circ\text{C}$: 1.05 to 1.10

Ageing in air (ASTM Method D573) :

70 hours at $100 \text{ }^\circ\text{C}$ - Shore hardness : max. variation ± 3

- breaking strength : decrease $< 10 \%$ of R_b

- elongation : decrease $< 10 \%$ of A_b

- weight : decrease $< 1 \%$

Immersion in oil (ASTM Method No. 1 Oil) :

70 hours at $100 \text{ }^\circ\text{C}$ - Shore hardness : max. variation ± 4

- breaking strength : decrease $< 15 \%$ of R_b

- elongation : decrease $< 10 \%$ of A_b

- volume : swelling $< 5 \%$

Immersion in oil (ASTM Method No. 3 Oil) :

70 hours at $100 \text{ }^\circ\text{C}$ - breaking strength : decrease $< 15 \%$ of R_b

- elongation : decrease $< 15 \%$ of A_b

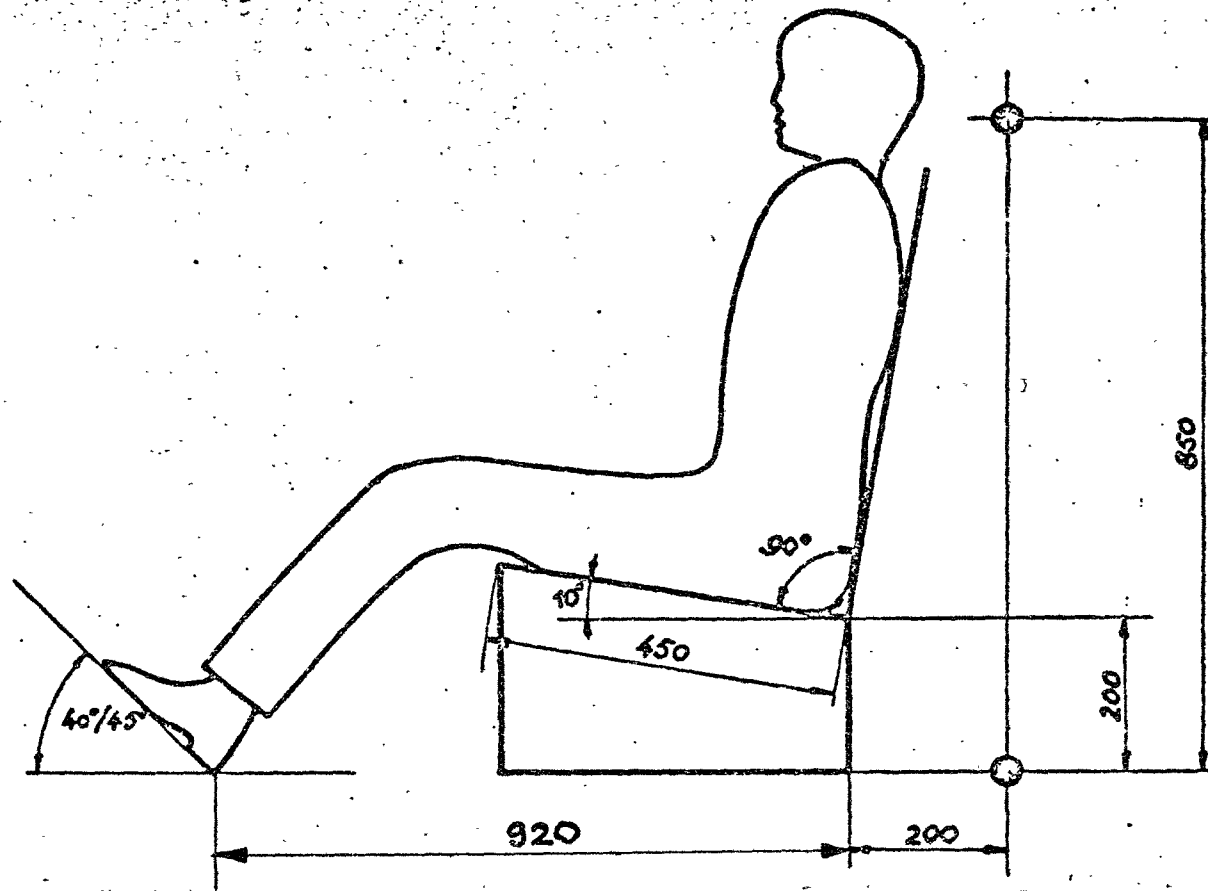
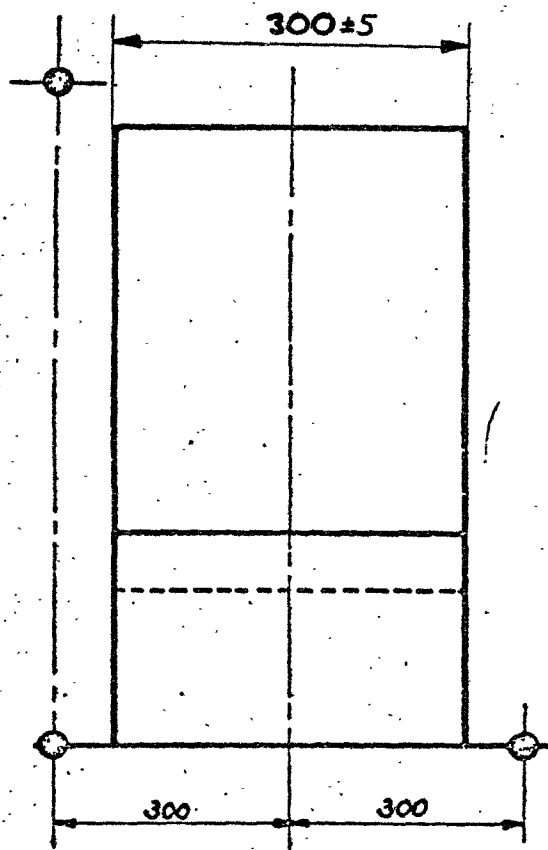
- volume : swelling $< 20 \%$

Immersion in distilled water :

- breaking strength : decrease $< 35 \%$ of R_b

1 week at $70 \text{ }^\circ\text{C}$

- elongation : increase $< 20 \%$ of A_b



Dimensions in mm, tolerance ± 5 mm

Figure 1 : TROLLEY, SEAT , ANCHORAGES

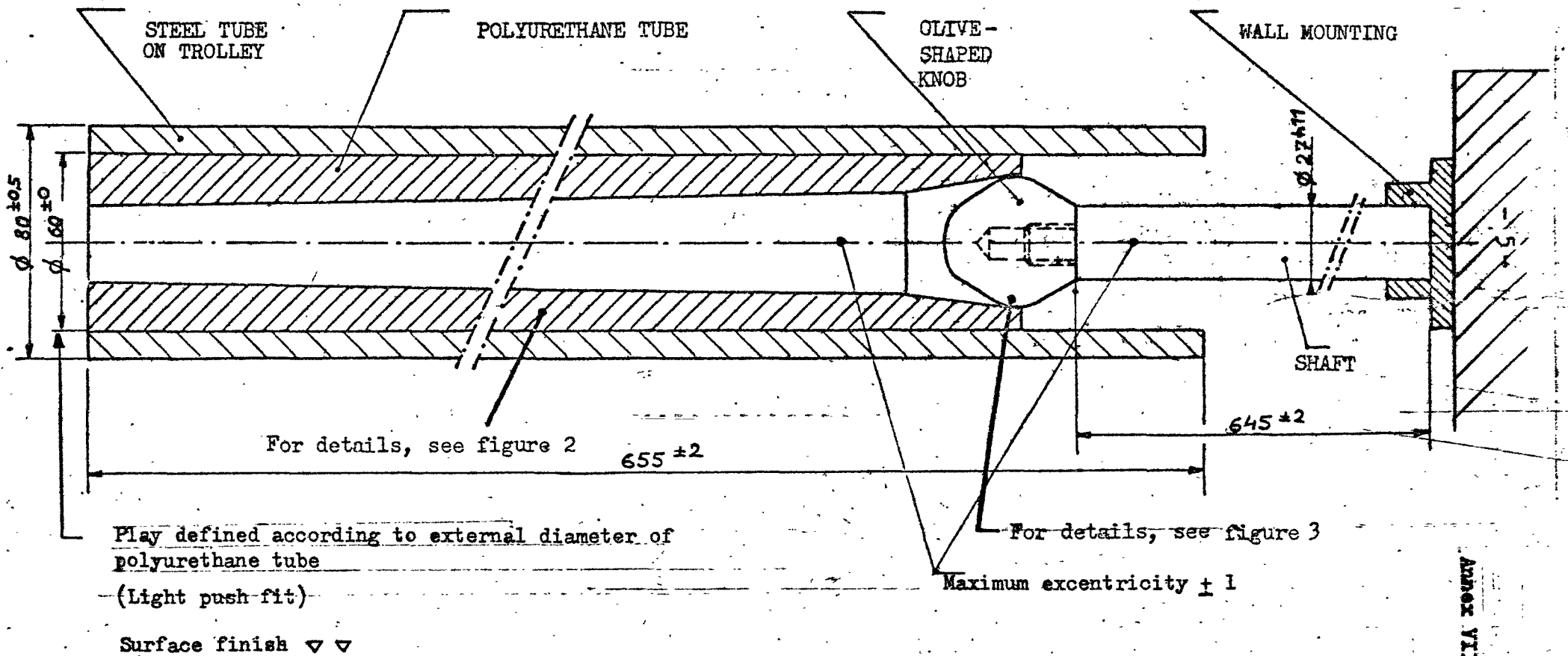
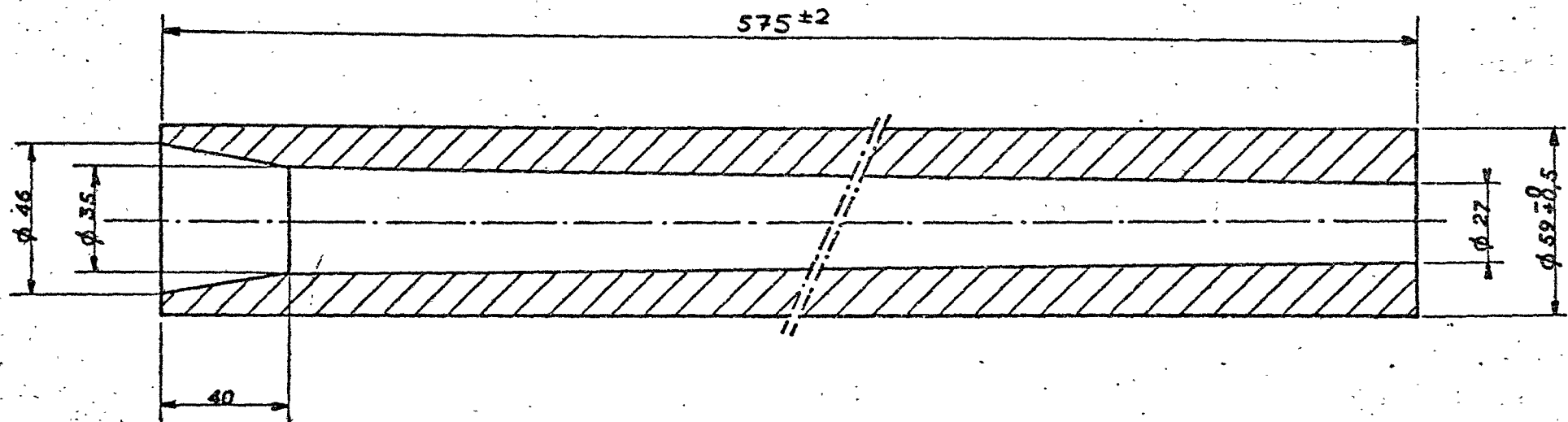


Figure 2 : STOPPING DEVICE (as assembled)

All dimensions in mm

Annex VII

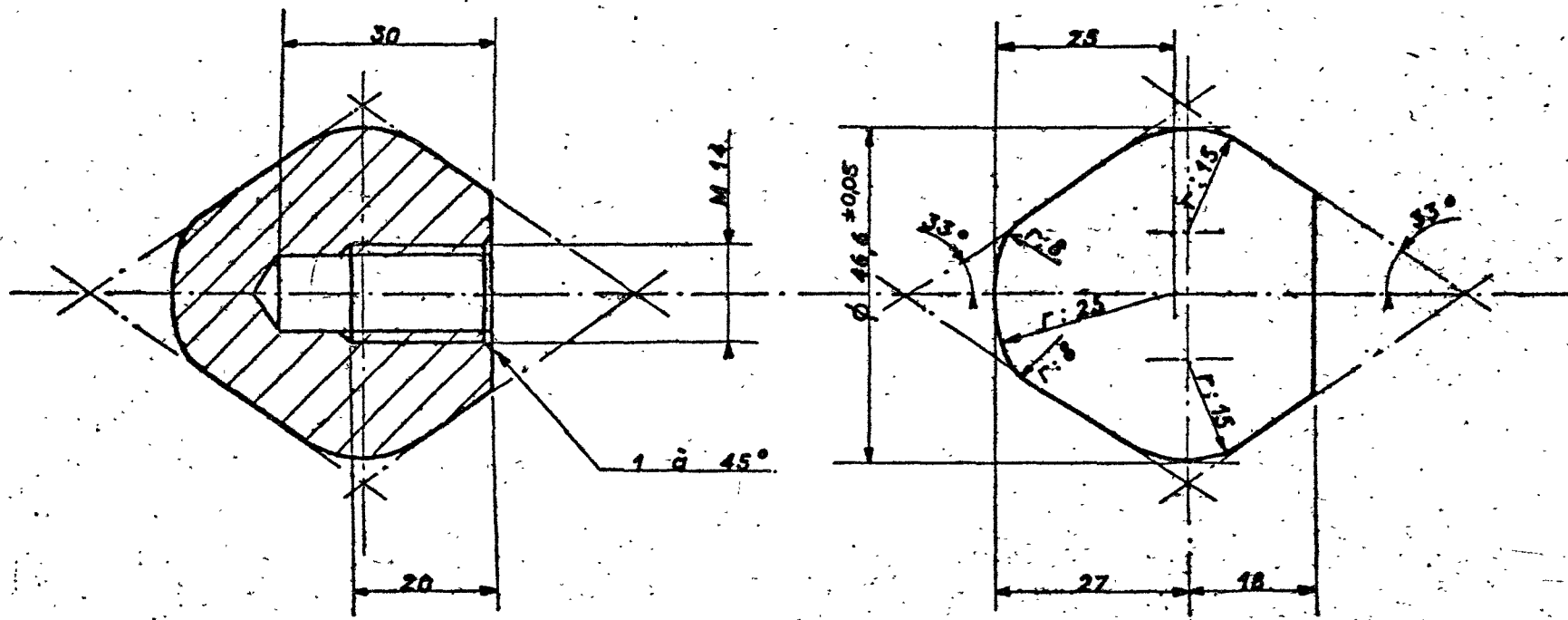


Interference tolerance $\pm 0,2$

Surface finish of maxelril $\nabla \nabla$

Figure 3 : STOPPING DEVICE (Polyurethane tube)

All dimensions in mm



Surface finish $\nabla \nabla \nabla$
 Interference tolerance $\pm 0,1$

Figure 4 : STOPPING DEVICE (Olive-shaped knob)

All dimensions in mm

Annex VIII

DESCRIPTION OF MANIKIN

Specifications of the manikin

1. General

The main characteristics of the manikin are illustrated in the following figures and tables:-

- Fig 1 Side view of head, neck and torso;
- Fig 2 Front view of head, neck and torso;
- Fig 3 Side view of hip, thighs and lower leg;
- Fig 4 Front view of hip, thighs and lower leg;
- Fig 5 Principal dimensions;
- Fig 6 Manikin in sitting position, showing:
 - location of the centre of gravity;
 - location of points at which displacement shall be measured; and
 - shoulder height.

Table 1 References, names, materials and principal dimensions of components of the manikin; and

Table 2 Masses of head, neck, torso, thighs and lower leg.

1.2 Description of the manikin

1.2.1 Structure of the lower leg (see Figures 3 and 4)

The structure of the lower leg consists of three components:

- a sole plate (30);
- a shin tube (29); and
- a knee tube (26).

The knee tube has two lugs which limit the movement of the lower leg in relation to the thigh.

The lower leg can be rotated rearwards 120° from the straight position.

1.2.2 Structure of the thigh (see Figures 3 and 4)

The structure of the thigh consists of three components:

- a knee tube (22);
- a thigh bar (21); and
- a hip tube (20).

Movement of the knee is limited by two cut-outs in the knee tube (22) which engage with the lugs of the lower leg.

1.2.3 Structure of the torso (see Figures 1 and 2)

The structure of the torso consists of:

- a hip tube (2);
- a roller chain (4);
- ribs (6) and (7);
- a sternum (8); and
- chain attachments (3) and at parts (7) and (8).

1.2.4 Neck (see Figures 1 and 2)

The neck consists of seven polyurethane discs (9). The stiffness of the neck can be adjusted by means of a chain tensioner.

1.2.5 Head (see Figures 1 and 2)

The head (15) itself is hollow; the polyurethane form is reinforced by steel plate (17). The chain tensioner by which the neck can be adjusted consists of a polyamide block (10), a tubular spacer (11), and tensioning members (12) and (13). The head can be turned about the Atlas-Axis joint, which consists of the adjuster assembly (14) and (18), the spacer (16), and polyamide block (10).

1.2.6 Knee joint (see Figure 4)

The lower leg and thighs are connected by a tube (27) and a tensioner (28).

1.2.7 Hip joint (see Figure 4)

The thighs and torso are connected by a tube (23), friction plates (24), and tensioner assembly (25).

1.2.8 Polyurethane

Type: PU 123 CH Compound

Hardness: 50-60 Shore A

1.2.9 Overalls

The manikin is covered by a special overall. (see table 1)

2. Correction devices

2.1 General

In order to calibrate the manikin to certain values and its total mass, the mass distribution are adjusted by the use of six correction steel weights each of 1 kg mass which can be mounted at the hip joint. Six polyurethane weights each of 1 kg mass can be mounted in the torso.

3. Cushion

A cushion must be positioned between the chest of the manikin and the overall. This cushion shall be made of polyethylene foam of the following specification:

Hardness: 7-10 shore A

Thickness: 25 mm \pm 5

It shall be replaceable.

4. Adjustment of the joints

4.1 General

In order to achieve reproducible results, it is necessary to specify and control the friction at each joint.

4.2 Knee joint

Tighten the knee joint.

Set the thigh and lower leg vertical

Rotate the lower leg through 30°.

Gradually slacken the tensioner (28) until the lower leg starts to fall under its own mass.

Lock the tensioner in this position.

4.4 Atlas-Axis joint

Adjust the Atlas-Axis joint so that it just resists its own weight in the fore and aft directions.

4.5 Neck

The neck can be adjusted by means of the chain tensioner (13). When the neck is adjusted, the upper end of the tensioner shall displace between 4-6 cm when subjected to a horizontal load of 10 daN.

Table 1

Reference Number	Name	Material	Dimensions
1	Body	polyurethane	-
2	Hip tube	steel	76x70x100 mm
3	Chain attachments	steel	25x10x70 mm
4	Roller chain	steel	3/4 mm
5	Shoulder plane	polyurethane	-
6	Ribs (rolled section)	steel	30x30x3x250 mm
7	Ribs	perforated steelplate	400x85x1.5 mm
8	Sternum	perforated steelplate	250x90x1.5 mm
9	Discs (6)	polyurethane	Ø 90x20 mm Ø 80x20 mm Ø 75x20 mm Ø 70x20 mm Ø 65x20 mm Ø 60x20 mm
10	Block	polyamide	60x60x25 mm
11	Tubular spacer	steel	40x40x2x50 mm
12	Tensioning bolt	steel	M16x90 mm
13	Tensioner nut	steel	M16
14	Tensioner for Atlas-Axis joint	steel	Ø 12x130 mm (M12)
15	Head	polyurethane	-
16	Spacer	steel	Ø 18x13x17 mm
17	Reinforcement plate	steel	30-3-500 mm
18	Tensioner nut	steel	M12
19	Lower legs	polyurethane	-
20	Hip tube	steel	76x70x80 mm
21	Thigh bar	steel	30x30x440 mm
22	Knee tube	steel	52x46x40 mm
23	Hip connecting tube	steel	70x64x250 mm
24	Friction plates (4)	steel	160x75x1 mm
25	Tensioner assembly	steel	M12x320 mm + plates and nuts
26	Knee tube	steel	52x46x160 mm
27	Knee connecting tube	steel	44x39x190 mm
28	Tensioner	steel	Ø 70x4 mm
29	Shin tube	steel	50x50x2x460 mm
30	Sole plate	steel	100x170x3 mm
31	Torso correction weights (6)	polyurethane	mass 1 kg each
32	Cushion	polyethylene foam	350x250x25 mm
33	Overall	cotton and polyamide	
34	Hip joint correction weights (6)	steel	mass 1 kg each

Table 2

Parts of dummy	Mass in kg
Head and neck	4.6 ± 0.3
Torso and arms	40.3 ± 1.0
Thighs	16.2 ± 0.5
Lower leg and foot	9.0 ± 0.5
Total mass including correction weights	74.5 ± 1.0

FIG. 1

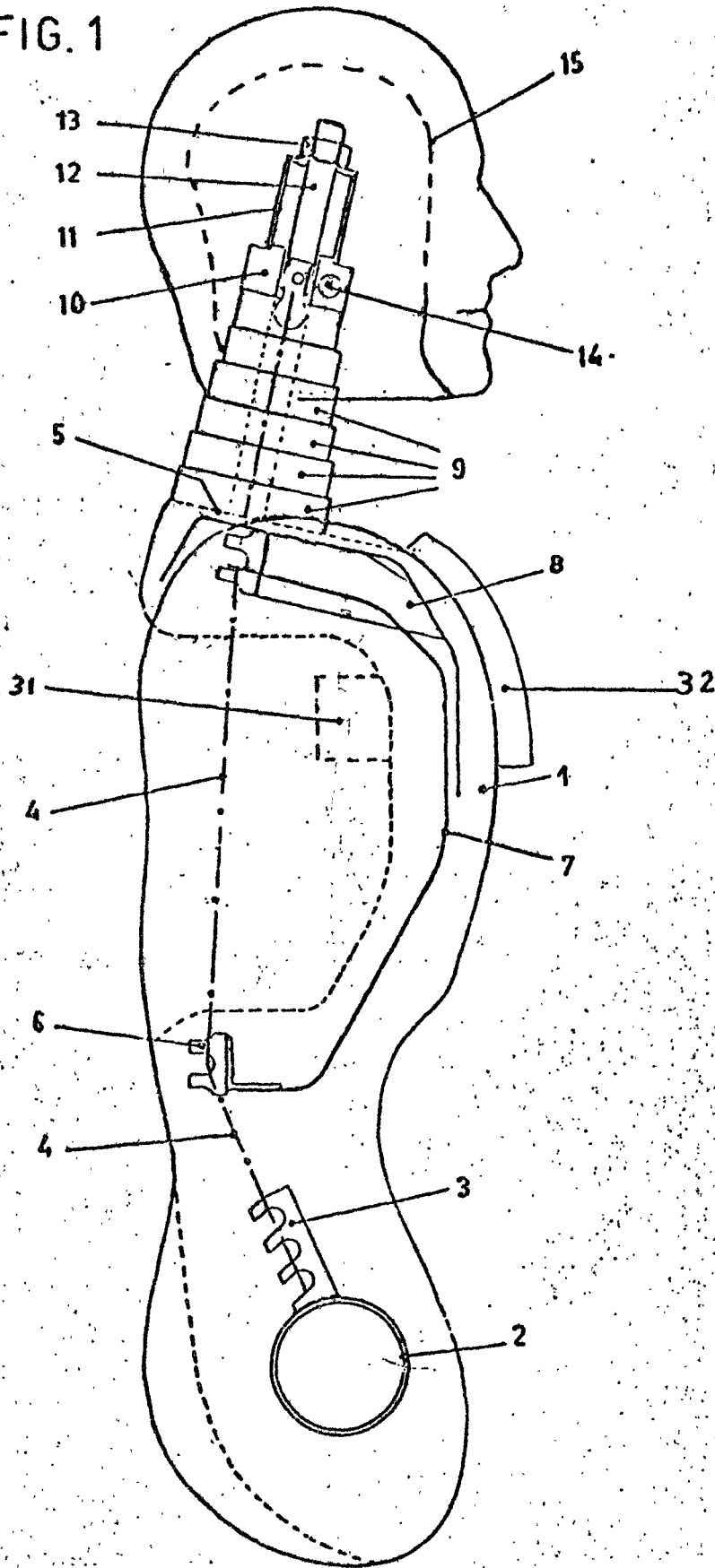
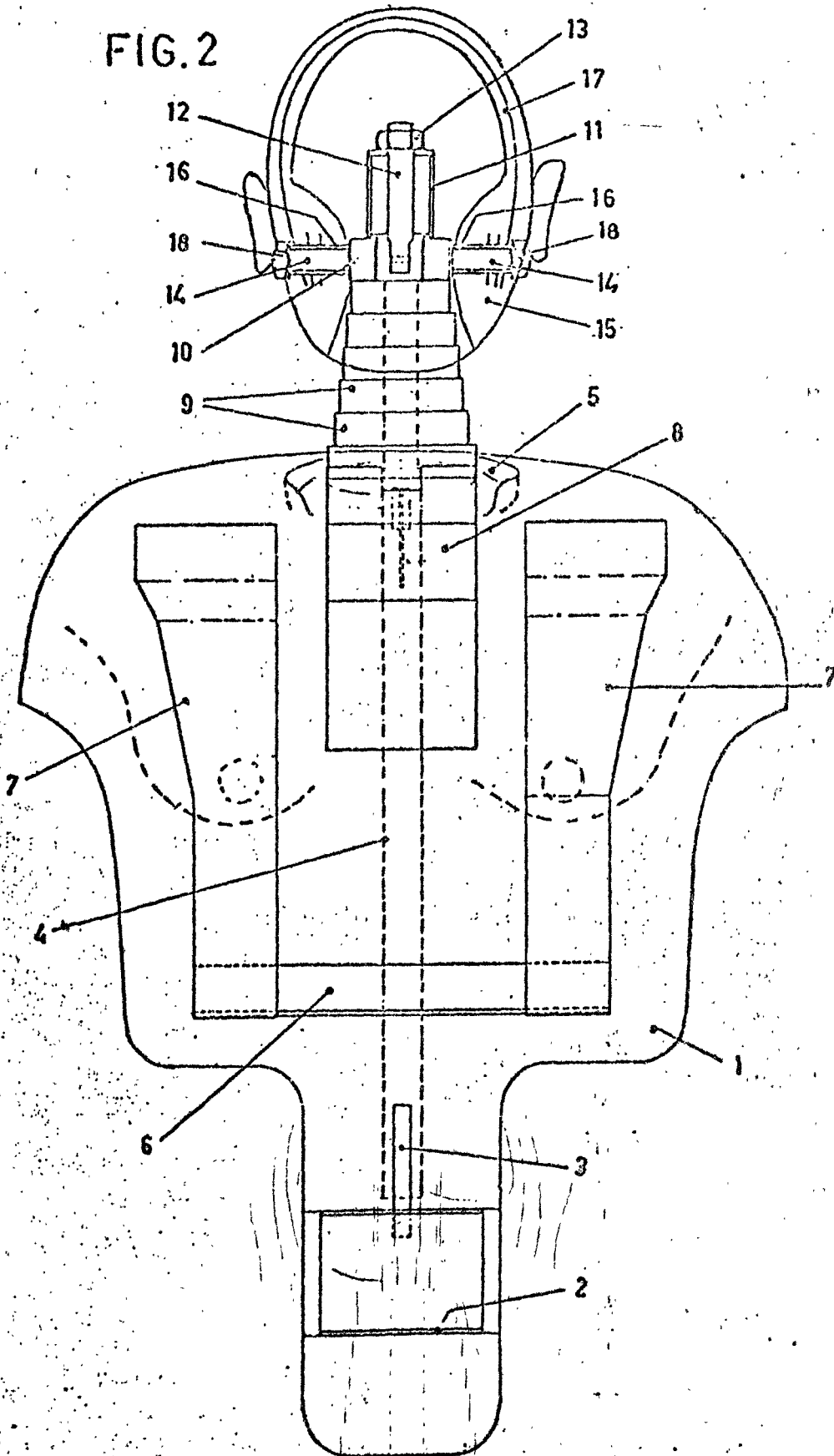


FIG. 2



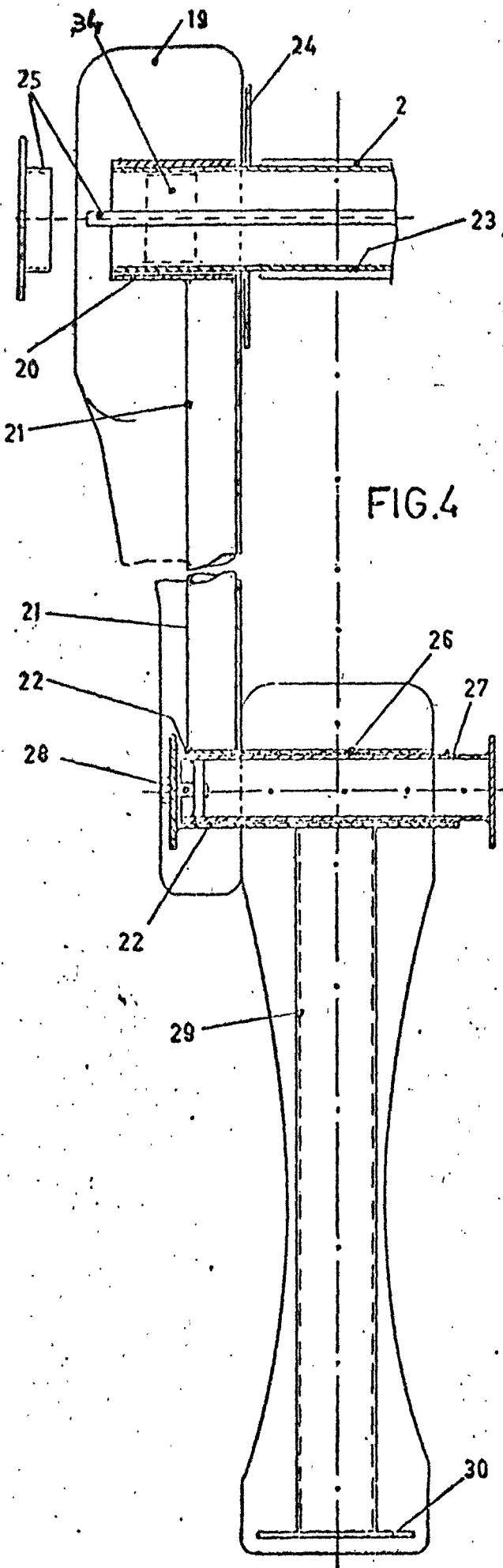


FIG. 4

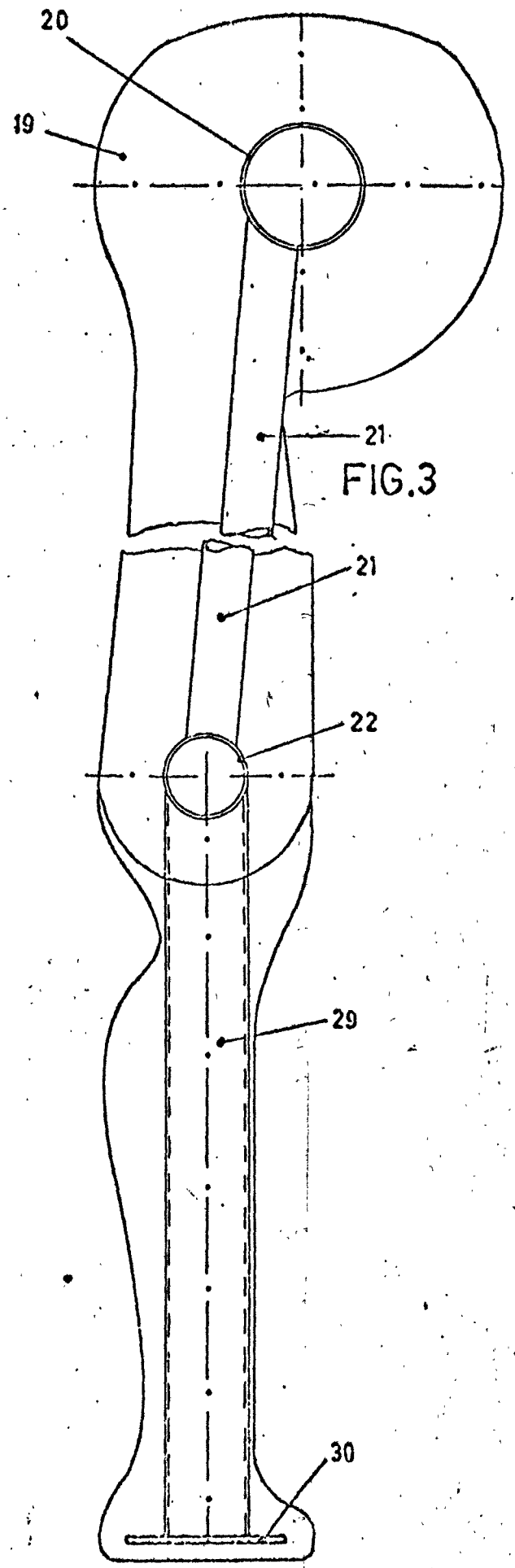


FIG. 3

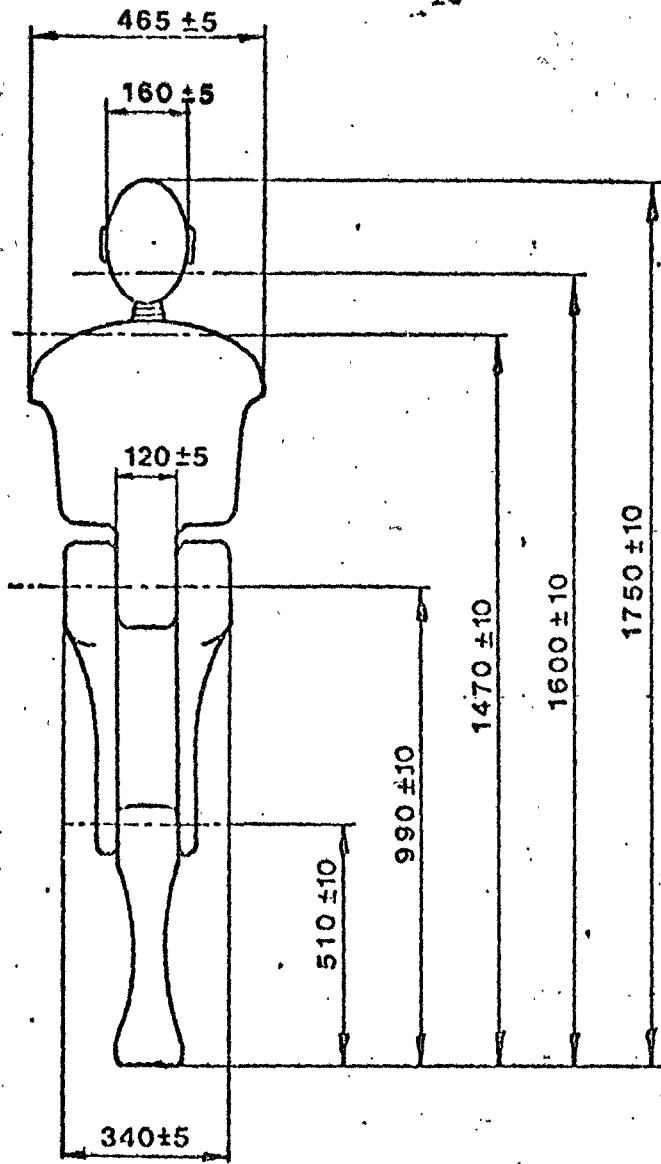


FIG.5

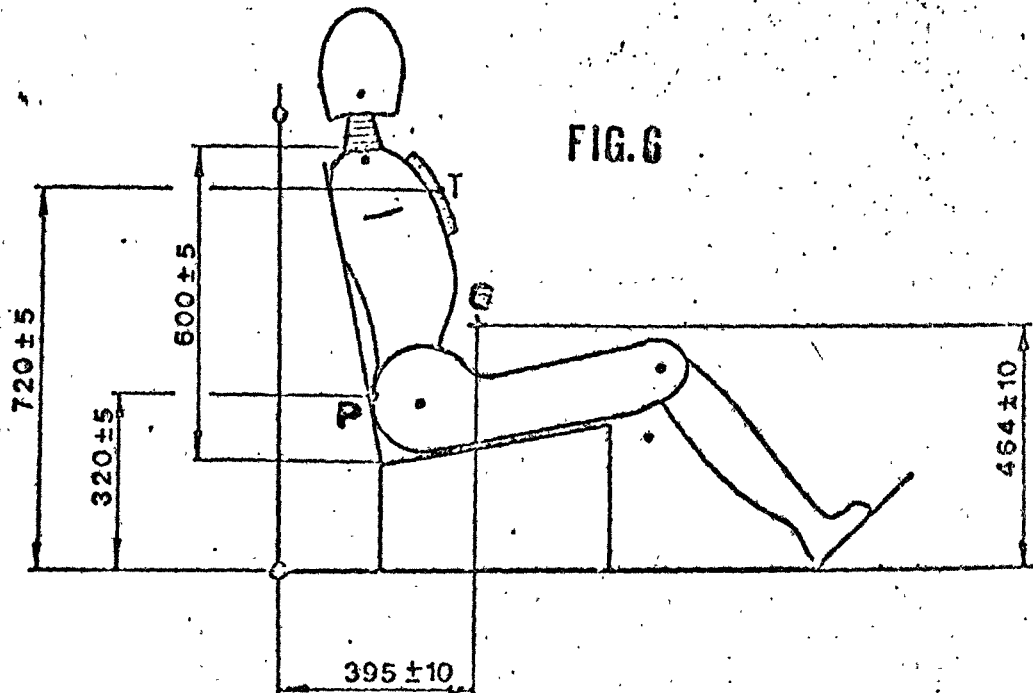


FIG.6

Manikin seated in position shown in Figure 1 of Annex VII

G = Centre of gravity

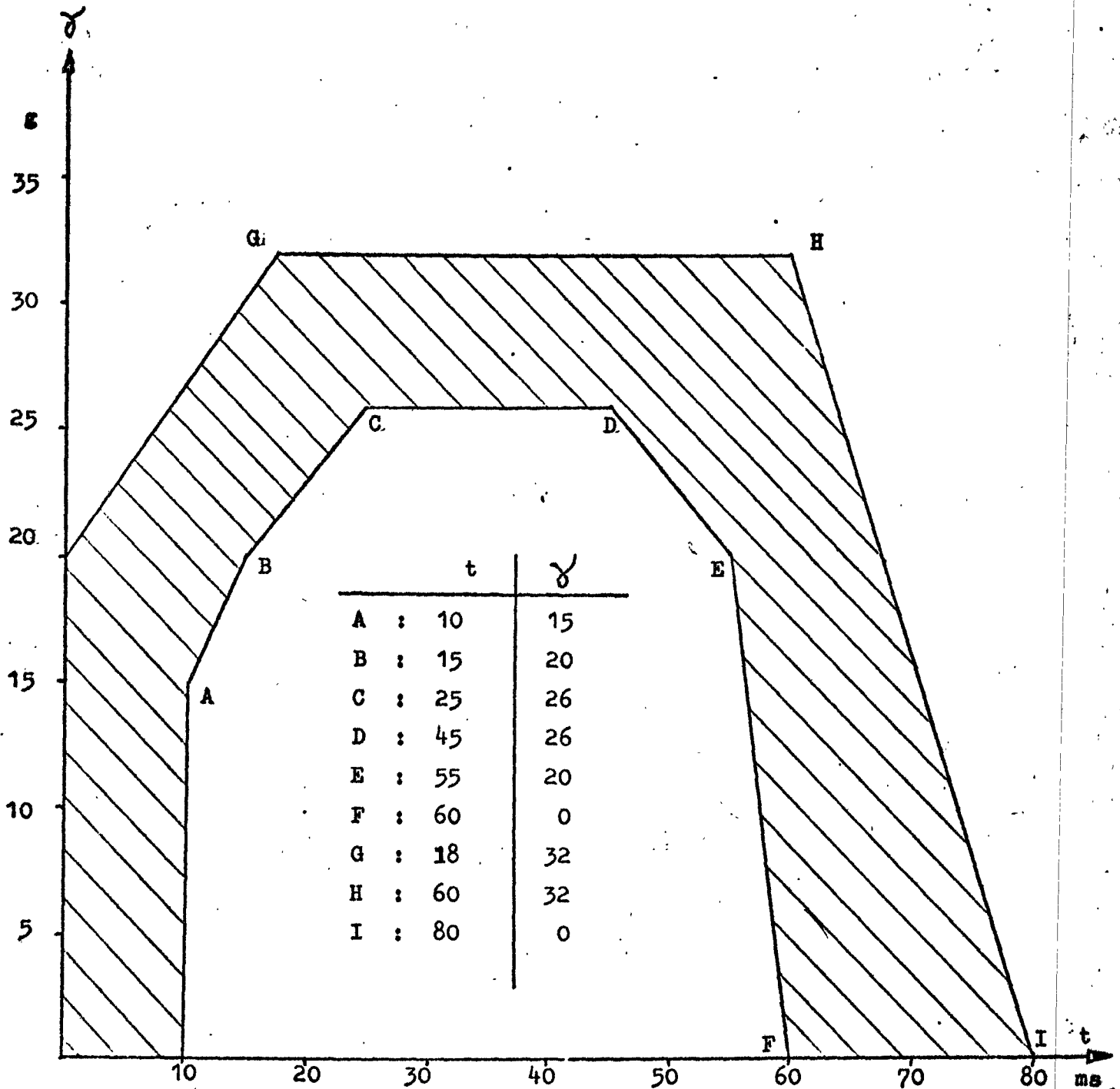
T = Measurement point torso (located at the front on the centre line of the manikin)

P = Measurement point pelvis (located at the back on the centre line of the manikin)

ANNEX IX

DESCRIPTION OF CURVE OF TROLLEY'S DECELERATION
AS FUNCTION OF TIME

(Curve for testing stopping devices)



The deceleration curve of the trolley weighted with inert mass to produce a total weight of $455 \text{ kg} \pm 20 \text{ kg}$ for safety belt tests and $910 \pm 40 \text{ kg}$ for restraint system tests where the nominal mass of the trolley and vehicle structure is 800 kg must remain within

the hatched area above. If necessary, the nominal mass of the trolley and attached vehicle structure can be increased by increments of 200 kg, in which case an additional inert mass of 28 kg per increment shall be added. In no case shall the total mass of the trolley and vehicle structure and inert masses differ from the nominal value for calibration tests by more than ± 40 kg.

In both the above cases the measurement equipment shall have a response which is substantially flat up to 60 Hz with a roll off at 100 Hz. Mechanical resonances associated with transducer mounting should not distort readout data. Consideration should be given to the effect of cable length and temperature on frequency response (1).

(1) These requirements are in accordance with SAE recommended practice J 211 a and will be later substituted by the reference to an ISO standard at present under preparation.

ANNEX X

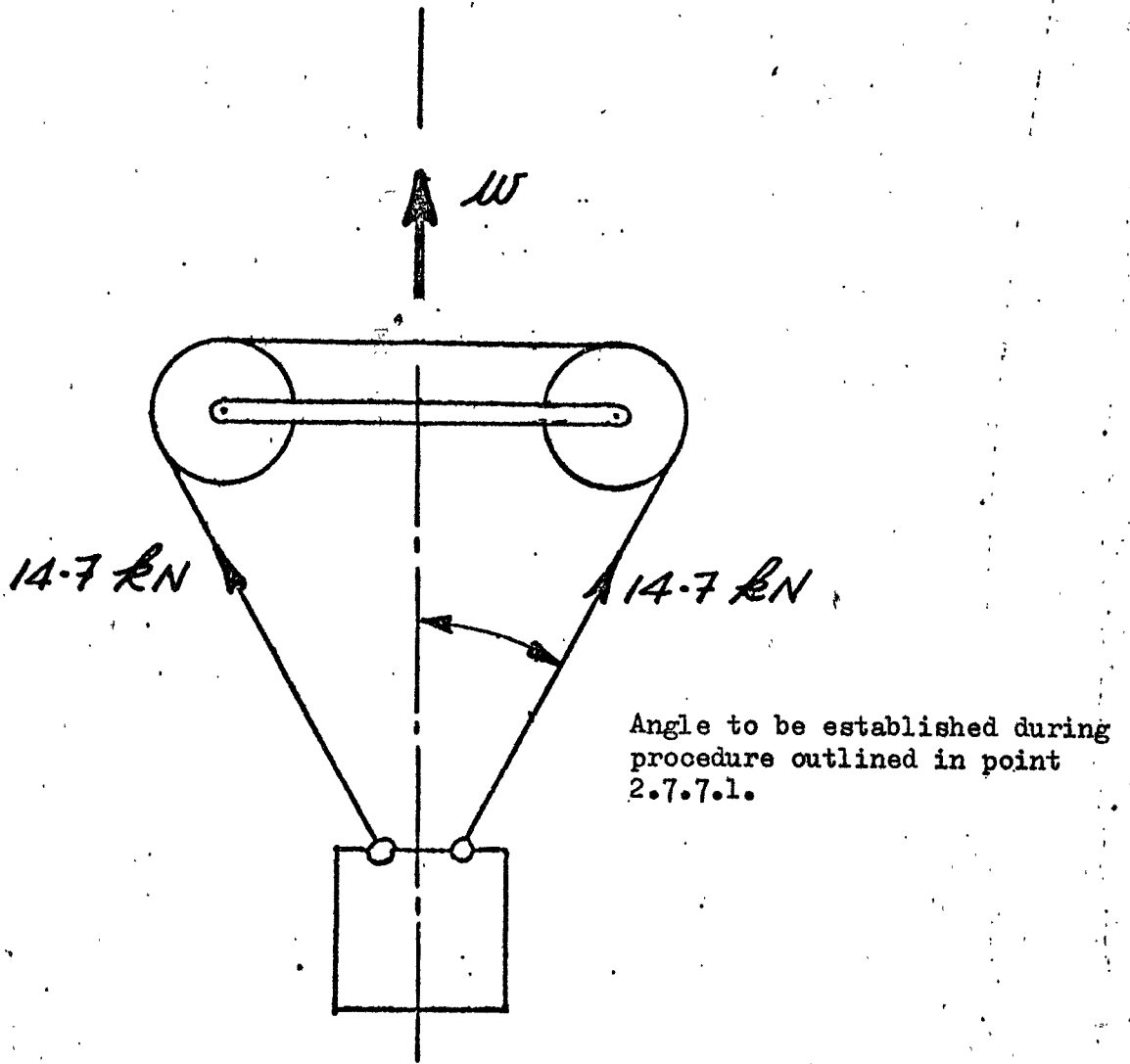
INSTRUCTIONS

Every safety belt shall be accompanied by instructions of the following content or kind in the language or languages of the country in which it is to be placed on sale :

1. Installation instructions (not required if the vehicle manufacturer is to install the safety belt) which specify for which vehicle models the assembly is suitable and the correct method of attachment of the assembly to the vehicle, including a warning to guard against chafing of the straps.
2. User instructions (may be included in the vehicle user's handbook if the safety belt is installed by the vehicle manufacturer) which specify the instructions to ensure that the user obtains the greatest benefit from the safety belt. In these instructions reference shall be made to :
 - a) the importance of wearing the assembly on all journeys;
 - b) the correct manner of wearing the belt and in particular to :
 - the intended location of the buckle;
 - the desirability of wearing belts tightly;
 - the correct positioning of the straps and the need to avoid twisting them;
 - the importance of each belt being used by one occupant only, and especially of not putting a belt around a child seated on the occupants lap.
 - c) the method of operating the buckle;
 - d) the method of operating the adjuster;
 - e) the method of operating any retractor which may be incorporated in the assembly and the method of checking that it locks;
 - f) the recommended methods of cleaning the belt and reassembling it after cleaning where appropriate;
 - g) the need to replace the safety belt when it has been used in a severe accident or shows signs of severe fraying or having been cut;
 - h) the fact that the belt must not be altered or modified in any way since such changes may render the belt ineffective, and in particular where the design permits parts to be disassembled, instructions to ensure correct re-assembly;
 - i) the fact that the belt is intended for use by adult sized occupants.
 - j) the stowage of the belt when not in use.

ANNEX XI

DUAL BUCKLE TEST

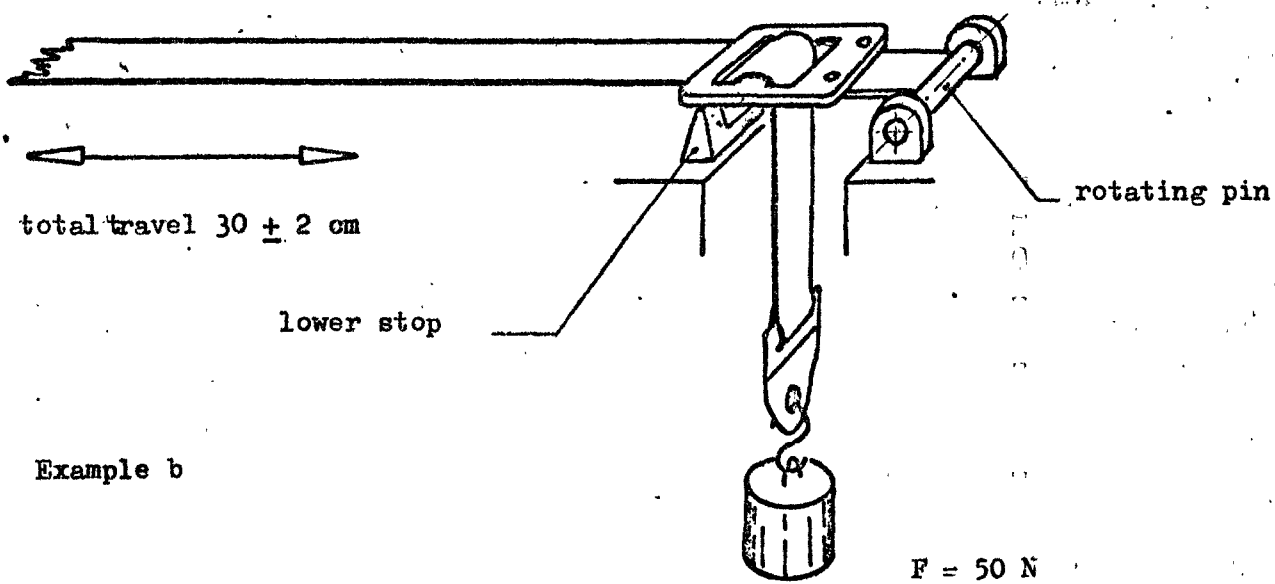
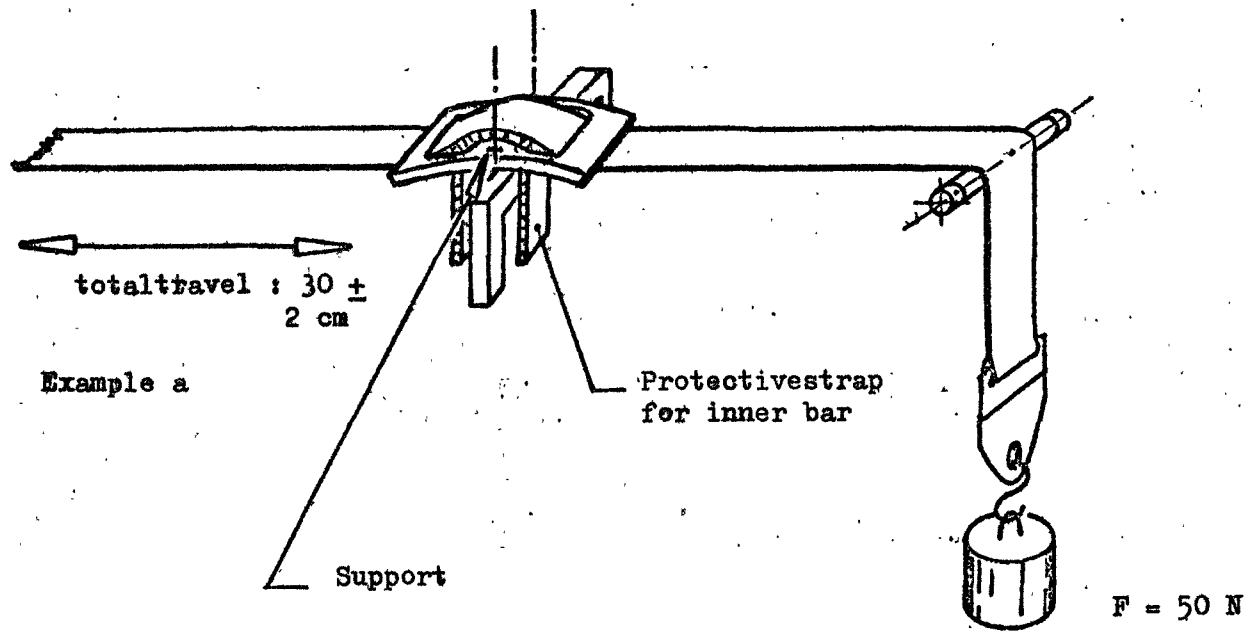


$W =$ applied load

A N N E X XII

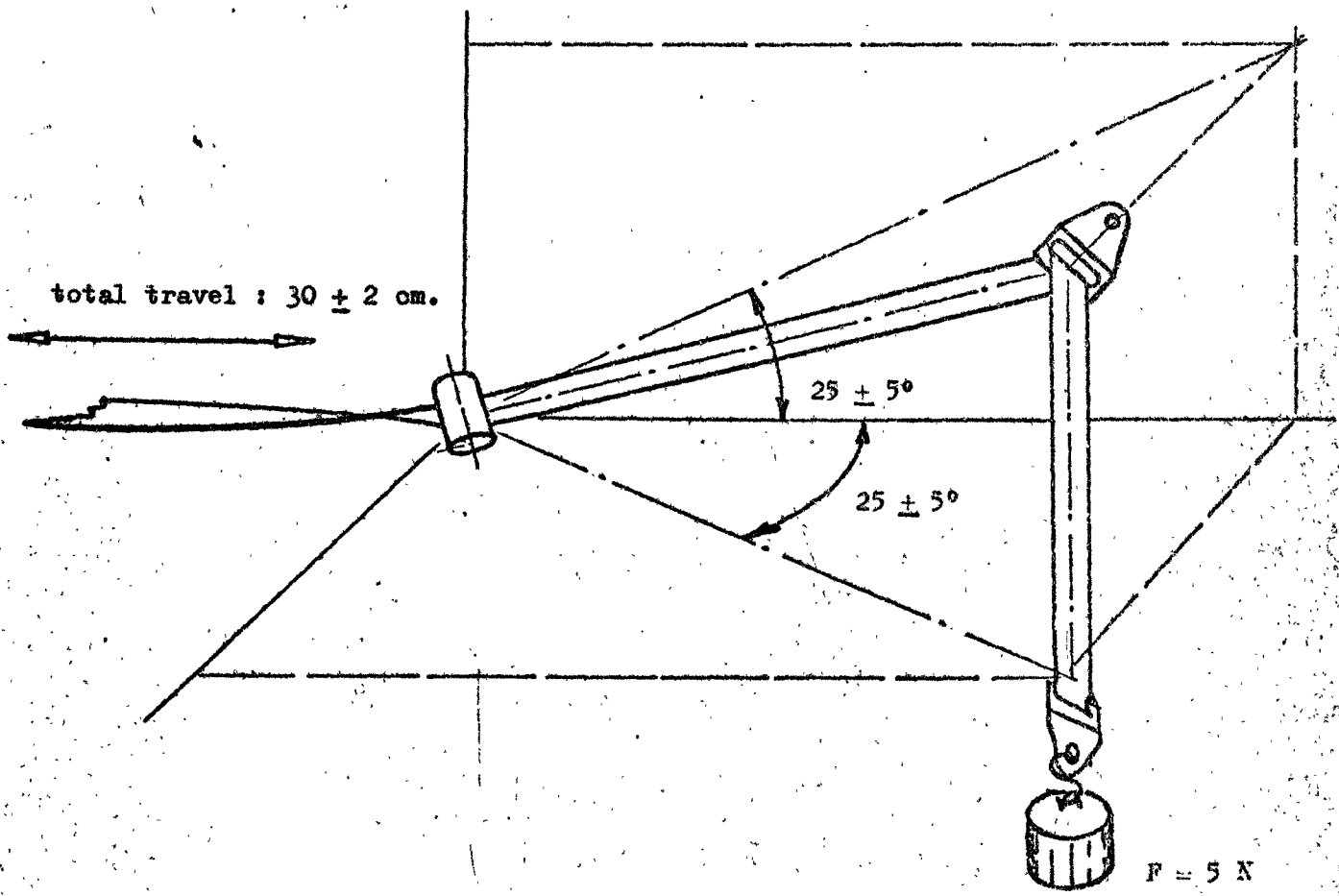
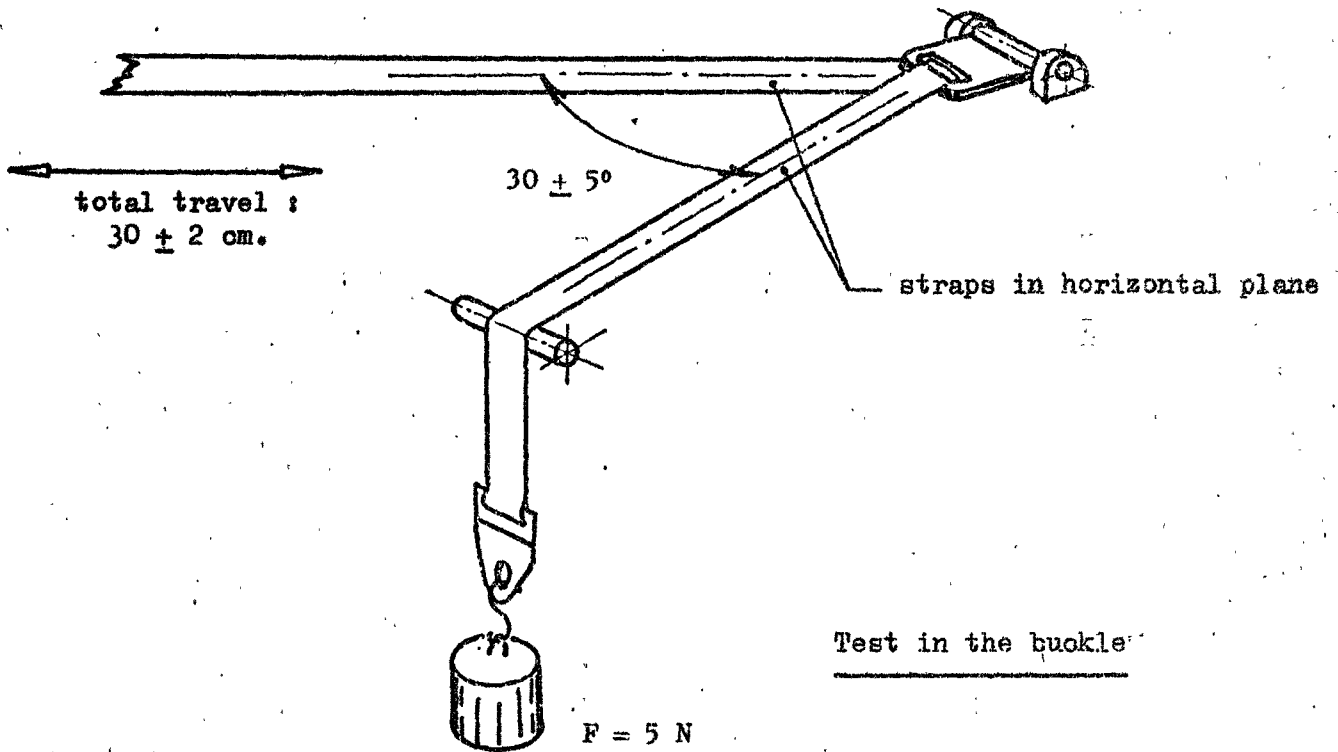
ABRASION AND MICROSLIP TEST

Fig. 1 : TEST TYPE 1



Examples of test arrangements corresponding to the type of adjusting device.

FIG. 2 : TEST TYPE 2



Test in a guide or pulley

ANNEX XIII

Corrosion test

1. Test apparatus

- 1.1. The apparatus shall consist of a mist chamber, a salt solution reservoir, a supply of suitably conditioned compressed air, one or more atomizing nozzles, sample supports, provision for heating the chamber, and necessary means of control. The size and detail construction of the apparatus shall be optional; provided that the test conditions are met.
- 1.2. It is important to ensure that drops of solution accumulated on the ceiling or cover of the chamber do not fall on test samples.
- 1.3. Drops of solution which fall from test samples shall not return to the reservoir for respraying.
- 1.4. The apparatus shall not be constructed of materials that will affect the corrosiveness of the mist.

2. Location of test samples in the mist cabinet

- 2.1. Samples, except retractors, shall be supported or suspended between 15° and 30° from the vertical and preferably parallel to the principle direction of horizontal flow of mist through the chamber, based upon the dominant surface being tested.
- 2.2. Retractors shall be supported or suspended so that the axes of the reel for storing the strap shall be normal to the principle direction of horizontal flow of mist through the chamber. The strap opening in the retractor shall also be facing in this principle direction.

2.3. Each sample shall be so placed as to permit free setting of mist on all samples.

2.4. Each sample shall be so placed as to prevent salt solution from one sample dripping on to any other sample.

3. Salt solution

3.1. The salt solution shall be prepared by dissolving 5 ± 1 parts by mass of sodium chloride in 95 parts of distilled water. The salt shall be sodium chloride substantially free of nickel and copper and containing on the dry basis not more than 0.1 % of sodium iodide and not more than 0.3 % of total impurities.

3.2. The solution shall be such that when atomized at 35° the collected solution is in the pH range of 6.5 to 7.2.

4. Air supply

4.1. The compressed air supply to the nozzle or nozzles for atomizing the salt solution shall be free of oil and dirt, and maintained at a pressure between 70 KN/m^2 and 170 KN/m^2 .

5. Conditions in the mist chamber

5.1. The exposure zone of the mist chamber shall be maintained at $35 \pm 5^{\circ} \text{ C}$. At least two clean mist collectors shall be placed within the exposure zone so that no drops of solution from the test samples or any other sources are collected. The collectors shall be placed near the test samples, one nearest to any nozzle and one furthest from all nozzles. The mist shall be such that for each 80 cm^2 of horizontal collecting areas, there is collected in each collector from 1.0 to 2.0 ml of solution per hour when measured over an average of at least 16 hours.

5.2. The nozzle or nozzles shall be directed or baffled so that the spray does not impinge directly on test samples.

ANNEX XIV
CHRONOLOGICAL ORDER OF TESTS

Relevant Provisions Points	Test	SAMPLES																			
		BELT NO						STRAP SAMPLE NO													
		1	2	3	4	5	6	1 2	3 4	5 6	7 8	9 10									
2.2., 2.3.2., 2.4.1.1., 2.4.2.1., 2.4.2.2., 3.2.3., 2.4.3.1., 2.5.1.1.,	Inspection of assembled belt	X																			
2.4.1.2., 2.7.2.,	Corrosion tests on all rigid parts			X																	
2.4.2.6., 2.7.5.1., 2.7.5.5.,	Strength of buckle			X																	
2.4.3.2., 2.7.5.1.	Strength of adjusting device			X																	
2.4.3.3., 2.7.5.6.,	Ease of adjustment																				
2.4.4., 2.7.5.2.	Strength of attachments			X																	
2.4.2.4., 2.7.5.3.,	Cold operating of buckle	X	X																		
2.4.1.4., 2.4.5.4.,	Cold impact of all rigid parts	X	X																		
2.5.2., 2.7.3.1., 2.7.4.	Strength of strap after room-conditioning									X											
2.5.1.2., 2.7.4.,	Check of strap width									X											
2.5.3., 2.7.4.,	Strength of strap after special conditioning:																				
2.7.3.2.	Light-conditioning										X	X									
2.7.3.3.	cold-conditioning												X	X							
2.7.3.4.	heat-conditioning																X	X			
2.7.3.5	exposure to water																			X	X
2.6.3., 2.7.3.6.	Abrasion					X		X													
2.4.3., 2.7.3.7.	Micro-slip					X		X													
2.4.2.3., 2.7.6.1.	Conditioning of buckle	X	X																		
2.4.2.7., 2.6., 2.7.6., 2.7.7.	Dynamic test of assembled belt	X	X																		
2.4.2.5., 2.4.2.6., 2.7.8	Buckle-opening test	X	X																		
2.4.5.3., 2.7.6.	Durability of retractor				X																

NOTE: In addition, one belt sample is required for reference purposes

THE HISTORY OF THE

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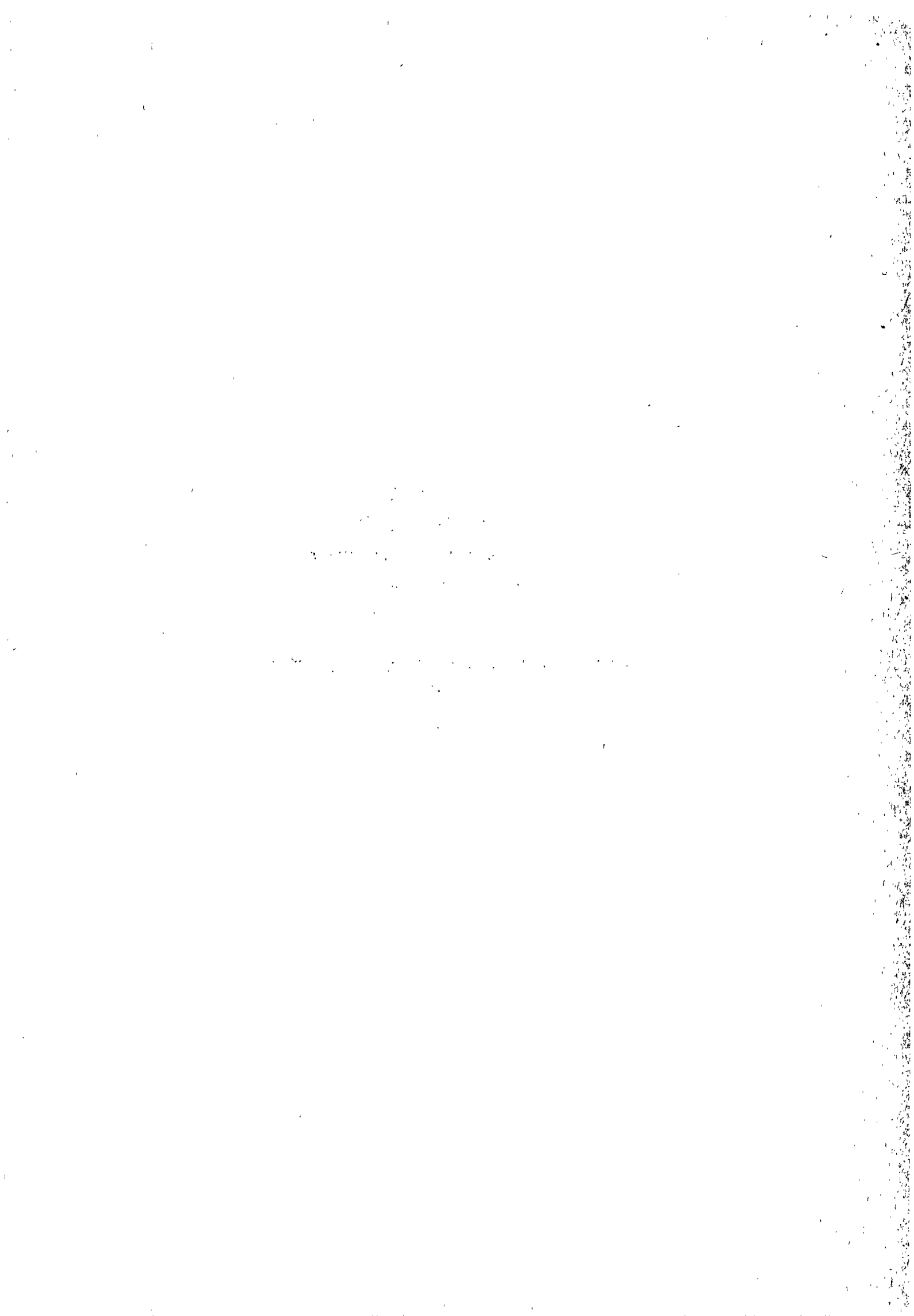
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PROPOSAL
FOR A COUNCIL DIRECTIVE
on the approximation of the laws
of the Member States relating
TO
HEAD RESTRAINTS OF SEATS OF MOTOR VEHICLES



THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Having regard to the Opinion of the Economic and Social Committee;

Whereas the technical requirements which motor vehicles must satisfy pursuant to national laws relate, inter alia, to head restraints;

Whereas these requirements differ from one Member State to another; and whereas there is a consequent need for the same requirements to be adopted by all the Member States, either in addition to or instead of their present regulations, in particular with a view to permitting the operation, in respect of each type of vehicle, of the EEC type-approval procedure instituted by Directive 70/156/EEC of the Council of 6 February 1970 on the approximation of the laws of the Member States relating to the type approval of motor vehicles and their trailers¹;

Whereas the common requirements for the interior of the passenger compartment, the layout of the controls, the roof and backrest and rear part of the seats were determined by Directive 74/60/EEC of the Council of 17 December 1973²; and whereas those for the internal fittings relating to the protection of the driver from the steering mechanism in the event of an impact were determined by Directive 74/297/EEC of the Council of 4 June 1974³; and whereas those relating to the strength of the seats and their anchorages were determined by Directive 74/408/EEC of the Council of July 1974⁴; whereas those relating to anchorages for safety

(1) O.J. n° L 42 of 23 February 1970, p. 1

(2) O.J. n° L 38 of 11 February 1974

(3) O.J. n° L 165 of 20 June 1974

(4) O.J. n° L 221 of 12 August 1974.

belts were determined by Directive /EEC of the Council of 1975; whereas the other requirements relating to safety belts and restraint systems will be determined simultaneously;

Whereas a harmonized type-approval procedure for head restraints will enable each Member State to establish compliance with the common requirements for manufacture and testing and to inform the other Member States accordingly by sending a copy of the type-approval document drawn up in respect of each equipment of this kind; whereas the placing of an EEC type-approval mark on all equipments manufactured in conformity with the approved type obviate the need for technical checking in this respect in the other Member States;

Whereas the approximation of national laws relating to motor vehicles embraces mutual recognition by the Member States of checks carried out by each of them on the basis of the common requirements; whereas such a system if it is to operate properly presupposes that these requirements be applied by all the Member States from the same date;

HAS ADOPTED THIS DIRECTIVE :

(4) O.J. n° L 221 of 12 August 1974

(5) COM(74) 1121 of 22 August 1974

Article 1

1. Each Member State shall approve any type of head-restraint whether integrated or not in the seats of motor vehicles, which satisfies the construction and testing requirements laid down in the Annexes I to V.
2. The Member State which has granted the EEC component type-approval of the head-restraints shall take the measure required in order to verify, in so far as is necessary and if need be in cooperation with the competent authorities in the other Member States, that production models conform to the approved type. Such verification shall be effected by means of spot checks.

Article 2

Member States shall issue to the manufacturer, or to his authorised representative, an EEC component type-approval mark, which shall conform to the model shown in Annex VI, for each type of head-restraint which they approve pursuant to Article 1.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between head-restraints which have been type-approved pursuant to Article 1 and other head-restraints.

Article 3

1. No Member State may prohibit the placing on the market of head-restraints on grounds relating to their construction or method of functioning if they bear the EEC component type-approval mark.
2. Nevertheless, this provision shall not prevent a Member State from taking such measure in respect of head-restraints bearing the EEC component type-approval mark which, by their design, do not conform to the approved prototype.

That State shall inform the other Member States and the Commission forthwith of the measures taken, specifying the reasons for its decision.

Article 4

The competent authorities of each Member State shall within one month send to the competent authorities of the other Member States a copy of the component type-approval certificates completed for each type of head-restraint which they approve or refuse to approve.

Article 5

1. If the Member State which has granted EEC component type-approval finds that a number of head-restraints bearing the same component type-approval mark do not conform to the type which it has approved, it shall take the necessary measures to ensure that production models conform to the approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken, which may, where necessary, extend to withdrawal of EEC component type-approval. The said authorities shall take the same measures if they are informed by the competent authorities of another Member State of such failure to conform.
2. The competent authorities of Member States shall inform each other within one month of any withdrawal of EEC component type-approval, and of the reasons for such measure.

Article 6

All decision taken pursuant to the provisions adopted in implementation of this Directive which refuse or withdraw component type-approval for a head-restraint or prohibit its sale or use shall set out in detail the reasons on which they are based. A decision shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the law in force in the Member States and of the time limits allowed for the exercise of such remedies.

Article 7

No Member State may refuse to grant EEC type-approval or national type-approval of a vehicle on grounds relating to head-restraints if these bear the EEC component type-approval mark and are intended for installation in the type of vehicle submitted for approval.

Article 8

No Member State may refuse or prohibit the sale, registration, entry into service or use of any vehicle on grounds relating to head-restraints, whether integral or not, if these bear the EEC component type-approval mark and are intended for installation in the type of vehicle submitted for approval.

Article 9

For the purposes of this Directive, "vehicle" means any motor vehicle of category M1 (as defined in Annex I of the Council Directive 70/156/EEC) intended for use on the road having at least four wheels, and a maximum design speed exceeding 25 Km/h.

Article 10

The amendments necessary for adjusting the dispositions of this Directive so as to take account of technical progress shall be drawn up in accordance with the procedure laid down in Article 13 of the Council Directive 70/156/EEC of 6 February 1970 concerning the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.

Article 11

1. The Member States shall adopt and publish the provisions needed in order to comply with this Directive before 1 April 1976 and shall forthwith inform the Commission thereof.

They shall apply such measures with effect from 1 July 1976.

2. As soon as this Directive has been notified, the Member States take care to inform the Commission in sufficient time to enable it to submit its comments, of any draft laws, regulations or administrative provisions which they intend to adopt in the field covered by this Directive.

Article 12

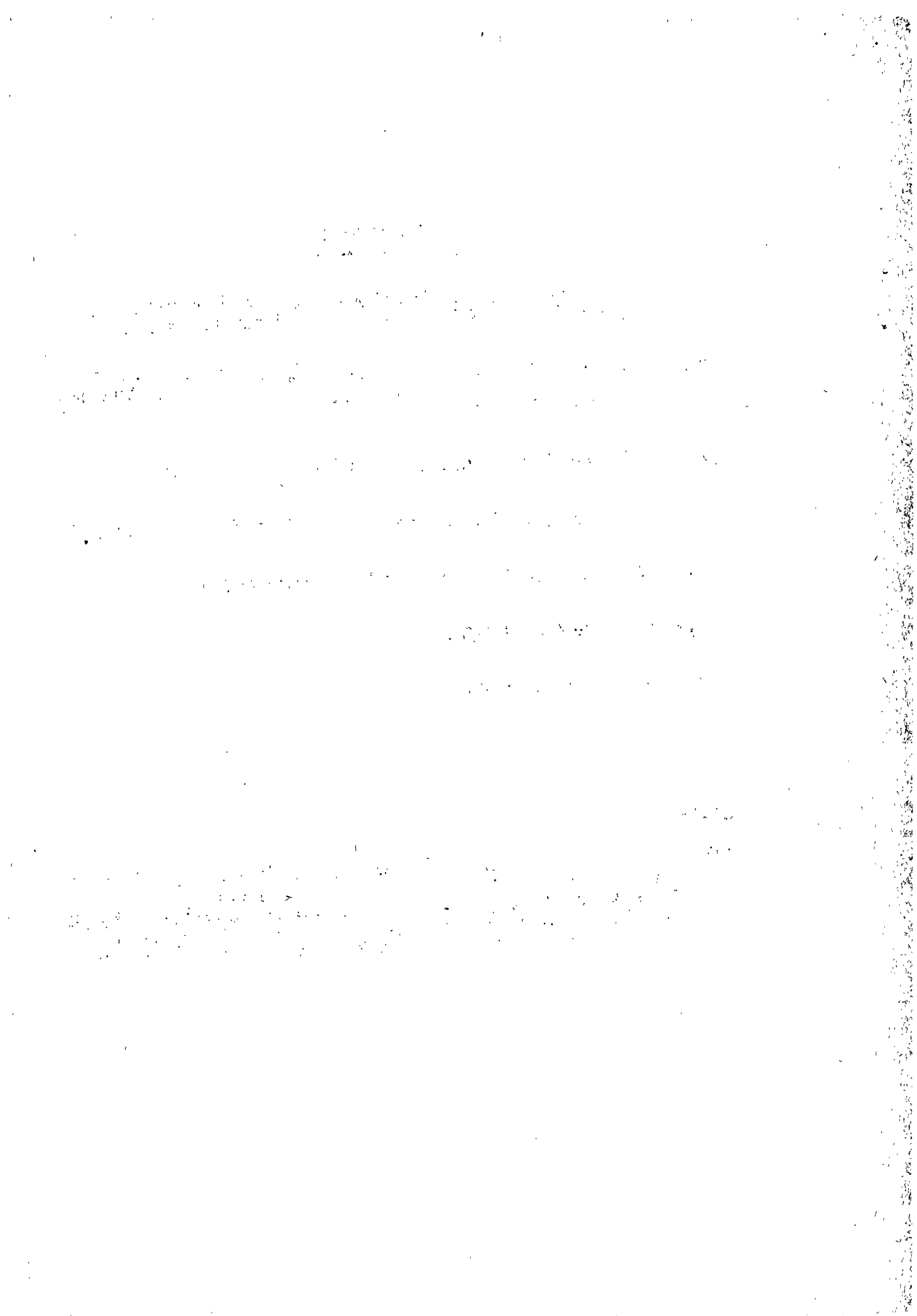
This Directive is addressed to the Member States.

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LIST OF ANNEXES

- I. SCOPE, DEFINITIONS, APPLICATION FOR EEC TYPE-APPROVAL, GENERAL SPECIFICATIONS, TESTS AND CONFORMITY OF PRODUCTION MODELS (°)
- II. PROCEDURE FOR DETERMINING THE H POINT AND THE ACTUAL SEAT-BACK ANGLE AND FOR VERIFYING THEIR RELATIONSHIP TO THE R POINT AND THE DESIGN SEAT BACK ANGLE.
- III. DETERMINATION OF HEIGHT AND WIDTH OF HEAD RESTRAINTS (°)
- IV. DETAILS OF THE LINES DRAWN AND MEASUREMENTS TAKEN DURING TEST. (°)
- V. TEST PROCEDURE FOR CHECKING ENERGY DISSIPATION. (°)
- VI. EEC TYPE-APPROVAL MARK.
- VII. EEC TYPE-APPROVAL FORM.

(°) The requirements of this Annex correspond to the similar requirements of regulation n 25 of the Economic Commission for Europe (E/ECE/324/E/ECE/TRANS/505-Rev 1/Add 24), thus respecting the breakdown into items. When an item of this Regulation has no counterpart in this Directive its number is given in brackets as a token entry.



ANNEX I

SCOPE, DEFINITIONS, APPLICATION FOR EEC TYPE-APPROVAL GENERAL SPECIFICATIONS, TESTS AND CONFORMITY OF PRODUCTION MODELS

1. SCOPE

- 1.1. The present Directive applies to head restraints (head rests)
- forming an integral part of the seat back, or
- designed to be installed on the seat
of motor vehicles conforming to the definition given in Article 9
and intended for separate use, i.e. as individual equipment by
adult occupants of forward facing seats.

2. DEFINITIONS

For the purposes of this Directive

- 2.1. "vehicle type as regards head-restraints" means a category of power-driven vehicles which do not differ in such essential respects as :
- 2.1.1. the lines and internal dimensions of the bodywork constituting the passenger compartment, and
- 2.1.2. the types and dimension of the seats;
- 2.2. "head restraint" means a device whose purpose is to limit the rearward displacement of the occupant's head in relation to his torso in order to reduce the danger of injury to the cervical vertebrae in the event of an accident. This device may or may not be integral with the seat back;
- 2.3. "type of seat" means a category of seats which do not differ in their dimensions, in their framework or in their padding, although they may differ in finish and colour;
- 2.4. "type of head-restraint" means a category of head-restraint which do not differ in their dimensions, in their framework or in their padding, although they may differ in finish, in finish, in colour and in covering;
- 2.5. "reference point of the seat" ("H point") (see annex 2) means the trace, in a vertical plane longitudinal in relation to the seat, of the theoretical axis of rotation between the leg and the torso of a human body represented by a manikin.

- 2.6 "reference line" means a straight line which either on a test manikin having the weight and dimensions of an average 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. On the manikin referred to in Annex II, item 3, to this Directive, for determining the H point of the seat, the reference line is that shown in fig. 1 in the appendix to annex III of the Council Directive of 1 March 1971 concerning the approximation of the laws of the Member States relating to motor-vehicle rear-view mirrors;(*)
- 2.7. "head line" means a straight line passing through the centre of gravity of the head and through the joint of the neck with the thorax. When the head is at rest the head line is situated in the extension of the reference line.
3. APPLICATION FOR EEC TYPE-APPROVAL
- 3.1. The application for EEC Type-approval shall be submitted by the holder of the trade name or mark of the seat or the head-restraint or by his authorised representative.
- 3.2. It shall be accompanied by the undermentioned documents in triplicate:
- 3.2.1. a detailed description of the head-restraint, specifying in particular the nature of the padding material or materials and, where applicable, the position and specifications of the braces and anchorage pieces for the type or types of seats for which approval of the head-restraint is sought;
- 3.2.2. a detailed description of the type or types of seats for which approval of the head-restraint is sought;
- 3.2.3. particulars identifying the type or types of vehicle on which the seats referred to in item 3.2.2. above are intended to be fitted;
- 3.2.4. dimensioned drawings of the characteristic parts of the seat and the head-restraint.
- 3.3. The following shall be submitted to the technical authority responsible for conducting the approval tests:
- 3.3.1. if the head restraint is integral with the seat, four complete seats;
- 3.3.2. if the head restraint is intended to be firmly anchored to the seat:

(*) See O.J. No. L68, 12 March 1971 page 16

- 3.3.2.1. two seats of each of the types to which the head-restraint is to be fitted;
- 3.3.2.2. $4 + 2N$ head-restraints, N being the number of types of seat to which the head-restraint is to be fitted.
- 3.4. The technical authority responsible for conducting the approval tests may request:
 - 3.4.1. the delivery to that authority of specific parts, or of specific samples of the materials used; and/or
 - 3.4.2. the production to that authority of vehicles of the type or types referred to in item 3.2.3. above.

4. MARKINGS

- 4.1. The devices submitted for approval shall:
 - 4.1.1. be clearly and indelibly marked with the trade name or mark of the applicant for approval;
 - 4.1.2. provide adequate space on the lateral face for the approval mark; the aforesaid space shall be shown in the drawings referred to in item 3.2.4. above.
- 4. 2. Where the head restraint is integral with the seat, the marking referred to in items 4.1.1. and 4.1.2. above shall be placed on the part of the seat which is used as a head-restraint.

(5.)

6. GENERAL SPECIFICATIONS

- 6.1. The presence of the head-restraint shall not be an additional cause of danger to occupants of the vehicle. In particular it shall not in any position of use exhibit any dangerous roughness or sharp edge liable to increase the risk or seriousness of injury to the occupants. Parts of the head-restraint which are situated in the impact zone defined below shall be capable of dissipating energy in the manner specified in annex V to this Directive.
 - 6.1.1. The impact zone is bounded laterally by two vertical longitudinal planes, one on each side of and each 70 mm distant from the plane of symmetry of the seat considered;

.../...

- 6.1.2. the impact zone is limited in height to the part of the head-restraint situated above the plane perpendicular to the reference line R and 635 mm distant from the H point.
- 6.2. Parts of the front and rear faces of the head-restraint which are situated outward of the said longitudinal vertical planes shall be so padded as to prevent any direct contact of the head with the components of the structure, which latter shall in those areas have a radius of curvature of not less than 5 mm.
- 6.3. The head-restraint shall be anchored to the seat in such a way that no rigid and dangerous part projects from the padding of the head-restraint, from the anchorage or from the seat back as a result of the pressure exerted by the head during the test.
- 6.4. The height of the head-restraint, measured as prescribed in item 7.2. below, shall be not less than 700 mm above the reference point of the seat.
- 6.5. The height of the device on which the head rests, measured as prescribed in item 7.2., shall in the case of a head-restraint adjustable for height be not less than 100 mm.
- 6.6. There shall be no gap of more than 50 mm between the seat back and the head restraint in the case of a device not adjustable for height. If the head-restraint is adjustable for height it shall when in the low position be not more than 25 mm from the top of the seat back.
- 6.7. The width of the head-restraint shall be such as to provide suitable support for the head of a person normally seated. In the plane of measurement of width defined in item 7.3. below, the head-restraint shall cover an area extending not less than 85 mm to each side of the plane of symmetry of the seat for which the head-restraint is intended, that distance being measured as prescribed in item 7.3.
- 6.8. The head restraint and its anchorage shall be such that the maximum backward displacement of the head permitted by the head-restraint and measured in conformity with the static procedure prescribed in item 7.4. below is less than 102 mm.
- 6.9. The head-restraint and its anchorage shall be strong enough to bear without failure the load prescribed in item 7.4.3.7. below.

7. TESTS

7.1. Determination of the reference point (H point) of the seat in which the head restraint is incorporated

This point shall be determined in conformity with the requirements of Annex II to this Directive.

7.2. Determination of the height of the head restraint

7.2.1. All lines shall be drawn in the plane of symmetry of the seat considered, the intersection of which plane with the seat determines the contour of the head-restraint and of the seat-back (see Annex III fig. 1).

7.2.2. The manikin corresponding to an average adult male or the manikin referred to in Annex II, item 3 shall be placed in a normal position on the seat. The seat-back, if inclinable shall be locked in a position corresponding to a rearward inclination of the reference line of the manikin's torso of as nearly as possible 25° from the vertical.

7.2.3. The projection of the reference line of the manikin referred to in Annex II, item 3 shall in the case of the seat considered be drawn in the plane specified in item 7.2.1. The tangent S to the top of the head-restraint shall be drawn perpendicular to the reference line.

7.2.4. The distance h from the H point to the tangent S is the height to be taken into consideration in implementing the requirement of item 6.4.

7.3. Determination of the width of the head - restraint (see Annex III, fig. 2).

7.3.1. The plane S_1 perpendicular to the reference line and situated 65 mm below the tangent S defined in item 7.2.3. defines a section in the head restraint bounded by the outline C. The direction of the straight lines tangential to C representing the intersection of the vertical planes (P and P'), parallel to the plane of symmetry of the seat considered, with the plane S_1 shall be drawn in the plane S_1 .

7.3.2. The width of the head-restraint to be taken into consideration in implementing the requirement of item 6.7. is the distance L separating the projections of planes P and P' and plane S_1 .

7.3.3. The width of the head-restraint shall if necessary also be determined 635 mm above the reference point of the seat, this distance being measured along the reference line.

7.4. Determination of the effectiveness of the device

7.4.1. The effectiveness of the head-restraint shall be checked by the static test described below.

7.4.2. Preparation for the test

7.4.2.1. If the head-restraint is not integrated in the seat it shall be set in the highest position.

.../...

7.4.3. Testing

- 7.4.3.1. All lines shall be drawn in the vertical plane of symmetry of the seat considered (see Annex IV).
- 7.4.3.2. A projection of the reference line R shall be drawn in the plane referred to in item 7.4.3.1.
- 7.4.3.3. The displaced reference line R_1 shall be determined by applying to the part simulating the back in the manikin referred to in Annex II an initial force producing a rearward moment of 37,3. mdaN about the H point.
- 7.4.3.4. By means of a spherical head 165 mm in diameter an initial force producing a moment of 37,3.mdaN about the H point shall be applied at right angles to the displaced reference line R_1 at a distance of 65 mm below the top of the head-restraint.
- 7.4.3.5. The tangent Y to the spherical head, parallel to the displaced reference line R_1 , shall be determined.
- 7.4.3.6. The distance X between the tangent Y and the displaced reference line R_1 shall be measured. The requirement of item 6.8. shall be deemed to be met if the distance X is less than 102 mm.
- 7.4.3.7. The initial load prescribed in item 7.4.3.4. shall be increased to 89 daN unless breakage of the seat or its back occurs earlier.

8. CONFORMITY OF PRODUCTION MODELS

(8.1.)

(8.2.)

(8.3.)

8.4. Head-restraints selected for verification of conformity with an approved type shall undergo the test described in item 7.

(9.)

10. INSTRUCTIONS

The manufacturer shall supply, with each model conforming to a type of head-restraint approved, particulars of the types and characteristics of the seats for which the head-restraint is approved and eventually the necessary indications for the correct adaptation of the head-restraint to seats by the person using it.

ANNEX II

PROCEDURE FOR DETERMINING THE "H" POINT AND THE ACTUAL SEAT-BACK ANGLE AND VERIFYING THEIR RELATIONSHIP TO THE "R" POINT AND THE DESIGN SEAT-BACK ANGLE

1. DEFINITIONS

- 1.1. The "H" point, which indicates the position of a seated occupant in the passenger compartment, is the point of intersection of the vertical plane of symmetry of a human body, as represented by the manikin referred to in item 3 below, and the theoretical axis of rotation between the legs and the torso of that body.
- 1.2. The "R" point or "seating reference point" is the reference point specified by the manufacturer which
 - 1.2.1. has co-ordinates determined in relation to the vehicle structure;
 - 1.2.2. corresponds to the theoretical position of the point of torso/legs rotation ("H" point) for the lowest and most rearward normal driving position or position of use given to each seat provided by the vehicle manufacturer.
- 1.3. "Seat-back angle" means the inclination of the seat back in relation to the vertical.
- 1.4. "Actual seat-back angle" means the angle formed by the vertical through the "H" point with the torso reference line of the human body represented by the manikin referred to in item 3. below.
- 1.5. "Design seat-back angle" means the angle prescribed by the manufacturer which:
 - 1.5.1. determines the seat-back angle for the lowest and most rearward normal driving position or position of use given to each seat by the vehicle manufacturer;
 - 1.5.2. is formed at the "R" point by the vertical and the torso reference line,
 - 1.5.3. corresponds theoretically to the actual seat-back angle.

2. DETERMINATION OF "H" POINTS AND ACTUAL SEAT-BACK ANGLES

- 2.1. An "H" point and an "actual seat-back angle" shall be determined for each seat provided by the manufacturer. If the seats in the same row can be regarded as similar (bench seat, identical seats, etc.), only one "actual seat-back angle" shall be determined for each row of seats, the manikin described in item 3. below being seated in a place regarded as representative for the row. This place shall be:
.../...

- 4.5. The weights shall be placed on the thighs, the axis representing the transverse inclination of the seat of the manikin shall be brought to the horizontal, and the weights shall be placed on the component representing the seat of the manikin.
- 4.6.3 The manikin shall be moved away from the seat back by means of the knee-pivot bar and the back of the manikin shall be pivoted forwards. The manikin shall be repositioned on the seat of the vehicle by being slid backwards on its seat until resistance is encountered, the back of the manikin then being replaced against the seat-back;
- 4.7. A horizontal load of approximately 10 ± 1 daN shall be ~~twice~~ applied to the manikin. The direction and point of application of the load are shown by a black arrow in figure 2 of the appendix to Annex III of the Council Directive of 1 March 1971 on the approximation of the laws of the Member States relating to motor-vehicle rear-view mirrors (1)
- 4.8. The weights shall be installed on the right and left sides, and the torso weights shall then be placed in position. The transverse axis of the manikin shall be kept horizontal.
- 4.9. The transverse axis of the manikin being kept horizontal, the back of the manikin shall be pivoted forwards until the torso weights are above the "H" point, so as to eliminate any friction with the seat back.
- 4.10. The back of the manikin shall be gently moved rearwards so as to complete the setting-up operation. The transverse axis of the manikin shall be horizontal. If it is not, the procedure described above shall be repeated.
5. RESULTS
- 5.1. When the manikin has been set up as described in item 4. above, the "H" point and the actual seat-back angle of the vehicle seat considered are constituted by the "H" point and the angle of inclination of the manikin's torso reference line.
- 5.2. The co-ordinates of the "H" point in the three mutually perpendicular planes, and the actual seat-back angle, shall be measured for comparison with the data supplied by the vehicle manufacturer.
6. VERIFYING THE RELATIVE POSITIONS OF THE "R" AND "H" POINTS AND THE RELATIONSHIP BETWEEN THE DESIGN SEAT-BACK ANGLE AND THE ACTUAL SEAT-BACK ANGLE
- 6.1. The results of the measurements carried out as described by item 5.2. for the "H" point and the actual seat-back angle shall be compared with the co-ordinates of the "R" point and the design seat-back angle as supplied by the vehicle manufacturer.

(1) See O.J. No L 68, 22 March 1971, Page 17

- 6.2. The relative positions of the "R" point and the "H" point and the relationship between the design seat-back angle and the actual seat-back angle shall be deemed satisfactory for the seat in question if the "H" point, as defined by its co-ordinates, lies within a longitudinal rectangle whose horizontal and vertical sides are 30 mm and 20 mm long respectively and whose diagonals intersect at the "R" point, and if the actual seat-back angle is within 3° of the design seat-back angle.
- 6.2.1. If these conditions are met, the "R" point and the design seat-back angle shall be used for the test and, if necessary, the manikin shall be so adjusted that the "H" point coincides with the "R" point and the actual seat-back angle coincides with the design seat-back angle.
- 6.3. If the "H" point or the actual seat-back angle does not satisfy the requirements of item 6.2. above, the "H" point or the actual seat-back angle shall be determined twice more (three times in all). If the results of two of these three operations satisfy the requirements the result of the test shall be considered to be satisfactory.
- 6.4. If at least two of the three test results do not satisfy the requirements of item 6.2., the result of the test shall be deemed not satisfactory.
- 6.5. If the situation described in item 6.4. above arises, or if verification cannot be effected because the manufacturer has failed to supply information regarding the position of the "R" point or regarding the design seat-back angle, the average of the results of the three determinations may be used and be regarded as applicable in all cases where the "R" point or the design seat-back angle is referred to in this Directive
- 6.6. For verifying the relative positions of the "R" point and the "H" point and the relationship between the design seat-back angle and the actual seat-back angle in a series-production vehicle the rectangle referred to in item 6.2. above shall be replaced by a square of 50 mm side and the actual seat-back angle shall not differ by more than $\pm 5^\circ$ from the design seat-back angle.

ANNEX III

DETERMINATION OF HEIGHT AND WIDTH OF HEAD-RESTRAINT

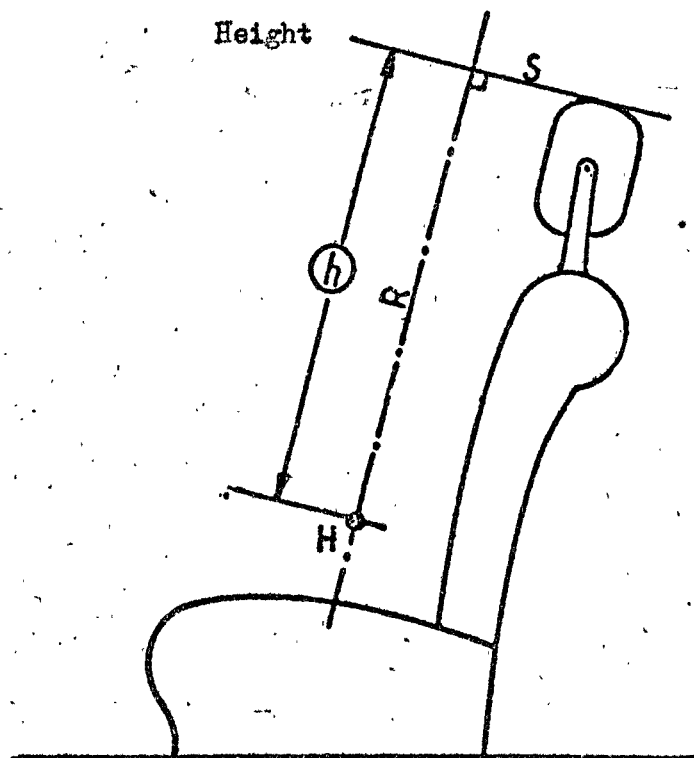


Fig. 1

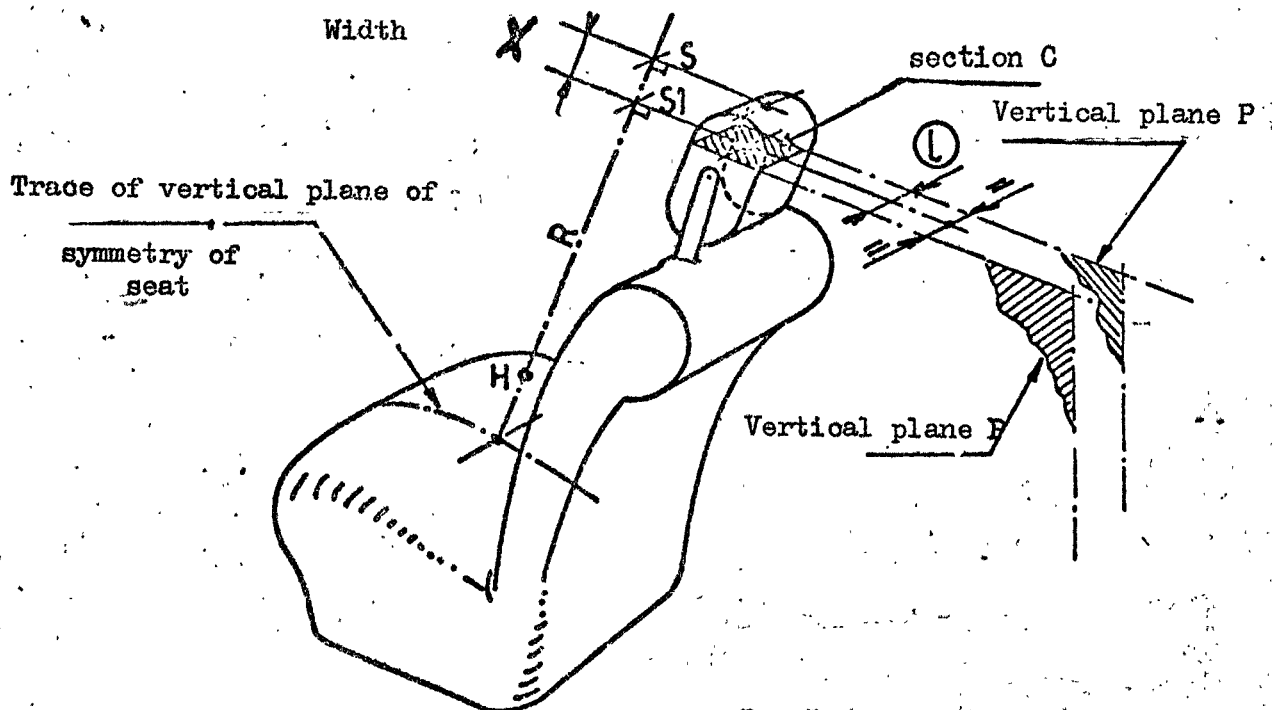
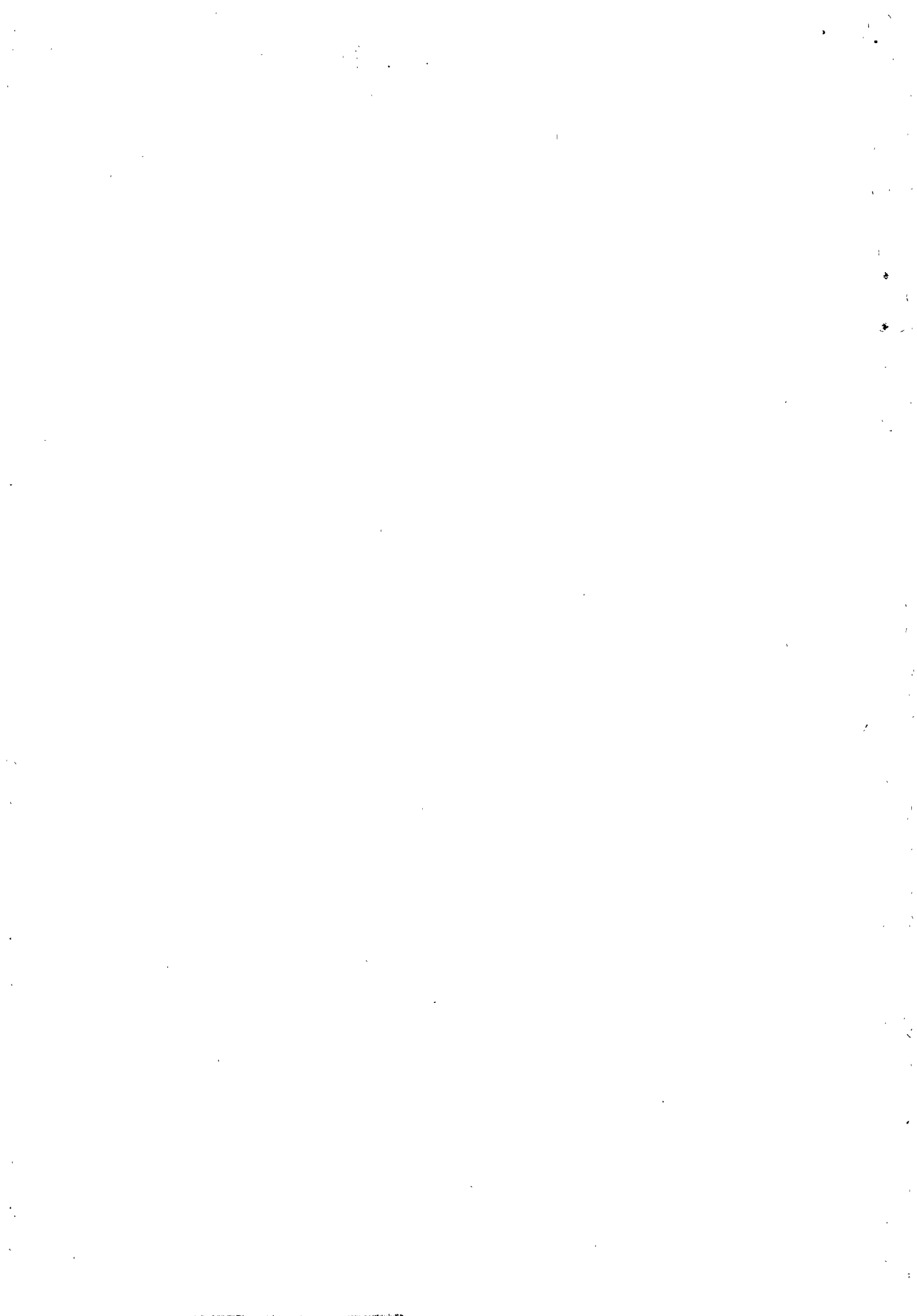


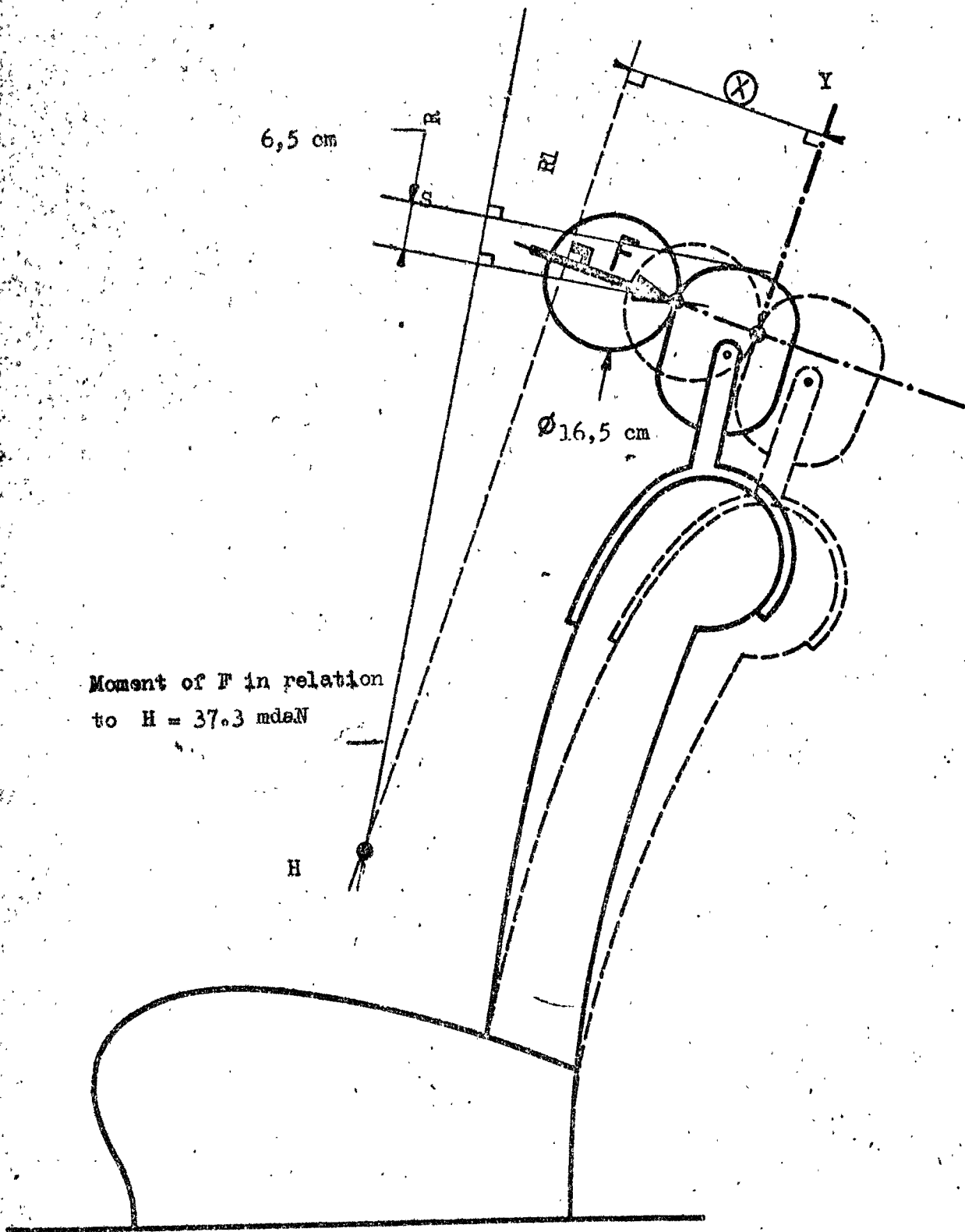
Fig. 2

R = Reference line
X = 6.5 cm



ANNEX IV

DETAILS OF LINES DRAWN AND MEASUREMENTS TAKEN DURING TEST

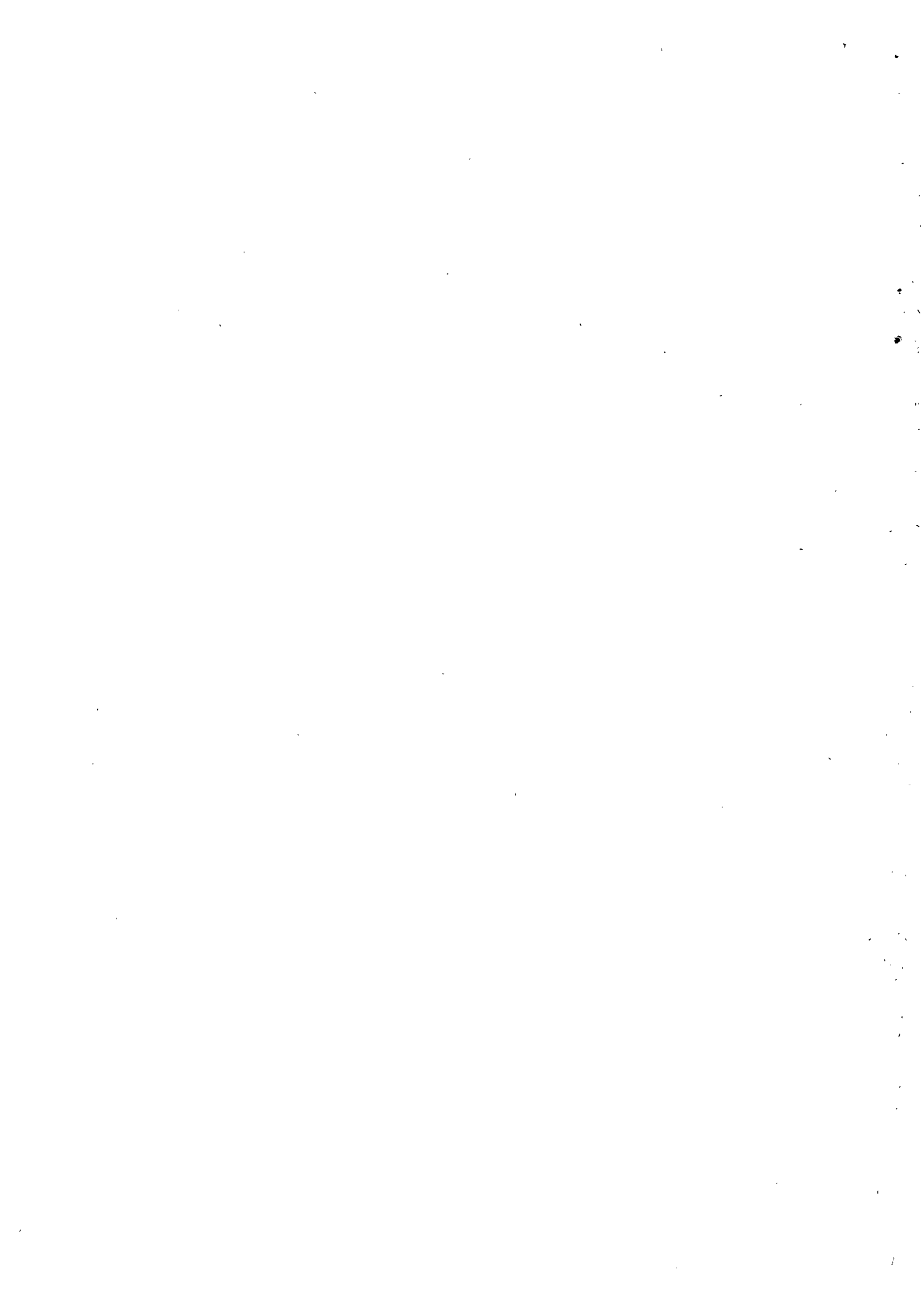


Moment of F in relation
to $H = 37.3 \text{ mdaN}$

H

————— : Initial position

----- : Position at end of test



ANNEX V

TEST PROCEDURE FOR CHECKING ENERGY DISSIPATION

1. INSTALLATION, TEST APPARATUS, RECORDING INSTRUMENTS AND PROCEDURE

1.1. Installation

The head-restraint covered with an energy-dissipating material shall be fitted and tested on the seat of the vehicle in which it is installed. This structural component shall be firmly secured to the test bench so as to remain stationary when the impact is applied.

1.2. Test apparatus

1.2.1. This apparatus consists of a pendulum whose pivot is supported by ball-bearings and whose reduced mass (*) at its centre of percussion is 6,8 kg. The lower extremity of the pendulum consists of a rigid headform 165 mm in diameter whose centre is identical with the centre of percussion of the pendulum.

1.2.2. The headform shall be fitted with two accelerometers and a speed-measuring device, all capable of measuring values in the direction of impact.

1.3. Recording instruments

The recording instruments used shall be such that measurements can be made with the following degrees of accuracy:

1.3.1. Acceleration:

accuracy = $\pm 5\%$ of the actual value;
frequency response = up to 1,000 c/s;
cross-axis sensitivity = $< 5\%$ of the lowest point
on the scale.

1.3.2. Speed:

accuracy = $\pm 2.5\%$ of the real value;
sensitivity = 0.5 km/h

.../...

(*) The relationship of the reduced mass " m_r " of the pendulum to the total mass " m " of the pendulum at a distance " a " between the centre of percussion and the axis of rotation and at a distance " l " between the centre of gravity and the axis of rotation is given by the formula: $m_r = \frac{m a^2}{l}$.

1.3.3. Time recording:

- the instrumentation shall enable the action to be recorded throughout its duration and readings to be made within one one-thousandth of a second;
- the beginning of the impact at the moment of first contact between the headform and the item being tested shall be detected on the recordings used for analysing the test.

1.4. Test procedure

- 1.4.1. The surface to be tested shall be so placed that the pendulum will normally strike the surface at the point considered.
- 1.4.2. The headform shall strike the test item at a speed of 24.1 km/h; this speed shall be achieved either by the mere energy of propulsion or by using an additional impelling device.

2. Results

In tests carried out by the above procedure the deceleration of the headform shall not exceed 80 g continuously for more than 3 milliseconds. The deceleration rate shall be taken as the average of the readings on the two decelerometers.

3. Equivalent procedures

- 3.1. Equivalent test procedures shall be permitted on condition that the results required in item 2. above can be obtained.
 - 3.2. Responsibility for demonstrating the equivalence of a method other than that described in item 1. shall rest with the person using that other method.
-

A N N E X VI

EEC TYPE - APPROVAL MARK

1. GENERAL

1.1. The type approval mark shall be made up of :

1.1.1. A rectangle within which shall be placed the letter "e" in lower case followed by a distinguishing number or letters of the country which has issued the approval (1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 6 for Belgium, 11 for the United Kingdom, 12 for Luxembourg, DK for Denmark, IRL for Ireland) (*)

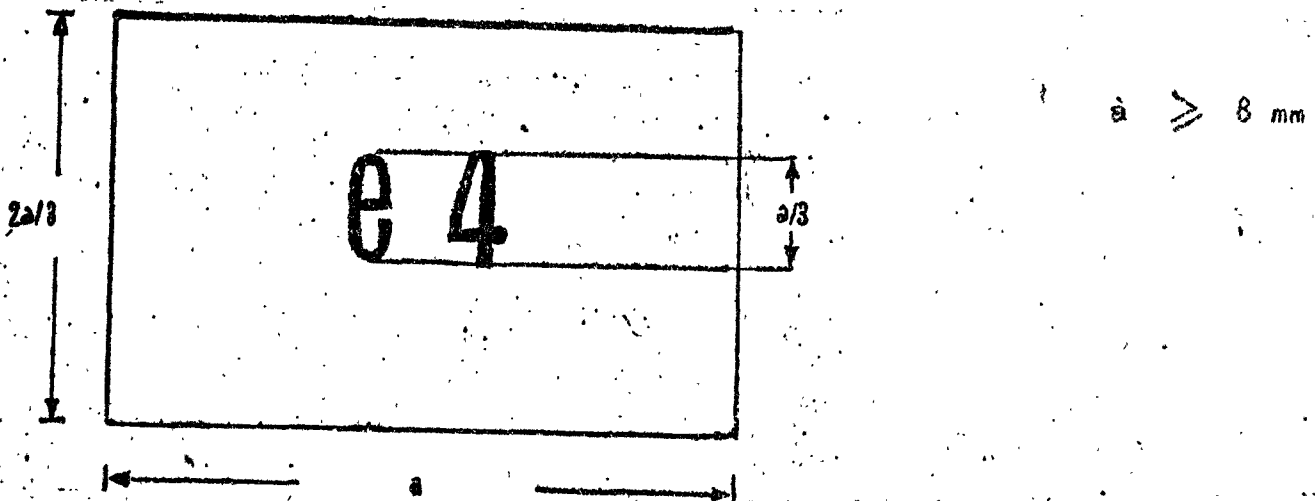
1.1.2. The type approval number entered below the rectangle ;

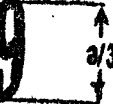
1.1.3. The head restraint is integral with the seat back, the type-approval number is preceded by the letter I and a - ;

1.2. The type approval mark must be clearly legible and indelible.

2. ARRANGEMENTS OF THE E E C APPROVAL MARKS

2.1. Approval mark of a head restraint which is integral with a seat

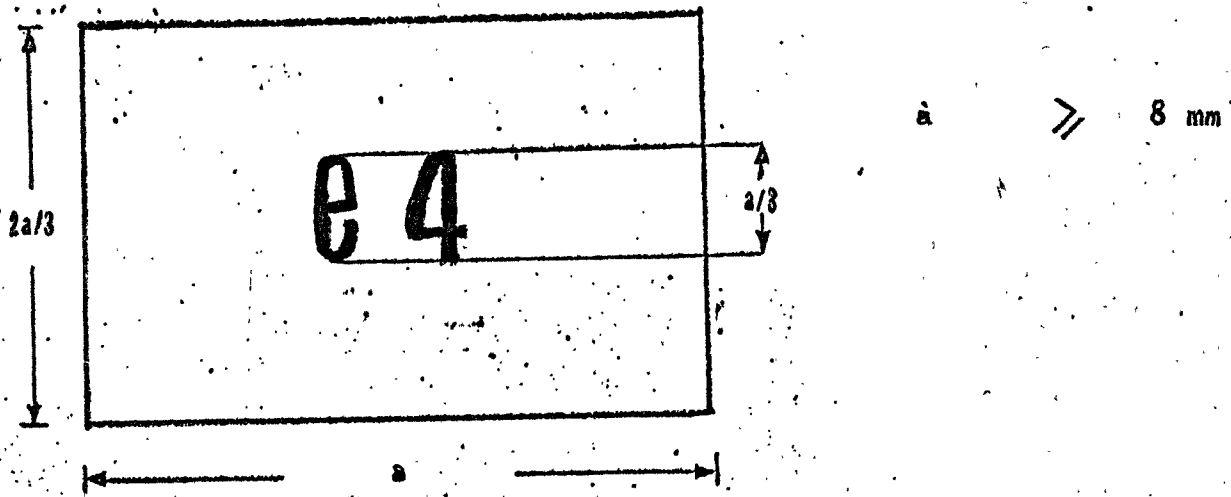


I-2439 

The above approval mark affixed to a head restraint or restraints integral in the seat or seats of a vehicle shows that the type of seat in question has been approved with regard to the head restraints in the Netherlands (see 4) under approval number 2439.

(*) See OJ N° L 73, 27 March 1972 "Acts relating to the accession to the European Communities of the Kingdom of Denmark, Ireland, the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland". Act relating to the conditions of accession and adaptations to the treaties. Annex I, title X.

2.2. Approval mark of a head restraint which is not integral with a seat.



2439 

The above approval mark affixed to a head restraint shows that the head restraint in question has been approved, that it is a head restraint which is not integral with a seat and has been approved in the Netherlands under approval number 2439.

ANNEX VII

E E C TYPE - APPROVAL FORM

Name of authority

Communication concerning the EEC type-approval (or refusal or withdrawal of the EEC type-approval) of a type of head restraint, whether or not incorporated in a seat

EEC approval n°.....

1. Trade name of mark
2. Manufacturer's name
3. If applicable, name of manufacturer's representative
4. Submitted for EEC approval on
5. Technical service conducting tests
6. Brief description of the head restraint (*)
-
-
-
7. Type and characteristics of the seats for which the head restraint is intended or in which it is incorporated
-
-
8. Types of vehicles for which the seats on which the head restraint can be fitted are intended
9. Date of report issued by the technical service
10. Number of report issued by the technical service
11. EEC type-approval in respect of head-restraints, whether or not incorporated granted/refused (**)
12. Place

(*) In the case of an incorporated head restraint this item need not be completed if all the necessary characteristics and particulars are entered under item 8.

(**) Delete as appropriate.

13. Date

14. Signature

15. The following documents, bearing the EEC approval number shown above, are annexed to this EEC type-approval form :

..... drawings, diagrams and photographs of the head restraint and of seats for which the head restraint is intended or in which it is incorporated.