COMMISSION OF THE EUROPEAN COMMUNITIES

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Brussels, 20 June 1991

Proposal for a

COUNCIL DIRECTIVE

on the approximation of the laws of the Member States relating to wheeled agricultural or forestry tractors

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(presented by the Commission)

LIST OF DIRECTIVES

1. **COUNCIL DIRECTIVE 74/150/EEC** of 4 March 1974 on the approximation of the laws of the Member States relating to the type-approval of wheeled agricultural or forestry tractors
(OJ No L 84 of 28.03.1974, p. 10)

<u>Amended by directives</u>:
79/694/EEC (OJ No L 205 of 13.08.1979, p. 17)
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)
88/297/EEC (OJ No L 126 of 20.05.1988, p. 52)

<u>Amended by</u>:
the Act of Accession of Greece (OJ No L 291 of 19.11.1979, p. 109 and p. 209)
the Act of Accession of Spain and of Portugal (OJ No L 302 of 15.11.1985, p. 210 and p. 213)

2. **COUNCIL DIRECTIVE 74/151/EEC** of 4 March 1974 on the approximation of the laws of the Member States relating to certain parts and characteristics of wheeled agricultural or forestry tractors
(OJ No L 84 of 28.03.1974, p. 25)

<u>Amended or adapted by directives</u>:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)
88/410/EEC of the Commission (OJ No L 200 of 26.07.1988, p. 27)

3. **COUNCIL DIRECTIVE 74/152/EEC** of 4 March 1974 on the approximation of the laws of the Member States relating to the maximum design speed of and load platforms for wheeled agricultural or forestry tractors
(OJ No L 84 of 28.03.1974, p. 33)

<u>Amended or adapted by directives</u>:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)
88/412/EEC of the Commission (OJ No L 200 of 26.07.1988, p. 31)

4. **COUNCIL DIRECTIVE 74/346/EEC** of 25 June 1974 on the approximation of the laws of the Member States relating to rearview mirrors for wheeled agricultural or forestry tractors
(OJ No L 191 of 15.07.1974, p. 1)

<u>Amended by directive</u>:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

5. **COUNCIL DIRECTIVE 74/347/EEC** of 25 June 1974 on the approximation of the laws of the Member States relating to the field of vision and windscreen wipers for wheeled agricultural or forestry tractors
(OJ No L 191 of 15.07.1974, p. 5)

<u>Amended or adapted by directives</u>:
79/1073/EEC of the Commission (OJ No L 331 of 27.12.1979, p. 20)
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

6. **COUNCIL DIRECTIVE 75/321/EEC** of 20 May 1975 on the approximation of the laws of the Member States relating to the steering equipment of wheeled agricultural or forestry tractors
(OJ No L 147 of 09.06.1975, p. 24)

Amended or adapted by directives:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)
88/411/EEC of the Commission (OJ No L 200 of 26.07.1988, p. 30)

7. **COUNCIL DIRECTIVE 75/322/EEC** of 20 May 1975 on the approximation of the laws of the Member States relating to the suppression of radio interference produced by spark-ignition engines fitted to wheeled agricultural or forestry tractors
(OJ No L 147 of 09.06.1975, p. 28)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

8. **COUNCIL DIRECTIVE 75/323/EEC** of 20 May 1975 on the approximation of the laws of the Member States relating to the power connection fitted on wheeled agricultural or forestry tractors for lighting and light-signalling devices on tools, machinery or trailers intended for agriculture or forestry
(OJ No L 147 of 09.06.1975, p. 38)

9. **COUNCIL DIRECTIVE 76/432/EEC** of 6 April 1976 on the approximation of the laws of the Member States relating to the braking devices of wheeled agricultural or forestry tractors
(OJ No L 122 of 08.05.1978, p. 1)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

10. **COUNCIL DIRECTIVE 76/763/EEC** of 27 July 1976 on the approximation of the laws of the Member States relating to passenger seats for wheeled agricultural or forestry tractors
(OJ No L 262 of 27.09.1976, p. 135)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

11. **COUNCIL DIRECTIVE 77/311/EEC** of 29 March 1977 on the approximation of the laws of the Member States relating to the driver-perceived noise level of wheeled agricultural or forestry tractors
(OJ No L 105 of 28.04.1977, p. 1)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

12. **COUNCIL DIRECTIVE 77/536/EEC** of 28 June 1977 on the approximation of the laws of the Member States relating to the roll-over protection structures of wheeled agricultural or forestry tractors
(OJ No L 220 of 29.08.1977, p. 1)

Amended by:
the Act of Accession of Spain and of Portugal (OJ No L 302 of 15.11.1985, p. 213)

Amended by directives:
87/354/EEC (OJ No L 192 of 11.07.1987, p. 43)
89/680/EEC (OJ No L 398 of 30.12.1989, p. 26)

13. **COUNCIL DIRECTIVE 77/537/EEC** of 28 June 1977 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of pollutants from diesel engines for use in wheeled agricultural or forestry tractors
(OJ No L 220 of 29.08.1977, p. 38)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

14. **COUNCIL DIRECTIVE 78/764/EEC** of 25 July 1978 on the approximation of the laws of the Member States relating to the driver's seat on wheeled agricultural or forestry tractors
(OJ No L 255 of 18.09.1978, p. 1)

Amended or adapted by directives:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)
83/190/EEC of the Commission (OJ No L 109 of 26.04.1983, p. 13)
87/354/EEC (OJ No L 192 of 11.7.1987, p. 43)
88/465/EEC of the Commission (OJ No L 228 of 17.08.1988, p. 31)

Amended by:
the Act of Accession of Spain and of Portugal (OJ No L 302 of 15.11.1985, p. 214)

15. **COUNCIL DIRECTIVE 78/933/EEC** of 17 October 1978 on the approximation of the laws of the Member States relating to the installation of lighting and light-signalling devices on wheeled agricultural and forestry tractors
(OJ No L 325 of 20.11.1978, p. 16)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

16. **COUNCIL DIRECTIVE 79/532/EEC** of 17 May 1979 on the approximation of the laws of the Member States relating to the component type-approval of lighting and light-signalling devices on wheeled agricultural or forestry tractors
(OJ No L 145 of 13.06.1979, p. 16)

Amended by directive:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

17. **COUNCIL DIRECTIVE 79/533/EEC** of 17 May 1979 on the approximation of the laws of the Member States relating to the coupling device and the reverse of wheeled agricultural or forestry tractors
(OJ No L 145 of 13.06.1979, p. 20)

<u>Amended by directive</u>:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)

18. **COUNCIL DIRECTIVE 79/622/EEC** of 25 June 1979 on the approximation of the laws of the Member States relating to the roll-over protection structures of wheeled agricultural or forestry tractors (static testing)
(OJ No L 179 of 17.07.1979, p. 1)

<u>Amended or adapted by directives</u>:
82/953/EEC of the Commission (OJ No L 386 of 31.12.1982, p. 31)
87/354/EEC (OJ No L 192 of 11.7.1987, p. 43)
88/413/EEC of the Commission (OJ No L 200 of 26.07.1988, p. 32)

<u>Amended by</u>:
the Act of Accession of Spain and of Portugal (OJ No L 302 of 15.11.1985, p. 214)

19. **COUNCIL DIRECTIVE 80/720/EEC** of 24 June 1980 on the approximation of the laws of the Member States relating to the operating space, access to the driving position and the doors and windows of wheeled agricultural or forestry tractors
(OJ No L 194 of 28.07.1980, p. 1)

<u>Amended or adapted by directives</u>:
82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)
88/414/EEC of the Commission (OJ No L 200 of 26.07.1988, p. 34)

20. **COUNCIL DIRECTIVE 86/297/EEC** of 26 May 1986 on the approximation of the laws of the Member States relating to the power take-offs of wheeled agricultural and forestry tractors and their protection
(OJ No L 186 of 08.07.1986, p. 19)

21. **COUNCIL DIRECTIVE 86/298/EEC** of 26 May 1986 on rearmounted roll-over protection structures of narrow-track wheeled agricultural and forestry tractors
(OJ No L 186 of 08.07.1986, p. 26)

<u>Amended by directive</u>:
89/682/EEC (OJ No L 398 of 30.12.1989, p. 29)

22. **COUNCIL DIRECTIVE 86/415/EEC** of 24 July 1986 on the installation, location, operation and identification of the controls of wheeled agricultural or forestry tractors
(OJ No L 240 of 26.08.1986, p. 1)

23. **COUNCIL DIRECTIVE 87/402/EEC** of 25 June 1987 on roll-over protection structures mounted in front of the driver's seat on narrow-track wheeled agricultural and forestry tractors
(OJ No L 220 of 08.08.1987, p. 1)

Amended by directive:
89/681/EEC (OJ No L 398 of 30.12.1989, p. 27)

24. **COUNCIL DIRECTIVE 89/173/EEC** of 21 December 1988 on the approximation of the laws of the Member States relating to certain components and characteristics of wheeled agricultural or forestry tractors
(OJ No L 67 of 10.03.1989, p. 1)

EXPLANATORY MEMORANDUM

1. In the context of a people's Europe, the Commission attaches great importance to simplifying and clarifying Community law so as to make it clearer and more accessible to the ordinary citizen, thus giving him new opportunities and the chance to make use of the specific rights it gives him.

   This aim cannot be achieved so long as numerous provisions that have been amended several times, often quite substantially, remain scattered, so that they must be sought partly in the original instrument and partly in later amending ones. Considerable research work, comparing many different instruments, is thus needed to identify the current rules. For this reason a consolidation of rules that have frequently been amended is essential if Community law is to be clear and transparent.

2. In its resolution of 26 November 1974 concerning consolidation of its acts (1), the Council recommended that those of its acts which have been amended several times be assembled into a single text. It stressed that, in the interests of legal certainty, a genuine legislative consolidation, involving the repeal of earlier acts, should wherever possible be effected (as is being done in this case). It consequently invited the Commission to let it have proposals for consolidation and undertook to examine them "as quickly as possible, without bringing into question, during that consolidation, the substantive solutions contained in the consolidated texts".

3. By its decision of 1 April 1987 the Commission instructed its departments to produce a formal consolidated version of legislative instruments no later than after their tenth amendment, but made it clear that this was a minimum requirement, and that in the interests of clarity and of the ready comprehension of Community law, an effort should be made by each department to consolidate the instruments for which it is responsible at more frequent intervals.

   The attached proposal for a consolidation of Council Directives on the approximation of the laws of the Member States relating to wheeled agricultural or forestry tractors, applies the fundamental principles on which the Council, Parliament and the Commission agreed in 1974 and aims at legislative consolidation : the existing directives would be replaced by one new one, which would leave their substance untouched but would assemble them into a single text, with only the formal amendments required by the operation itself.

4. As in the past the text supplied here is collated from the original Directives as published in the Official Journal; the use of photocopies means that any improvements to the wording are immediately identifiable. The old numbering of the Articles has been retained for ease of reference, the new numbering being entered in the margin; Annex C provides a concordance table relating the old system of numbering to the new. In order to preserve the dates for transposal of all the Directives concerned a new Annex B lists the deadline for implementation of each of the directives now being repealed.

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(1) OJ No C 20, 28.01.1975, p. 1.

TABLE OF CONTENTS

		Page
List of Directives		A - E
Chapter I:	Definitions (articles 1 and 2)	9
Chapter II:	EEC tractor type-approval (articles 3 to 10)	10
Chapter III:	General requirements (article 11)	14
Chapter IV:	Specific requirements	16
- Section 1	: Driver-perceived noise level (articles 12 to 14)	16
- Section 2	: Driver's seat (articles 15 to 22)	16
- Section 3	: Installation of lighting and light-signalling devices (article 23)	18
- Section 4	: Emission of pollutants and removal of radio interference (article 24)	19
- Section 5	: Protection in case of roll-over (articles 25 to 34)	19
- Section 6	: Certain components and characteristics of tractors (articles 35 to 41)	22
- Section 7	: Roll-over protection structure (static testing) (articles 42 to 51)	24
- Section 8	: Rear-mounted protection devices (articles 52 to 62)	26
- Section 9	: Front-mounted protection devices (articles 63 to 72)	29
- Section 10	: Maximum design speed and load platforms (article 73)	32
Chapter V:	General and final provisions (articles 74 to 78)	33

Page

Annex I: Type-approval of wheeled agricultural or forestry tractors 36

Annex II: Certain components and characteristics of wheeled agricultural or forestry tractors 46

Annex III: Maximum design speed - Load platforms 52

Annex IV: Rear-view mirrors 53

Annex V: Field of vision and windscreen wipers 55

Annex VI: Steering equipment 60

Annex VII: Removal of interference 63

Annex VIII: Power connection for lighting and light-signalling devices 71

Annex IX: Braking devices 72

Annex X: Passenger seats 84

Annex XI: Driver-perceived noise level 86

Annex XII: Protection in case of roll-over (dynamic testing) 93

Annex XIII: Emission of pollutants 127

Annex XIV: Driver's seat 147

Annex XV: Lighting and light-signalling 178

Annex XVI: Type-approval of lighting devices 204

Annex XVII: Coupling device - Reverse 206

Annex XVIII: Static testing of protection structures 207

Annex XIX: Operating space 235

Annex XX: Rear-mounted roll-over protection devices 243

Page

Annex XXI: Front-mounted roll-over protection devices 279

Annex XXII: Power take-offs and their protection 319

Annex XXIII: Installation, location, operation and identification of controls 324

Annex XXIV: Certain components and characteristics of tractors 340

ANNEX A : Repealed directives 456

ANNEX B : Deadlines for implementation 457

ANNEX C : Correlation table 459

PROPOSAL FOR A COUNCIL DIRECTIVE

ON THE APPROXIMATION OF THE LAWS OF THE MEMBER STATES RELATING TO WHEELED AGRICULTURAL OR FORESTRY TRACTORS

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

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

Having regard to the proposal from the Commission ,

In cooperation with the European Parliament (1),

Having regard to the opinion of the Economic and Social Committee (2),

Whereas the directives on the approximation of the laws of the Member States relating to wheeled agricultural or forestry tractors set out in Annex A have been substantially amended and on a number of occasions; whereas for reasons of
clarity and rationality the said directives should 1 74/150/EEC
be consolidated in a single text;

Whereas in each Member State tractors must comply with certain mandatory technical requirements; whereas such requirements differ from one Member State to another and consequently hinder trade within
the Community; 2 74/150/EEC

Whereas such obstacles to the establishment and proper functioning of the common market can be reduced, and even eliminated, if all Member States adopt the same requirements, either in addition to or
in place of their existing laws; 4 74/150/EEC

Whereas it is the established practice of the Member States to check that tractors comply with the relevant technical requirements before they are placed on the market; whereas this check is carried out on tractor
types; 5 74/150/EEC

Whereas the harmonized technical requirements applicable to individual tractor parts and characteristics should be specified by means of specific provisions;

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(1) OJ No C
(2) OJ No C

Whereas at Community level it is necessary to introduce a Community type-approval procedure for each tractor type in order that compliance with the above requirements can be checked and that each Member State may recognize checks carried out by other Member States;	6	74/150 /EEC
Whereas that procedure must enable each Member State to ascertain whether a tractor type has been subjected to the checks laid down by special Directives and listed in a type-approval certificate; whereas that procedure must enable manufacturers to complete a certificate of conformity for all tractors which conform to an approved type; whereas a tractor accompanied by such a certificate must be considered by all Member States as conforming to their own laws; whereas each Member State should inform the other Member States of its findings by sending a copy of the type-approval certificate completed for each tractor type which has been approved;	7	74/150/ EEC
Whereas, without prejudice to Articles 169 and 170 of the Treaty, it is advisable within the framework of cooperation between the competent authorities of the Member States, to lay down provisions to help resolve disputes of a technical nature regarding the conformity of production models to an approved type;	9	74/150 /EEC
Whereas a tractor may conform to an approved type but nevertheless have certain features which are potential safety hazards on the road or at work; whereas it is therefore advisable to prescribe an appropriate procedure to preclude such hazards;	10	74/150/EEC
Whereas technical progress requires prompt adaption of the technical requirements specified in the special directives; whereas, in order to facilitate implementation of the measures required for this purpose, a procedure should be prescribed for establishing close cooperation between the Member States and the Commission within the Committee on the Adaptation to Technical Progress of the Directives on the Removal of Technical Barriers to Trade in the Agricultural or Forestry Tractor Sector;	11	74/150 /EEC
Whereas the technical requirements with which tractors must comply pursuant to national laws concern the elements and characteristics set out in Annex I, Part 2 and bearing the letters SD;	1	75/151 /EEC (adapted)

Whereas these requirements differ from one Member State to another; whereas it is therefore necessary that all Member States adopt the same requirements either in addition to or in place of their existing rules, in order, in particular, to allow the EEC type-approval procedure to be applied in respect of each type of tractor;

2 74/151/EEC

Whereas this Directive does not affect the time limits, mentioned in Annex B, within which Member States must comply with the Directives listed in Annex A and their successive amendments,

HAS ADOPTED THIS DIRECTIVE :

CHAPTER I

Definitions

Article 1 74/150/EEC

1. 'Agricultural or forestry tractor' means any motor vehicle, fitted with wheels or caterpillar tracks, having at least two axles, the main function of which lies in its tractive power and which is specially designed to tow, push, carry or power certain tools, machinery or trailers intended for agricultural or forestry use. It may be equipped to carry a load and passengers.

2. This Directive shall apply only to tractors defined in paragraph 1 above which are fitted with pneumatic tyres and which have two axles and a maximum design speed between 6 and 25 km/h. 82/890/EEC

Article 2

74/150/EEC

For the purposes of this Directive:

(a) 'national type-approval' means the administrative procedure known as:

- 'agréation par type' and 'aanneming' in Belgian law;
- 'standardtypegodkendelse' in Danish law;
- 'allgemeine Betriebserlaubnis' in German law;
- 'réception par type' in French law;
- 'έγκριση τύπου' in Greek law → O.J. L 291/79
- 'homologacion de tipo' in Spanish law → O.J. L 302/85
- 'type-approval' in Irish law;
- 'omologazione' or 'approvazione del tipo' in Italian law;
- 'agréation' in Luxembourg law;
- 'typegoedkeuring' in Netherlands law;
- 'aprovação de marca e modelo' in Portuguese law → O.J. L 302/85
- 'type-approval' in the law of the United Kingdom.

(b) 'EEC type-approval' means the procedure whereby a Member State certifies that a tractor type satisfies the technical requirements of the special provisions and the checks listed in the EEC type-approval certificate, the model of which is given in Annex I, Part 2.

CHAPTER II

EEC tractor type-approval

Article 3

Application for EEC type-approval shall be submitted by the manufacturer or his authorized representative to a Member State. An application shall be accompanied by an information document, the model of which is given in Annex I, Part 1, and by the documents referred to therein. No application in respect of any one type of tractor may be submitted to more than one Member State. 74/150/EEC

Article 4

1. A Member State shall approve all tractor types which satisfy the following conditions: 74/150/EEC

(a) the tractor type must conform to the particulars in the information document;

(b) the tractor type must satisfy the checks listed in the model, referred to in Article 2 (b), of the type-approval certificate.

2. The Member State which has granted type-approval shall take the necessary measures to verify, in so far as is necessary, and if need be in cooperation with the competent authorities of the other Member States, that production models conform to the approved prototype. Such verification shall be limited to spot checks.

The Member State shall complete all the sections of a type-approval certificate for each tractor type which it approves.

Article 5

1. The competent authorities of each Member State shall send within one month to the competent authorities of the other Member States a copy of the information document and approval certificate for each tractor type which they approve or refuse to approve. 74/150/EEC

2. The manufacturer or his authorized representative in the country of registration shall complete a certificate of conformity, the model of which is given in Annex I Part 3, for each tractor manufactured in conformity with the approved prototype.

3. Member States may, however, for purposes of tractor taxation or completion of its registration documents, ask for particulars not mentioned in Annex I Part 3 to be given on the certificate of conformity, provided that such particulars are explicitly stated on the information document or can be derived therefrom by a straightforward calculation.

Article 6

1. The Member State which has granted EEC type-approval must take the necessary measures to ensure that it is informed of any cessation of production and of any change in particulars appearing in the information document. 74/150/EEC

2. If the State in question considers that such a change does not require an amendment to the existing type-approval certificate, or completion of a new type-approval certificate, the competent authorities of that State shall inform the manufacturer thereof and shall send to the competent authorities of the other Member States, in periodic consignments, copies of amendments to information documents which have already been distributed.

3. If the State in question finds that an amendment to an information document warrants fresh checks or fresh tests and that it is accordingly necessary to amend the existing type-approval certificate or complete a new type-approval certificate, the competent authorities of that State shall inform the manufacturer thereof and shall, within one month of such new documents being completed, send them to the competent authorities of the other Member States.

4. Where a type-approval certificate is amended or replaced or production of the approved tractor type ceases, the competent authorities of the Member State which granted that type-approval shall, within one month, communicate to the competent authorities of the other Member States the serial numbers of the last tractor produced in conformity with the old certificate and, where applicable, the serial numbers of the first tractor produced in conformity with the new or amended certificate.

Article 7

1. No Member State may refuse the registration or may prohibit the sale, entry into service or use of any new tractor on grounds relating to its construction or operation where that tractor is accompanied by a certificate of conformity. 74/150/EEC

Nevertheless, this certificate shall not prevent a Member State from taking such measures in respect of tractors which do not conform to the approved prototype.

2. Failure to conform to the approved prototype shall be established where deviations from the particulars in the information document are found to exist and where these deviations have not been authorized under Article 6 (2) or (3) by the Member State which granted the type-approval. A tractor shall not be considered to deviate from the approved type where tolerances are permitted by special directives and these tolerances are respected.

Article 8

1. If the Member State which has granted EEC type-approval finds that a number of tractors accompanied by a certificate of conformity to a particular type 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 type-approval. The said authorities shall take like measures if they are informed by the competent authorities of another Member State of such failure to conform. 74/150/EEC

2. The competent authorities of the Member States shall inform one another, within one month, of any withdrawal of EEC type-approval, and of the reasons for such a measure.

3. If the Member State which has granted EEC type-approval disputes the failure to conform notified to it, the Member States concerned shall endeavour to settle the dispute.

The Commission shall be kept informed and shall, where necessary, hold appropriate consultations for the purpose of reaching a settlement.

Article 9

1. If a Member State finds that tractors of a particular type may be a hazard to safety on the road or at work, even though they are accompanied by a properly issued certificate of conformity, then that State may, for a maximum period of six months, refuse to register new tractors of that type or prohibit their sale, entry into service or use in its territory. It shall forthwith inform the other Member States and the Commission thereof, stating the reasons for its decision. 74/150/EEC

2. The Commission shall within six weeks consult the Member States concerned. It shall deliver an opinion without delay and take appropriate steps. Where the Commission considers that an amendment as envisaged in Article 76 is necessary, the period of time laid down in paragraph 1 of this Article shall be extended until the procedure set out in Article 74 has been completed.

'Article 9a

1. Where the separate provisions make express provision for so doing, EEC type-approval may also be granted for types of systems or parts of tractors which form a separate technical unit.

2. Where the separate technical unit to be approved fulfils its function or offers a specific feature only in conjunction with other components of the tractor and for this reason compliance with one or more requirements can be verified only when the separate technical unit to be approved operates in conjunction with other tractor components, whether real or simulated, the scope of the EEC type-approval of the separate technical unit must be restricted accordingly. The EEC type-approval certificate for a separate technical unit shall then include any restrictions on its use and shall indicate any conditions for fitting it. Observance of these restrictions and conditions shall be verified at the time of EEC type-approval of the tractor.

3. Articles 3 to 9 shall apply by analogy.

However, the holder of the EEC type-approval for a separate technical unit granted in accordance with this Article shall be obliged not only to complete the certificate provided for in Article 5 (2), but also to affix to each unit manufactured in conformity with the approved type the trade name or mark, the type and, if the separate provision so provides, the type-approval number.'

Article 10

79/694/EEC

Chapter III

General Requirements

Article 10

No Member State may refuse EEC type-approval or national type-approval of a tractor or refuse its registration or prohibit the sale, entry into service or use of a tractor on grounds relating to :	Article 11 74/150/EEC
1. — the maximum permissible laden weight, — the location and fitting of the rear registration plates, — fuel tanks, — ballast weights, — audible warning devices, — the permissible sound level and exhaust system (silencer),	74/151/EEC
2. the maximum design speed or the load platforms,	74/152/EEC
3. rear-view mirrors,	74/346/EEC
4. windscreen wipers,	74/347/EEC
5. the steering equipment,	75/321/EEC
6. the radio interference produced by the spark-ignition system of its propulsion engine if such tractors are fitted with interference suppression equipment,	75/322/EEC
7. the braking devices,	76/432/EEC
8. the passenger seats,	76/763 /EEC
9. the emission of pollutants from diesel engine,	77/537/EEC
10. the installation of lighting and light-signalling devices,	78/933 /EEC

11. — headlamps which function as main-beam and/or dipped-beam headlamps or to incandescent electric filament lamps for such headlamps, 79/532/EEC
- end-outline marker lamps,
- front position (side) lamps,
- rear position (side) lamps,
- stop lamps,
- direction indicator lamps,
- reflex reflectors,
- rear registration plate lamps,
- front fog lamps and filament lamps for such lamps,
- rear fog lamps,
- reversing lamps,
- parking lamps,

12. devices for towing and reversing, 79/533/EEC

13. — the operating space,
- access to the driving position (means of entry and exit), 80/720/EEC
- doors and windows,

14. - power take-offs and their protection, 86/297/EEC

15. the installation, location, operation and identification of the controls, 86/415/EEC

if these satisfy the requirements set out in the relevant Annexes. 74/151/EEC

Chapter IV

Specific Requirements

Section I : Driver-perceived noise level

Article 2 — Article 12

1. No Member State may refuse to grant EEC type-approval or national type-approval or prohibit the sale, registration or entry into service of any tractor on grounds relating to the driver-perceived noise level if this level is within the following limits:

90 dB (A) in accordance with Annex XI Part 1.

86 dB (A) in accordance with Annex XI Part 2

77/311 /EEC

Article 3 — Article 13

For the purposes of this section "cab" means any structure built of rigid components, transparent or not, which totally encloses the driver and isolates him from the outside, and is capable of being kept permanently closed during service.

77/311 /EEC

Article 4 — Article 14

Member States shall take all necessary measures to ensure that in both the sales presentation and advertising there is nothing to suggest that the tractors have features regarding the driver-perceived noise level which they do not in fact possess.

77/311 /EEC

Section 2 : Driver's seat

Article 1 — Article 15

1. Each Member State shall grant EEC component type-approval for any type of driver's seat which satisfies the construction and testing requirements laid down in Annexes XIV , Parts 1 & 2.

2. The Member State which has granted EEC component type-approval shall take the measures 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 limited to spot checks.

78/764 /EEC

Article 2

Member States shall, for each type of driver's seat which they approve pursuant to Article 15 issue to the manufacturer or to his authorized representative, an EEC component type-approval mark conforming to the model shown in point 3.5 of Annex XIV, Part 2.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between driver's seats which have been granted component type-approval pursuant to Article 15 and other devices.

Article 16
78/764/EEC

Article 3

1. No Member State may prohibit the placing on the market of driver's seats on grounds relating to their construction if they bear the EEC component type-approval mark.

2. Nevertheless, a Member State may prohibit the placing on the market of driver's seats bearing the EEC component type-approval mark which consistently fail to conform to the approved type.

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

Article 17
78/764/EEC

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, the model of which is given in Annex XIV, Part 3, completed for each type of driver's seat which they approve or refuse to approve.

Article 18
78/764/EEC

Article 5

1. If the Member State which has granted EEC component type-approval finds that a number of driver's seats 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 approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken, which may, if necessary, where there is serious and repeated failure to conform, 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 the Member States shall inform each other within one month of any withdrawal of EEC component type-approval, and of the reasons for such a measure.

Article 19
78/764/EEC

Article 6

Any decision taken pursuant to the provisions adopted in implementation of this section to refuse or withdraw EEC component type-approval for a driver's seat or to prohibit its placing on the market or use, shall set out in detail the reasons on which it is based. Such decisions shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in the Member States and of the time limits allowed for the exercise of such remedies.

Article 20

78/764/EEC

Article 7

No Member State may refuse to grant EEC type-approval or national type-approval for a tractor on grounds relating to its driver's seat if this bears the EEC component type-approval mark and is fitted in accordance with the requirements laid down in Annex XIV, Part 4.

Article 21

78/764/EEC

Article 8

No Member State may refuse or prohibit the sale, registration, entry into service or use of any tractor on grounds relating to the driver's seat if this bears the EEC component type-approval mark and is fitted in accordance with the requirements laid down in Annex XIV, Part 4.

Article 22

78/764/EEC

Section 3 : Installation of lighting and light-signalling devices

Article 4

A Member State which has granted EEC type-approval shall take the necessary measures to ensure that it is informed of any modification to any of the parts or characteristics referred to in point 1.1 of Annex 15, Part 1. The competent authorities of that Member State shall determine whether further tests should be carried out on the modified tractor type and a fresh report drawn up. Where such tests reveal failure to comply with the requirements of this Directive, the modification shall not be approved.

Article 23

78/933/EEC

Section 4 : Emission of pollutants and removal of radio interference

Article 4

Article 24

77/537 /EEC

75/322 /EEC

The Member State which has granted type-approval shall take the necessary measures to ensure that it is informed of any modification of a part or characteristic referred to in point 2.2 of Annex VII, Part 1 and in point 1.1 of Annex XIII, Part 1. The competent authorities of that State shall determine whether fresh tests should be carried out on the modified tractor and a fresh report drawn up. Where such tests reveal a failure to comply with the requirements of this Directive, the modification shall not be approved.

Section 5 : Protection in case of roll-over

Article 1

Article 25

77/536 /EEC

1. Each Member State shall grant EEC component type-approval for any type of roll-over protection structure and its tractor attachment which satisfies the construction and testing requirements laid down in Annex XII, Parts 1 to 5.

2. The Member State which has granted EEC component type-approval shall take the measures required 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 limited to spot checks.

Article 2

Article 26

77/536 /EEC

Member States shall for each type of roll-over protection structure and its tractor attachment which they approve pursuant to Article 25 issue to the manufacturer of the tractor or of the roll-over protection structure or to his authorized representative, an EEC component type-approval mark conforming to the model shown in Annex XII, Part 6.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between roll-over protection structures which have been component type-approved pursuant to Article 25 and other devices.

Article 3

Article 27

77/536 /EEC

1. No Member State may prohibit the placing on the market of roll-over protection structures or their tractor attachment on grounds relating to their construction if they bear the EEC component type-approval mark.

2. Nevertheless, a Member State may prohibit the placing on the market of roll-over protection structures bearing the EEC component type-approval mark which consistently fail to conform to the approved type.

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

Article 28

77/536 /EEC

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, the model of which is given in Annex XII, Part 7, completed for each type of roll-over protection structure which they approve or refuse to approve.

Article 29

77/536 /EEC

Article 5

1. If the Member State which has granted EEC component type-approval finds that a number of roll-over protection structures and their tractor attachments 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 approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken which may, if necessary, where there is serious and repeated failure to conform, 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 the Member States shall within one month inform each another of any withdrawal of EEC component type-approval and of the reasons for any such measure.

Article 30

77/536 /EEC

Article 6

Any decision taken pursuant to the provisions adopted in implementation of this section to refuse or withdraw component type-approval for roll-over protection structures and their tractor attachments, or to prohibit their placing on the market or their use, shall set out in detail the reasons on which it is based. Such decision shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws 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 in respect of a tractor on grounds relating to roll-over protection structures or their tractor attachments if these bear the EEC component type-approval mark and if the requirements laid down in Annex XII, Part 8 have been met.

Article 31

77/536 /EEC

Article 8

No Member State may refuse or prohibit the sale, registration, entry into service or use of any tractor on grounds relating to the roll-over protection structure and its tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XII, Part 8 have been met.

Article 32

77/536 /EEC

Article 9

This section shall apply to tractors defined in Article 1, having the following characteristics :

— clearance beneath the rear axle of not more than 1 000 mm,

— fixed or adjustable track width of one of the driving axles of 1 150 mm or more,

— possibility of being fitted with a multipoint coupling device for detachable tools and a draw bar,

— mass between 1·5 and 6 tonnes, corresponding to the unladen weight of the tractor, as defined in point 2.4 of Annex I, Part 1, including the roll-over protection structure fitted in compliance with the present section and tyres of the largest size recommended by the manufacturer.

Article 33

77/536 /EEC

89/680/ EEC

Article 10

In the context of EEC type-approval any tractor to which Article 33 refers must be fitted with a roll-over protection structure which meets the requirements laid down in Annex XII, Parts 1 to 4.

Article 34

77/536 /EEC

Section 6 : Certain components and characteristics of tractors

Article 2

Article 35

89/173/EEC

1. No Member State may refuse EEC type-approval or national type-approval of a tractor or refuse its registration or prohibit the sale, entry into service or use of a tractor or grounds relating to:

— dimensions and towable masses,

— speed governors and protection of drive components, projections and wheels,

— windscreens and other glazing,

— mechanical couplings between tractor and towed vehicle, including the vertical load on the coupling point,

— location and method of affixing statutory plates and inscriptions to the body of the tractor,

— brake control for towed vehicles,

where these comply with the requirements of the Annexes relating thereto and where the windscreens and other glass panes or the mechanical couplings bear an EEC component type-approval mark.

2. By way of derogation from the provisions of paragraph 1 relating to use of the tractor, Member States may, for reasons concerning towable mass(es), continue to apply their national provisions reflecting in particular the special requirements relating to the nature of the land relief on their territory, within the limits of the towable masses listed in point 2.2 of Annex XXIV, Part 1 in so far as this does not involve alterations to the tractor or a further supplementary national type-approval.

Article 3

Article 36

89/173/EEC

1. Each Member State shall grant EEC component type-approval for any type of windscreen or other glass-pane and/or of mechanical coupling which satisfies the construction and testing requirements laid down in Annex XXIV, Parts 3 and/or 4.

2. The Member State which has granted EEC component type-approval shall take the measures 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 limited to spot checks.

Article 4

Member States shall, for each type of windscreen or other glass pane or of mechanical coupling which they approve pursuant to Article 35 issue to the manufacturer of the tractor, windscreen or mechanical coupling or to his authorized representative, an EEC component type-approval mark conforming to the models shown in Annex. XXIV, Part 3 or 4.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between the type of equipment which has been granted EEC component type-approval pursuant to Article 35 and equipment of other types.

Article 37
89/173/EEC

Article 5

1. No Member State may prohibit the placing on the market of windscreens and other glass panes or mechanical couplings on grounds relating to their construction if they bear the EEC component type-approval mark.

2. Nevertheless a Member State may prohibit the placing on the market of windscreens or mechanical couplings bearing the EEC component type-approval mark which do not conform to the approved type.

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

Article 38
89/173/EEC

Article 6

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, the model of which is given in Annex XXIV, Part 3 or 4 completed for each type of windscreen or mechanical coupling which they approve or refuse to approve.

Article 39
89/173/EEC

Article 7

1. If the Member State which has granted EEC component type-approval finds that a number of windscreens or mechanical couplings 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 approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken, which may, if necessary, where there is serious and repeated failure to conform, 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 the Member States shall inform each other within one month of any withdrawal of EEC component type-approval and of the reasons for such a measure.

Article 40
89/173/EEC

Article 8

Any decision taken pursuant to the provisions adopted in implementation of this section to refuse or withdraw EEC component type-approval for a windscreen or mechanical coupling or to prohibit their placing on the market or use, shall set out in detail the reasons on which it is based. Such decisions shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in the Member States and of the time limits allowed for the exercise of such remedies.

Article 41
89/173/EEC

Section 7 : Roll-over protection structure (static testing)

Article 1

Article 42
79/622/EEC

1. Each Member State shall grant EEC component type-approval for any type of roll-over protection structure and its tractor attachment which satisfies the construction and testing requirements laid down in Annex XVIII, Parts 1 to 5.

2. A Member State which has granted EEC component type-approval shall take the measures required 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 limited to spot checks.

Article 2

Article 43
79/622 /EEC

Member States shall, for each type of roll-over protection structure and its tractor attachment which they approve pursuant to Article 42 issue to the manufacturer of the tractor or of the roll-over protection structure, or to his authorized representative, an EEC component type-approval mark conforming to the model shown in Annex XVIII, Part 6.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between roll-over protection structures which have been component type-approved pursuant to Article 42 and other devices.

Article 3

Article 44
79/622 /EEC

1. No Member State may prohibit the placing on the market of roll-over protection structures or their tractor attachments on grounds relating to their construction if they bear the EEC component type-approval mark.

2. Nevertheless, a Member State may prohibit the placing on the market of roll-over protection structures bearing the EEC component type-approval mark which consistently fail to conform to the approved type.

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

Article 4

Article 45
79/622 /EEC

The competent authorities of each Member State shall within one month send to the competent authorities of the other Member States copies of the component type-approval certificates, the model of which is given in Annex XVIII Part 7, completed for each type of roll-over protection structure 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 roll-over protection structures and their tractor attachments 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 approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken which may, if necessary, where there is serious and repeated failure to conform, 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 the Member States shall within one month inform each other of any withdrawal of EEC component type-approval and of the reasons for any such measure.

Article 46
79/622/EEC

Article 6

Any decision taken pursuant to the provisions adopted in implementation of this section to refuse or withdraw component type-approval for roll-over protection structures and their tractor attachments, or to prohibit their placing on the market or their use, shall set out in detail the reasons on which it is based. Such decision shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in the Member States and of the time limits allowed for the exercice of such remedies.

Article 47
79/622/EEC

Article 7

No Member State may refuse to grant EEC type-approval or national type-approval in respect of a tractor on grounds relating to the roll-over protection structure or its tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XVIII, Part 8 have been met.

Article 48
79/622/EEC

Article 8

No Member State may refuse or prohibit the sale, registration, entry into service or use of any tractor on grounds relating to the roll-over protection structure and its tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XVIII, Part 8 have been met.

Article 49
79/622/EEC

Article 9

Article 50

79/622 /EEC

This section shall apply to tractors as defined in Article 1 having the following characteristics :

— clearance beneath the rear axle of not more than 1 000 mm,

— fixed or minimum adjustable track width of one of the driving axles of 1 150 mm or more,

-- possibility of being fitted with a multipoint coupling device for detachable tools and a draw bar,

— mass of 800 kg or more, corresponding to the unladen weight of the tractor as defined in point 2.4 of Annex I, Part 1, including the roll-over protection structure fitted in compliance with this section and tyres of the largest size recommended by the manufacturer.

Article 10

Article 51

79/622 /EEC

For the purposes of EEC type-approval, any tractor to which Article 50 refers must be fitted with a roll-over protection structure which satisfies the requirements laid down in Annex XVIII, Parts 1 to 4.

However, the tractors defined in Article 33 may, for the purposes of EEC type-approval, be fitted with a roll-over protection structure which satisfies the requirements laid down in Annex XII, Parts 1 to 4.

Section 8 : Rear-mounted protection devices.

Article 1

Article 52

86/298, /EEC

This section shall apply to tractors as defined in Article 1 having the following characteristics :

— ground clearance of not more than 600 mm measured beneath the lowest points of the front or rear axles, allowing for the differential,

— **fixed or adjustable minimum track width of less than 1 150 mm for the axles fitted with the widest tyres; since the axle fitted with the widest tyres is assumed to be adjusted to a maximum track width of 1 150 mm, the other axle must be capable of being adjusted in such a way that the outer edges of the narrowest tyres do not project beyond the outer edges of the tyres on the axle with the widest tyres. Where both axles are equipped with wheels and tyres of the same size, the fixed or adjustable track width of both axles must be less than 1 150 mm,**

89/682 EEC

— mass greater than 600 kilograms and corresponding to the unladen weight of the tractor as defined in point 2.4 of Annex I Part 1, including the roll-over protection structure fitted in compliance with this section and tyres of the largest size recommended by the manufacturer.

86/298/EEC

Article 2

1. Each Member State shall grant EEC component type-approval for any type of roll-over protection structure and its tractor attachment which satisfies the construction and testing requirements laid down in Annex XX, Parts 1 to 4.

2. A Member State which has granted EEC component type-approval shall take the measures required 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 limited to spot checks.

Article 53
86/298/EEC

Article 3

Member States shall, for each type of roll-over protection structure and its tractor attachment which they approve pursuant to Article 53 issue to the manufacturer of the tractor or of the roll-over protection structure, or to his authorized representative, an EEC component type-approval mark conforming to the model shown in Annex XX, Part 6.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between roll-over protection structures which have been component type-approved pursuant to Article 53 and other devices.

Article 54
86/298/EEC

Article 4

1. No Member State may prohibit the placing on the market of roll-over protection structures or their attachment to the tractors for which they are intended on grounds relating to their construction if they bear the EEC component type-approval mark.

2. Nevertheless, a Member State may prohibit the placing on the market of roll-over protection structures bearing the EEC component type-approval mark which consistently fail to conform to the approved type.

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

Article 55
86/298/EEC

Article 5

The competent authorities of each Member State shall, within one month, send to the competent authorities of the Member State a copy of the component type-approval certificates, the model of which is given in Annex XX, Part 7, completed for each type of roll-over protection structure which they approve or refuse to approve.

Article 56
86/298/EEC

Article 6

Article 57

86/298 /EEC

1. If the Member State which has granted EEC component type-approval finds that a number of roll-over protection structures and their tractor attachments 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 approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken which may, if necessary, where there is serious and repeated failure to conform, 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 the Member States shall within one month inform each other of any withdrawal of EEC component type-approval and of the reasons for any such measure.

Article 7

Article 58

86/298 /EEC

Any decision taken pursuant to the provisions adopted in implementation of this section to refuse or withdraw component type-approval for roll-over protection structures and their tractor attachments, or to prohibit their placing on the market or their use, shall set out in detail the reasons on which it is based. Such decisions shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in the Member States and of the time limits allowed for the exercise of such remedies.

Article 59

Article 8

86/298 /EEC

No Member State may refuse to grant EEC type-approval or national type-approval in respect of a tractor on grounds relating to roll-over protection structures or their tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XX, Part 8 have been met.

Article 60

Article 9

86/298 /EEC

No Member State may refuse or prohibit the sale, registration, entry into service or use of any tractor on grounds relating to the roll-over protection structure and its tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XX, Part 8 have been met.

Article 61

Article 10

86/298 /EEC

This section shall not affect the right of Member States to specify — in due compliance with the Treaty — the requirements they deem necessary to ensure that workers are protected when using the tractors in question, provided this does not mean that the protection structures are modified in a way unspecified in this section.

Article 11

1. In connection with EEC type-approval, any tractor to which Article 52 refers must be fitted with a roll-over protection structure.

2. Where the protection structure is not one having two pillars mounted in front of the driver's seat, the structure referred to in paragraph 1 must comply with the requirements laid down in Annexes XII, XVIII and/or XX, Parts 1 to 4.

Section 9 : Front-mounted protection devices.

Article 62

86/298 /EEC

Article 1

This section shall apply to tractors as defined in Article 1 having the following characteristics:

- ground clearance of not more than 600 mm beneath the lowest points of the front and rear axles, allowing for the differential,
- fixed or adjustable minimum track width with one of the axles less than 1 150 mm fitted with tyres of a larger size. It is assumed that the axle mounted with the wider tyres is set at a track width of not more than 1 150 mm. It must be possible to set the track width of the other axle in such a way that the outer edges of the narrower tyres do not go beyond the outer edges of the tyres of the other axle. Where the two axles are fitted with rims and tyres of the same size, the fixed or adjustable track width of the two axles must be less than 1 150 mm,
- mass of 600 and 3 000 kilograms, corresponding to the unladen weight of the tractor as defined in point 2.4 of Annex I, Part 1, including the roll-over protection structure fitted in compliance with this section and tyres of the largest size recommended by the manufacturer.

Article 63

87/402/EEC

Article 2

1. Each Member State shall grant component type-approval for any type of roll-over protection structure and its tractor attachment which satisfies the construction and testing requirements laid down in Annex XXI, Parts 1 to 4.

2. A Member State which has granted EEC component type-approval shall take the measures required 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 limited to spot checks.

Article 64

87/402 /EEC

Article 3

Member States shall, for each type of roll-over protection structure and its tractor attachment which they approve pursuant to Article 64, issue to the manufacturer of the tractor or of the roll-over protection structure, or to his authorized representative, an EEC component type-approval mark conforming to the model shown in Annex XXI, Part 7.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between roll-over protection structures which have been component type-approved pursuant to Article 64 and other devices.

Article 65

87/402 /EEC

Article 4

1. No Member State may prohibit the placing on the market of roll-over protection structures or their tractor attachments on grounds relating to their construction if they bear the EEC component type-approval mark.

2. Nevertheless, a Member State may prohibit the placing on the market of roll-over protection structures bearing the EEC component type-approval mark which fail to conform to the approved type.

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

Article 66

87/402/EEC

Article 5

The competent authorities of each Member State shall within one month send to the competent authorities of the other Member States copies of the component type-approval certificates, the model of which is given in Annex XXI, Part 8, completed for each type of roll-over protection structure which they approve or refuse to approve.

Article 67

87/402 /EEC

Article 6

1. If the Member State which has granted EEC component type-approval finds that a number of roll-over protection structures and their tractor attachments 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 approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken which may, where there is serious and repeated failure to conform, 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 the Member States shall within one month inform each other of any withdrawal of EEC component type-approval and of the reasons for any such measure.

Article 68

87/402/EEC

Article 7

Any decision taken pursuant to the provisions adopted in implementation of this section to refuse or withdraw component type-approval for roll-over protection structures and their tractor attachments, or to prohibit their placing on the market or their use, shall set out in detail the reasons on which it is based. Such decision shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in the Member States and of the time limits allowed for the exercise of such remedies.

Article 69

87/402/EEC

Article 8

No Member State may refuse to grant EEC type-approval or national type-approval in respect of a tractor on grounds relating to the roll-over protection structure or its tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XXI, Part 9 have been met.

Article 70

87/402/EEC

Article 9

1. No Member State may refuse or prohibit the sale, registration, entry into service or use of any tractor on grounds relating to the roll-over protection structure and its tractor attachment if these bear the EEC component type-approval mark and if the requirements laid down in Annex XXI, Part 9 have been met.

However, Member States may, in compliance with the Treaty, impose restrictions on the use of tractors referred to in this section in certain areas where safety so dictates, owing to the specific nature of certain terrains or crops. Member States shall inform the Commission of any such restrictions before they are implemented and of the reasons for their adoption.

2. This section shall not affect the right of Member States to specify — in due compliance with the Treaty — the requirements they deem necessary to ensure that workers are protected when using the tractors in question, provided this does not mean that the protection structures are modified in a way unspecified in this section.

Article 71

87/402/EEC

Article 10

1. In connection with EEC type-approval, any tractor to which Article 63 refers must be fitted with a roll-over protection structure.

2. The structure, referred to in paragraph 1, unless it is a rear-mounted protection structure, must comply with the requirements laid down in Annex XXI, Parts 1 to 5, Annex XII, or Annex XVIII.

Article 72

87/402/EEC

Section 10 : Maximum design speed and loading platforms

Article 4

Article 73

74/152 /EEC

1. No Member State may prohibit the fitting of load platforms or require that tractors must be fitted with one or more such platforms.

2. No Member State may prohibit the carriage on such platforms of products which they permit to be carried on trailers used for agriculture or forestry purposes; within the limits laid down by the manufacturer, a maximum load of at least 80 % of the weight of the tractor in running order is authorized.

Chapter V : General and final provisions

Article 12

1. A Committee on the Adaptation to Technical Progress of the Directives on the Removal of Technical Barriers to Trade in the Agricultural and Forestry Tractors Sector, hereinafter called 'the Committee', is hereby set up; it shall consist of representatives of the Member States with a representative of the Commission as Chairman.

2. The Committee shall adopt its own rules of procedure.

Article 74

74/150/EEC

Article 13

1. Where the procedure laid down in this Article is to be followed, matters shall be referred to the Committee by the Chairman, either on his own initiative or at the request of the representative of a Member State.

2. The representative of the Commission shall submit to the Committee a draft of the measures to be taken. The Committee shall deliver its opinion on the draft within a time limit which the Chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148 (2) of the Treaty. The Chairman shall not vote.

3. (a) The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the Committee.

   (b) If the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council the measures to be adopted. The Council shall act by a qualified majority.

   (c) If, within three months of the proposal being submitted to it, the Council has not acted, the proposed measures shall be adopted by the Commission.

Article 75

74/150/EEC

OJ L 302/85

Article 11

The modifications which are necessary in order to adapt to technical progress the provisions concerning the approximation of the laws relating to:

- type-approval of wheeled agricultural or forestry tractors;
- certain components and characteristics of wheeled agricultural or forestry tractors;
- the maximum design speed and the loading platforms of wheeled agricultural or forestry tractors;
- the rear-view mirrors of wheeled agricultural or forestry tractors;
- the field of vision and the windscreen wipers of wheeled agricultural or forestry tractors;
- the steering equipment of wheeled agricultural or forestry tractors;
- the removal of radio interference produced by the engine ignition-control equipment of wheeled agricultural or forestry tractors;
- the power take-offs on the wheeled agricultural or forestry tractors for the use of lights and light-signalling of tools, machines or trailers to be used in agricultural or forestry work,
- the braking systems of wheeled agricultural or forestry tractors;
- the passenger seats in wheeled agricultural or forestry tractors;
- the driver-perceived noise level of wheeled agricultural or forestry tractors;
- the protection devices in case of roll-over of wheeled agricultural or forestry tractors which include static testing;
- protective measures against the emission of pollutants from diesel engines for use in wheeled agricultural or forestry tractors;

Article 76

74/150/EEC
(adapted)

- the driver's seat of wheeled agricultural or forestry tractors;
- the type-approval and installation of lighting and light-signalling devices for wheeled agricultural or forestry tractors;
- the towing and reversing devices for wheeled agricultural or forestry tractors;
- the operating-space, access to the driving position and the doors and windows of wheeled agricultural or forestry tractors;
- the roll-over protection structure at the front and rear of the narrow track wheeled agricultural or forestry tractors;
- the power take-offs of wheeled agricultural and forestry tractors and their protection;
- the installation, location, operation and identification of the controls of wheeled agricultural or forestry tractors;

shall be adopted in accordance with the procedure provided for in Article 75, with the exception of points I.1. and I.4.1.2. of Annex II, Part 6.

Article 77

1. The Member States shall take the necessary measures to comply with this Directive not later than the date listed for each Directive separately in Annex B, and shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the texts of the main provisions of national law which they adopt in the fields covered by this Directive.

Article 78

The Directives listed in Annex A are repealed.

References made to the repealed Directives shall be construed as references to this Directive and are to be read in accordance with the correlation table set out in Annex C.

Article 79

This Directive is addressed to the Member States.

Done at Brussels,

For the Council
The President

ANNEX I

TYPE-APPROVAL OF WHEELED AGRICULTURAL OR FORESTRY TRACTORS
PART 1 : MODEL INFORMATION DOCUMENT (a)

0. GENERAL

0.1. Make (name of undertaking)

0.2. Type and commercial description (mention any variants)

0.3. Name and address of manufacturer

0.4. Name and address of manufacturer's authorized representative (if any)

0.5. Location of statutory plates and inscriptions and method of fixing:

0.5.1. On the tractor itself

0.5.2. On the engine

0.6. The serial numbers of tractors of this type commence at No ...

1. GENERAL CONSTRUCTION CHARACTERISTICS OF THE TRACTOR

(attach 3/4 front and 3/4 rear photographs and a dimensioned sketch of the whole tractor)

1.1. Number of axles and wheels

1.1.1. Number of axles with double tyres (if applicable)

1.2. Powered wheels (number, position, connection to other axles)

1.3. Position and arrangement of the engine

2. WEIGHTS AND DIMENSIONS (b) (in mm and kg)

2.1. Wheelbase(s) (c)

2.2. Width of track of each axle (measured between the symmetry planes of single or double tyres normally fitted) (to be stated by the manufacturer) (d)

2.3. Maximum (or overall) tractor dimensions excluding optional accessories but including coupling unit

2.3.1. length (e)

2.3.2. width (f)

2.3.3. height (g)

2.3.4. forward overhang (h)

2.3.5. rear overhang (i)

2.3.6. ground clearance (i)

2.4. Unladen weight of tractor in running order, i.e. excluding optional accessories but including coolant, oils, fuel, tools and driver (k)

2.4.1. Distribution of this weight between the axles

2.5. Ballast weights (description)

2.5.1. Distribution of these weights between the axles

2.6. Maximum weight technically permissible as stated by the manufacturer

2.6.1. Maximum laden weight of the tractor according to the tyre specification

2.6.1.1. Distribution of this weight between the axles

2.6.2. Limits on the distribution of this weight between the axles (specify the minimum limits in percentages on the front axle ... and on the rear axle ...)

2.6.3. Maximum weight on each of the axles according to the tyre specification

2.6.4. Maximum towable weight

2.6.5. Maximum vertical load at the coupling point (hook or special threepoint linkage system) (l)

2.6.5.1. Position of point of application of this vertical load.

2.6.5.1.1. Height above the ground

2.6.5.1.2. Distance between the vertical planes through the centre of the rear axle and the coupling point

3. ENGINE

3.1. Manufacturer

3.2. Name

3.3. Type (spark-ignition, compression ignition etc.), cycle

3.4. Number and arrangement of cylinders

3.5. Bore, stroke and capacity of cylinders

3.6. Maximum power output (specify the standard used e.g. ISO, BSI, CUNA, DIN, DGM, SAE) at ...... rpm with the governor in operation

3.7. Maximum torque at ...... rpm (same standard as for point 3.6)

3.8. Normal fuel

3.9. Fuel tanks (capacity and position)

3.10. Reserve fuel tanks (capacity and position)

3.11. Fuel supply system (type)

3.12. Supercharger (if fitted) (type, control, supercharging pressure)

3.13. Speed governor (if fitted) (operating principles)

3.14. Electrical system (voltage, positive or negative earth)

3.15 Generator (type and nominal output)

3.16. Ignition (type of fittings, type of advance setting)

3.17 Interference suppressor (description)

3.18. Cooling system (air, water)

3.19. External sound level

3.20. Exhaust system (silencer) (sketch)

3.21. Measures taken against air pollution

3.22. Engine stopping device

4. TRANSMISSION (Sketch of the transmission plus drawing) (m)

4.1. Type (mechanical, hydraulic, electrical etc.)

4.2. Clutch (type)

4.3. Gearbox (type, direct engagement, method of control)

4.4. Transmission from engine to gearbox, rear axle(s), transfer or intermediate gears (if fitted)

4.5. Gear radio with or without transfer box(es) (n)

Gear	Gearbox ratios	Final drive ratio	Overall gear ratios
1			
2			
3			
......			
Reverse			

4.6. Maximum tractor speed in top gear in kph (show factors used in calculation) (n)

4.7. Forward movement of powered wheels corresponding to one revolution

4.8. Speedometer, tachometer and hour meter (if fitted)

4.9. Differential lock (if fitted)

4.10. Power take-offs (revolutions per minute and ratio of this figure to that of the engine) (number and position):

4.10.1. — main power take-off

4.10.2. — others

4.11. Protection of power take-offs

4.12. Protection of engine parts, projecting parts and wheels

4.12.1 singleface protection

4.12.2. multiface protection

4.12.3. total enclosure protection

5. SUSPENSION

5.1. Tyres normally fitted (dimensions, characteristics, inflation pressure for road use and maximum permissible load)

5.2. Type of suspension (if fitted) for each axle or wheel

5.3. Other devices (if any)

6. STEERING (sketch)

6.1. Type of mechanism and transmission to wheels, method of assistance (if any) (method and diagram of operation, make and type if necessary), and steering effort on the steering wheel

6.2. Maximum turning angle of the wheels:

6.2.1. to the right ... (degrees): number of steering wheel turns

6.2.2. to the left ... (degrees): number of steering wheel turns

6.3. Minimum turning circle (without braking) (o):

6.3.1. to the right

6.3.2. to the left

7. BRAKES (overall sketch and operating sketch) (p)

7.1. Service braking device

7.2. Secondary braking device (if fitted)

7.3. Parking braking device

7.4. Additional braking devices (if fitted) (including retarder)

7.5. Calculation of the braking system: determination of the ratio between the total braking forces at the circumference of the wheels and the force applied to the braking control

7.6. Linkage for left and right braking controls

7.7. Sources of energy (if any) (characteristics, capacity of energy reservoirs, maximum and minimum pressure, pressure gauge and minimum pressure warning device on the dashboard, vacuum reservoirs and supply valve, supply compressors, compliance with provisions regarding pressure equipment)

7.8. Tractors designed to pull a trailer:

7.8.1. trailer brake actuating device

7.8.2. connections, couplings, safety devices

8. FIELD OF VISION, REAR-VIEW MIRRORS, PROTECTIVE DEVICES IN THE EVENT OF OVERTURNING, WEATHER PROTECTION, SEATS AND LOAD PLATFORMS, SOUND LEVEL AT THE DRIVER'S EAR

8.1. Field of vision 74/150/EEC

8.2. Rear-view mirrors

8.3. Protective devices in the event of overturning

8.3.1. Description (type, detachable or not, etc.)

8.3.2. Internal and external dimensions

8.3.3. Materials and method of construction

8.4. Cab, general provisions

8.4.1. Doors (number, dimensions, direction of opening, latches and hinges)

8.4.2. Windscreen and other windows (if any) (number and position, materials used)

8.4.3. Windscreen wiper

— '8.4.4. Driver's operating space',

— '8.4.5. Windows'. 79/694/EEC

8.5. Other weather protection arrangements 74/150/EEC

8.6. Seats and foot rests

8.6.1. Driving seat (position and characteristics)

8.6.2. Passenger seats (number, dimensions, position and characteristics)

8.6.3. Foot rests

8.7. Load platform

8.7.1. Dimensions

8.7.2. Position

8.7.3. Technically permissible load

8.7.4. Distribution of load between the axles of the tractor

8.8. Sound level at the driver's ear

8.9. Means of access to the driving position

9. LIGHTING AND LIGHT SIGNALLING DEVICES

(Sketches of the exterior of the tractor showing the position of the illuminating surfaces of all devices: colour of lights)

9.1. Compulsory devices

9.1.1. Passing lights

9.1.2. Front position lights

9.1.3. Rear position lights

9.1.4. Direction indicators

9.1.5. Red rear reflex reflectors

9.1.6. Rear registration plate lights

9.2. Optional devices

9.2.1. Driving lights

9.2.2. Fog lights

9.2.3. Stop lights

9.2.4. Work lights

9.2.5. Parking lights

10. OTHER FITTINGS

10.1. Audible warning devices

10.2. Coupling device for a maximum horizontal load of ... kg, and for a maximum vertical load (if any) of ... kg (q)

10.3. Hydraulic lifting gear, three-point linkage

10.4. Power connection for lighting and light signalling devices on trailer (if any)

10.5. Location and marking of controls

10.6. Location of registration plates

10.7. Front coupling device

10.8. Hazard warning device

Notes

For each item where drawings or photographs must be attached, the numbers of the corresponding attached documents should be given.

(a) If a part has been type-approved, that part need not be described if reference is made to such approval. Similarly, a part need not be described if its construction is clearly apparent from the diagrams or sketches attached to this from.
(b) ISO Recommendation R. 612 — 1967 and R. 1176 — 1970.
(c) ISO Recommendation R. 789 — 1968 (term No A.3).
(d) ISO Recommendation R. 789 — 1968 (term No A.2).
(e) ISO Recommendation R. 789 — 1968 (term No A.5).
(f) ISO Recommendation R. 789 — 1968 (term No A.6).
(g) ISO Recommendation R. 789 — 1968 (term No A.7).
(h) ISO Recommendation R. 612 — 1967 (term No 21).
(i) ISO Recommendation R. 612 — 1967 (term No 22).
(j) ISO Recommendation R. 612 — 1967 (term No 8).
(k) The weight of the driver is assessed at 75 kg.
(l) ISO Recommendation R. 1176 — 1970 (term No 4.14).
(m) The specified particulars are to be given for any proposed variants.
(n) A 5 % tolerance is permitted.
(o) ISO Recommendation R. 789 — 1968 (term No A.14).
(p) The following particulars are to be given for each braking device:
   — type and character of brakes (dimensional sketch) (drums or discs etc., wheels braked, transmission to the system, friction surfaces, their properties and effective areas, radius of drums, shoes or discs, weight of drums and adjustment devices);
   — transmission and control (attach diagram) (construction, adjustment, lever ratios, accessibility of control and its position, ratchet controls in the case of mechanical transmission, characteristics of the main parts of the transmission, control cylinders and pistons, brake cylinders).
(q) Values in respect of the mechanical strength of the coupling device.

PART 2

EEC TYPE-APPROVAL CERTIFICATE

A. General

Type-approval certificates issued under the EEC type-approval procedure are to be completed as follows:

1. Fill in the relevant sections of the type-approval certificate, given under B of this Part on the basis of the particulars in the information document after verification of such particulars.

2. Enter the abbreviation(s) printed against each item of the model type-approval certificate after completing the relevant checks and tests:

   'CONF': check that the relevant part or characteristic conforms to the particulars in the information document;

   'SD': check that the part or characteristic in question conforms to the harmonized requirements adopted in implementation of the relevant special Directive;

   'R': compile the test report to be attached to the type-approval certificate;

   'S': check that a sketch and/or diagram has been attached.

B. Model type-approval certificate for a tractor

0.	GENERAL	
0.1.	Make (name of undertaking)	
0.2.	Type and commercial description (mention any variants)	
0.3.	Name and address of manufacturer	
0.4.	Name and address of manufacturer's authorized representative (if any)	
0.5.	Location of statutory plates and inscriptions and method of fixing such details to the tractor SD	
0.6.	The serial numbers of tractors of this type commence at No ...	
1.	WEIGHTS AND DIMENSIONS (in mm and kg)	
1.1.	Wheelbase	CONF
1.2.	Length	SD
1.3.	Width	SD
1.4.	Height unladen	SD
1.5.	Ballast weights	SD
1.6.	Technically permissible maximum laden weight	CONF
1.6.1.	Distribution of this weight between the axles	CONF
1.7.	Permissible maximum laden weight	SD
1.7.1.	Distribution of this weight between the axles	SD
1.8.	Technically permissible maximum weight on each axle	CONF
1.9.	Permissible maximum weight on each axle	SD
1.10.	Technically permissible limits on the distribution of weight between the axles	CONF
1.11.	Permissible limits for the distribution of weight between the axles	SD
1.12.	Maximum towable weight	SD

1.13.	Maximum vertical load at the coupling point	SD
2.	ENGINE	
2.1.	Manufacturer	
2.2.	Maximum power output at ...... rpm (specify the standard used)	CONF
2.3.	Fuel tanks	SD
2.3.1.	Reserve fuel tanks (if fitted)	SD
2.4.	Interference suppressor	SD-R
2.5.	Speed governor (if fitted)	SD
2.6.	External sound level	SD-R
2.7.	Exhaust system (silencer)	SD-R-S
2.8.	Air pollution	
2.8.1.	Smoke density of diesel engines	SD-R
2.9.	Engine stopping device	SD
3.	TRANSMISSION	
3.1.	Theoretical maximum speed calculated in top gear (in kph)	CONF
3.2.	Maximum speed measured in top gear (in kph)	SD
3.3.	Reserve	SD
3.4.	Power take-offs	SD
3.5.	Protection of engine parts, projecting parts and wheels	SD
4.	SUSPENSION	
4.1.	Tyres normally fitted	CONF
5.	STEERING	
5.1.	Type of mechanism and transmission to wheels	SD
5.2.	Method of assistance and steering effort on the steering wheel	SD
6.	BRAKES	
6.1.	Service braking device	SD
6.2.	Parking braking device	SD
6.3.	Additional braking devices (if fitted)	CONF
6.4.	Trailer brake control (if fitted)	SD
6.5.	Test conditions	R
6.6.	Test results	R
7.	FIELD OF VISION, REAR-VIEW-MIRRORS, PROTECTIVE DEVICES IN THE EVENT OF OVERTURNING, WEATHER PROTECTION, SEATS AND LOAD PLATFORMS AND SOUND LEVEL AT THE DRIVER'S EAR	
7.1.	Field of vision	SD
7.2.	Rear-view mirrors	SD
7.3.	Protective devices in the event of overturning	
7.3.1.	Saftey roll-bar	SD

7.3.2.	Safety frame	SD	74/150/EEC
7.3.3.	Safety cab	SD	
7.3.4.	Any other protective devices	CONF	88/297/EEC
7.4.	Cab, general provisions		
7.4.1.	Doors	SD	74/150/EEC
7.4.2.	Windscreen, and other windows	SD	
7.4.3.	Windscreen wipers	SD	
7.4.4.	Drivers operating space	SD	79/694/EEC
7.4.5.	Windows	SD	
7.5.	Other weather arrangements	CONF	88/297/EEC
7.6.	Seats and foot-rests		
7.6.1.	Driving seat	SD	74/150/EEC
7.6.2.	Passenger seats	SD	
7.6.3.	Foot-rests	CONF	88/297/EEC
7.7.	Load platform	SD	74/150/EEC
7.8.	Sound level at the driver's ear	SD	
7.9.	Means of access to driving position	SD	
8.	LIGHTING AND LIGHT SIGNALLING DEVICES		
8.1.	Compulsory devices		
8.1.1.	Passing lights	SD	
8.1.2.	Front position lights	SD	
8.1.3.	Rear position lights	SD	
8.1.4.	Direction indicators	SD	
8.1.5.	Red rear reflex reflectors	SD	
8.1.6.	Rear registration plate lights	SD	
8.2.	Optional devices		
8.2.1.	Driving lights	SD	
8.2.2.	Fog lights	SD	
8.2.3.	Stop lights	SD	
8.2.4.	Work lights	SD	
8.2.5.	Parking lights	SD	
9.	OTHER FITTINGS		
9.1.	Audible warning devices	SD	
9.2.	Coupling between tractor and trailer	SD	
9.3.	Power connection for lighting and light signalling devices on the trailer	SD	
9.4.	Location and marking of controls	SD	
9.5.	Location of registration plates	SD	
9.6.	Front coupling device	SD	
9.7.	Hazard warning device	SD	

I, the undersigned, hereby certify the accuracy of the manufacturer's description in Information Document No .... of the tractor serial No .... having the engine No [1] ...., such tractor having been submitted by the manufacturer as a prototype of model ....

The checks carried out at the request of the manufacturer, ..., show that the tractor specified above, which has been submitted as a series prototype, satisfies all requirements in respect of each and every item in this certificate.

Done at ...., ...

....
(signature)

[1] If indicated by the manufacturer.

74/150 /EEC

PART 3

MODEL

CERTIFICATE OF CONFORMITY

I, the undersigned, ...
(name of manufacturer or his authorized representative)

hereby certify that the tractor

1. Make ....
2. Type ....
3. Type serial number ....

conforms in all respects with the type approved ....

at ...., on ....

by ....

and described in Type-Approval Certificate No ....

and in Information Document No ....

Done at ...., ...
(date) (signature)

....
(position)

ANNEX II

Certain components and characteristics of wheeled agricultural or forestry tractors

PART 1 : MAXIMUM PERMISSIBLE LADEN WEIGHT

1. The technically permissible maximum laden weight as stated by the manufacturer shall be accepted by the competent administration as the maximum permissible laden weight provided that:

1.1. the results of any tests which that administration makes, in particular those in respect of braking and steering, are satisfactory.

1.2. the maximum permissible laden weight does not exceed 14 metric tons and the maximum permissible weight per axle does not exceed 10 metric tons.

2. Whatever the state of loading of the tractor, the weight transmitted to the road by the wheels on the forward axle must not be less than 20% of the unladen weight of that tractor.

PART 2

1. SHAPE AND DIMENSIONS OF THE SPACE FOR MOUNTING REAR REGISTRATION PLATES

The space for mounting shall comprise an even or virtually even rectangular surface with the following minimum dimensions:

— length 240 mm;
— height 165 mm.

2. LOCATION OF THE SPACE FOR MOUNTING AND THE FIXING OF THE PLATES

The space for mounting shall be such that, after correct fixing, the plates shall have the following characteristics:

2.1. **Position of the plate in relation to the width of the vehicle**

The centre point of the plate may not be situated to the right of the plane of symmetry of the tractor in Member States where traffic drives on the right or to the left of that plane where traffic drives on the left.

In Member States where traffic drives on the right, the left-hand edge of the plate may not be situated to the left of the vertical plane which is parallel to the plane of symmetry of the tractor and which touches the extreme outer edge of the vehicle.

In Member States where traffic drives on the left, the right-hand edge of the plate may not be situated to the right of the vertical plane which is parallel to the plane of symmetry of the tractor and which touches the extreme outer edge of the vehicle.

2.2. Position of the plate in relation to the longitudinal plane of symmetry of the tractor

The plate shall be perpendicular or practically perpendicular to the plane of symmetry of the tractor.

2.3. Position of the plate in relation to the vertical plane

The plate shall be vertical within a tolerance of 5°. However, where the shape of the tractor so requires, it may be inclined to the vertical:

2.3.1. at not more than 30° when the surface bearing the registration number is inclined upwards, provided that the height of the upper edge of the plate is not more than 1·20 metres from the ground;

2.3.2. at not more than 15° when the surface bearing the registration number is inclined downwards, provided that the height of the upper edge of the plate is more than 1·20 metres from the ground.

2.4. Height of the plate from the ground

The height of the lower edge of the plate from the ground shall not be less than 0·30 metres: the height of the upper edge of the plate from the ground shall be not more than 1·20 metres. However, where it is impossible in practice to comply with this latter provision, the height may exceed 1·20 metres, but it must then be as close to that limit as the constructional characteristics of the tractor allow, and must in no case exceed 2·5 metres. 74/151/EEC

2.5. Determination of the height of the plate from the ground

The heights given in points 2.3 and 2.4 shall be measured with the tractor unladen.

PART 3

TANKS FOR LIQUID FUEL

74/151/EEC

1. Fuel tanks must be made so as to be corrosion resistant. They must satisfy the leakage tests carried out by the manufacturer at a pressure equal to double the working pressure but in any event not less than 0.3 bars. Any excess pressure or any pressure exceeding the working pressure must be automatically compensated by suitable devices (vents, safety valves etc.). The vents must be designed in such a way as to prevent any fire risk. The fuel must not escape through the fuel-tank cap or through the devices provided to compensate excess pressure even if the tank is completely overturned: a drip shall be tolerated. 88/410/EEC 74/151/EEC

2. Fuel tanks must be installed in such a way as to be protected from the consequences of an impact to the front or to the rear of the tractor; there shall be no protruding parts, sharp edges etc. near the tanks.

PART 4

BALLAST WEIGHTS

74/151/EEC

If, in order to satisfy the provisions laid down for EEC type-approval, a tractor has to be fitted with ballast weights, these weights must be provided by the manufacturer, be made of metal, designed for fixing to the tractor, and bear the mark of the firm manufacturing them and an indication of their approximate weight in kilograms. 88/410/EEC

PART 5

74/151/EEC

AUDIBLE WARNING DEVICE

1. The warning device must bear the EEC approval mark prescribed by the Council Directive 70/388/EEC of 27 July 1970 on the approximation of the laws of Member States relating to audible warning devices for motor vehicles (1).

2. Characteristics of the Audible Warning Device when fitted to the tractor

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(1) OJ No L 176, 10.8.1970, p. 12.

2.1. Acoustic tests

When a tractor is type approved, the characteristics of the warning device fitted to that type of tractor shall be tested as follows:

2.1.1. The sound pressure level of the device when fitted to the tractor shall be measured at a point 7 metres in front of the tractor, at a site which is open and as level as possible. The engine of the tractor shall be stopped. The effective voltage shall be that laid down in point 1.2.1. of Annex I to the Directive referred to at 1 above.

2.1.2. Measurements shall be made on the 'A' weighting scale of the IEC (International Electrotechnical Commission) standard.

2.1.3. The maximum sound pressure level shall be determined at a height between 0·5 and 1·5 metres above ground level.

2.1.4. The said maximum must be not less than 93 dB (A).

PART 6

I. PERMISSIBLE SOUND LEVELS

I.1. Limits

The sound level of the tractors referred to in Article 1 of this Directive, when measured under the conditions set out in this Annex, may not exceed the following levels:

89 dB (A) for tractors with an unladen weight exceeding 1·5 metric tons;

85 dB (A) for tractors with an unladen weight not exceeding 1·5 metric tons.

I.2. Measuring instruments

The noise emitted by tractors shall be measured by means of a sound-level meter of the type described in Publication 179, 1st Edition (1965) of the International Electrotechnical Commission.

I.3. Conditions of measurement

Measurements shall be made on unladen tractors in a sufficiently silent and open area (ambient noise and wind noise at least 10 dB (A) below the noise being measured).

This area may take the form, for instance, of an open space of 50 metre radius having a central part of at least 20 metres radius which is practically level; it may be surfaced with concrete, asphalt, or similar material and may not be covered with powdery snow, tall grass, loose soil or ashes.

The surface of the test track shall be such as not to cause excessive tyre noise. This condition applies only to measurement of the noise made by tractors in motion.

Measurement shall be carried out in fine weather with little wind. No person other than the observer taking the readings from the apparatus may remain near the tractor or the microphone, as the presence of spectators near either the tractor or the microphone may considerably affect the readings from the apparatus. Marked fluctuations of the pointer which appear to be unrelated to the characterstics of the general sound level shall be ignored in taking readings.

I.4. Method of measurement

I.4.1. Measurement of noise of tractors in motion (for type-approval).

At least two measurements shall be made on each side of the tractor. Preliminary measurements may be made for adjustment purposes but shall be disregarded.

The microphone shall be situated 1·2 metres above ground level at a distance of 7·5 metres from the path of the tractor's centre line, CC, measured along the perpendicular PP' to that line (figure 1).

Two lines AA' and BB', parallel to line PP' and situated respectively 10 metres forward and 10 metres rearward of the line, shall be marked out on the test track. Tractors shall approach line AA' at a steady speed, as specified below. The throttle shall then be fully opened as rapidly as practicable and held in the fully opened position until the rear of the tractor ([1]) crosses line BB'; the throttle shall then be closed again as rapidly as possible.

The maximum sound level recorded shall constitute the result of the measurement. 74/151/EEC

I.4.1.1. The test speed shall be three-quarters of the maximum speed which can be attained in the highest gear used for road movement.

I.4.1.2. Interpretation of results

I.4.1.2.1. To take account of inaccuracies in the measuring instruments, the result obtained from each measurement shall be determined by deducting 1 dB (A) from the meter reading.

I.4.1.2.2. Measurements shall be considered valid if the difference between two consecutive measurements on the same side of the tractor does not exceed 2 dB (A).

I.4.1.2.3. The highest sound level measured shall constitute the test result. Should that result exceed by 1 dB (A) the maximum permissible sound level for the category of tractor tested, two further measurements shall be made. Three of the four measurements thus obtained must fall within the prescribed limits.

Measuring positions for tractors in motion 88/410/EEC

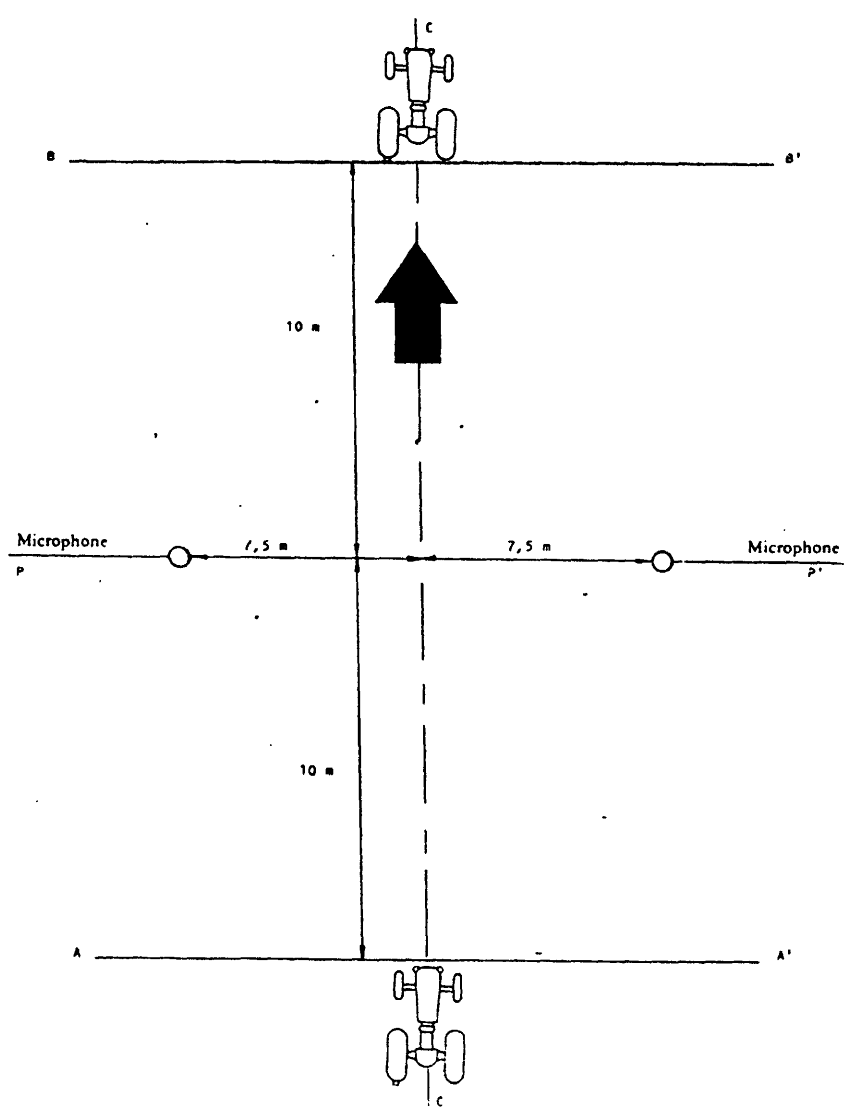


Figure 1

([1]) If the tractor includes a trailer, this shall not be taken into account in determining when line BB' is crossed. 74/151/EEC

'1.4.2 Measurement of noise with tractor stationary (not for type approval, but must be recorded)'. 88/410 /EEC

1.4.2.1. Position of sound level meter

Measurements shall be made at point X (shown in figure 2) at a distance of 7 metres from the nearest surface of the tractor.

The microphone shall be situated 1·2 metres above ground level.

1.4.2.2. Number of measurements 74/151 /EEC

At least two measurements shall be made.

1.4.2.3. Tractor test conditions

The engine of a tractor without a speed governor shall be run at three-quarters of the rpm speed at which, according to the tractor manufacturer, it develops its maximum power. The rpm speed of the engine shall be measured by means of an independent instrument, e.g. a roller bed and a tachometer. If the engine is fitted with a governor preventing the engine from exceeding the speed at which it develops its maximum power, it shall be run at the maximum speed permitted by the governor.

Before taking any measurements, the engine shall be brought to its normal running temperature.

1.4.2.4. Interpretation of results

All sound-level readings recorded shall be given in the report.

The method used to calculate the engine power shall also be shown where possible. The state of loading of the tractor must also be given.

The measurements shall be considered valid if the difference between two consecutive measurements on the same side of the tractor does not exceed 2 dB (A).

The maximum figure recorded shall constitute the result of the measurement.

Measuring positions for stationary tractors 88/410 /EEC

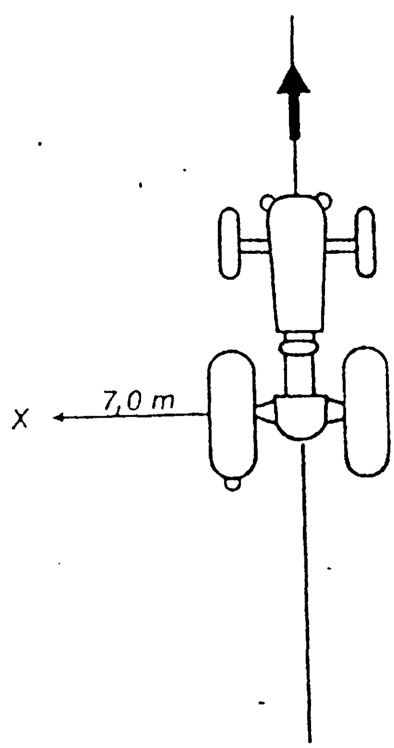


Figure 2

74/151/EEC

II. EXHAUST SYSTEM (SILENCER)

II.1. If the tractor is fitted with a device designed to reduce the exhaust noise (silencer), the requirements of this Item II shall apply. If the inlet of the engine is fitted with an air filter which is necessary in order to ensure compliance with the permissible sound level, the filter shall be considered to be part of the silencer, and the requirements of this Item II shall also apply to that filter.

II.2. A drawing of the exhaust system must be annexed to the tractor type-approval certificate

II.3. The silencer must be marked with a reference to its make and type which is clearly legible and indelible.

II.4. The use of fibrous absorbent material is permitted in the construction of silencers only if the following conditions are fulfilled:

II.4.1. The fibrous absorbent material may not be placed in those parts of the silencer through which gases pass;

II.4.2. Suitable devices must ensure that the fibrous absorbent material is kept in place for the whole time that the silencer is being used;

II.4.3. The fibrous absorbent material must be resistant to a temperature at least 20 % higher than the operating temperature (degrees C) which may occur in the region of the silencer where those fibrous absorbent materials are situated.

ANNEX III : MAXIMUM DESIGN SPEED - LOAD PLATFORMS

74/152 /EEC

1. MAXIMUM DESIGN SPEED

1.1. For the type-approval tests, the average speed shall be measured on a straight track, which the tractor shall traverse in both directions from a flying start. The soil of the track shall be stabilized; the track shall be flat and at least 100 metres long; however it may include slopes of not more than 1·5 %.

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

85/413/EEC

'1.3. During the test the tractor shall be fitted with new pneumatic tyres having the greatest rolling radius intended by the manufacturer for the tractor'.

74/152/EEC

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

82/890/EEC

'1.5. In order to take account of various unavoidable errors due, in particular, to the measuring technique and to the increase in running speed of the engine with a partial load, a result 10 % higher than the 30 km/h value shall be acceptable for the type-approval test.'

74/152/EEC

1.6. So that the authorities competent for the type-approval of tractors may calculate their maximum theoretical speed, the manufacturer shall specify as a guide the gear ratio, the actual foward movement of the powered wheels corresponding to one complete revolution, and the rpm at maximum power output with the throttle fully open and the speed governor, if fitted, adjusted as laid down by the manufacturer.

2. LOAD PLATFORMS

2.1. The centre of gravity of the platform shall be situated between the axles.

2.2. The dimensions of the platform shall be such that:

— the length does not exceed 1·4 times the front or rear track of the tractor, whichever is the larger;

— the width does not exceed the maximum overall width of the tractor without equipment.

2.3. The platform shall be laid out symmetrically in relation to the longitudinal median plane of the tractor.

2.4. The height of the load platform above the ground shall be not more than 150 cm.

2.5. The type of platform and the way it is fitted shall be such that, with a normal load, the driver's field of vision remains adequate and the various compulsory lighting and light-signalling devices may continue to fulfil their proper function.

2.6. The load platform shall be detachable; it shall be attached to the tractor in such a way as to avoid any risk of accidental detachment.

ANNEX IV
REAR-VIEW MIRRORS

1. DEFINITIONS

1.1. 'Rear-view mirror' means any device intended to give, within the field of vision geometrically defined in point 2.5 below, a clear view to the rear which, within reasonable limits, is not blocked by component parts of the tractor or by the occupants of the tractor itself.

1.2. 'Interior rear-view mirror' means a device as defined in point 1.1 which is fitted inside the cab or frame of a tractor.

1.3. 'Exterior rear-view mirror' means a device as defined in point 1.1 which is mounted on any part of the external surface of a tractor.

1.4. 'Class of rear-view mirror' means all rear-view mirrors having one or more common characteristics or functions. Interior rear-view mirrors are grouped in class I, exterior rear-view mirrors in class II.

2. REQUIREMENTS FOR FITTING

2.1. **General**

2.1.1. Tractors may be fitted with rear-view mirrors of classes I and II only bearing the EEC type-approval mark laid down in Council Directive No 71/127/EEC (1) of 1 March 1971 on the approximation of the laws of the Member States relating to the rear-view mirrors of motor vehicles, as last amended by Directive 88/32/EEC.

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

2.2. **Number**

All tractors shall be equipped with at least one exterior rear-view mirror fitted to the left side of the tractor in Member States in which traffic drives on the right and to the right side of the tractor in Member States in which traffic drives on the left.

2.3. **Position**

2.3.1. The exterior rear-view mirror must be so placed that the driver, when sitting on the driving seat in a normal driving position, has a clear view of that part of the road defined in point 2.5.

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

2.3.3. The rear-view mirror must not protrude beyond the external bodywork of the tractor or the tractor-trailer combination substantially more than is necessary to obtain the fields of vision laid down in point 2.5.

2.3.4. Where the bottom edge of an exterior rear-view mirror is less than 2 m above the ground when the tractor is laden, this rear-view mirror must not project more than 0·20 m beyond the overall width of the tractor or tractor-trailer combination measured without rear-view mirrors.

2.3.5. Subject to the requirements of points 2.3.3 and 2.3.4, rear-view mirrors may project beyond the tractor's permissible maximum width.

2.4. **Adjustment**

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

2.4.2. The driver must be able to adjust the exterior rear-view mirror from within the tractor. The mirror may, however, be locked into position from the outside.

(1) OJ No L 68, 22.3.1971, p. 1.
(2) OJ No L 147, 16.6.1988, p. 77.

2.4.3. The requirements of point 2.4.2 do not apply to exterior rear-view mirrors which, after being displaced, are returned automatically to their original position or can be restored to their original position without the use of tools.

2.5. **Fields of vision**

2.5.1. *Member States in which traffic drives on the right*

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

2.5.2. *Member States in which traffic drives on the left*

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

74/347 /EEC

ANNEX V

FIELD OF VISION AND WINDSCREEN WIPERS

DEFINITIONS AND REQUIREMENTS

1. DEFINITIONS

1.1. Field of vision

'Field of vision' means all forward and lateral directions in which the driver of the tractor can see.

1.2. Reference point

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

1.3. Semi-circle of vision

'Semi-circle of vision' means the semi-circle described by a radius of 12 m about a point situated in the horizontal plane of the road vertically below the reference point, in such a way that, when facing the direction of motion, the arc of the semi-circle lies in front of the tractor, while the diameter bounding the semi-circle is at right angles to the longitudinal axis of the tractor (Figure 2).

79/1073 /EEC

Masking effect

1.4 'Masking effect' means the chords of the sectors of the semi-circle of vision which cannot be seen owing to structural components such as roof-pillars, air intakes or exhaust stacks and the frame of the windscreen.

74/ 347 /EEC

1.5. Sector of vision

'Sector of vision' means that part of the field of vision bounded:

1.5.1. at the top,

by a horizontal plane passing through the reference point;

1.5.2. in the plane of the road,

by the zone lying outside the semi-circle of vision, and forming the continuation of the sector of the semi-circle of vision, the chord of which is 9·5 m long, perpendicular to the plane parallel to the longitudinal median plane of the tractor passing through the centre of the driver's seat and bisected by that plane.

1.6. Swept area of the windscreen wipers

'Swept area of the windscreen wipers' means the area of the outer surface of the windscreen swept by the windscreen wipers.

2. REQUIREMENTS

2.1 General

The tractor shall be constructed and equipped in such a way that, in road traffic and in farm and forest use, the driver has an adequate field of vision, under all the usual conditions pertaining to highway use and to work undertaken in fields and forests. The field of vision is considered adequate when the driver has, as far as possible, a view of part of each front wheel and when the following requirements are fulfilled.

2.2. Checking of the field of vision 74/347 /EEC

2.2.1. Procedure for determining masking effects

2.2.1.1. The tractor must be placed on a horizontal surface as shown in Figure 2. On a horizontal support level with the reference point, there must be mounted two point sources of light, e.g. 2 × 150 W, 12 V, 65 mm apart and symmetrically located with respect to the reference point. The support must be rotatable at its centre point about a vertical axis passing through the reference point. For the purpose of measuring the masking effects, the support must be so aligned that the line joining the two light sources is perpendicular to the line joining the masking component and the reference point. 79/1073 /EEC

The silhouette (deepest shadow) overlaps projected on to the semi-circle of vision by the masking component when the light sources are switched on simultaneously or alternately must be measured in accordance with 1.4 (Figure 3).

2.2.1.2. Masking effects must not exceed 700 mm.

2.2.1.3. Masking effects due to adjacent structural components over 80 mm in width must be so configured that there is an interval of not less than 2 200 mm — measured as a chord of the semi-circle of vision — between the centres of two masking effects.

2.2.1.4. There may be no more than six masking effects in the semi-circle of vision and no more than two inside the sector of vision defined in point 1.5. 74/347 /EEC

2.2.1.5

Outside the sector of vision, masking effects exceeding 700 mm but not exceeding 1 500 mm are, however, permissible if the components causing them cannot be redesigned or relocated: on each side there may be a total of either two such masking effects, one not exceeding 700 mm and the other not exceeding 1 500 mm, or two such masking effects, neither exceeding 1 200 mm. 79/1073 /EEC

2.2.1.6. Blind spots caused by type-approved rear-view mirrors may be disregarded if the design of these mirrors is such that they cannot be installed in any other way.

2.2.2. Mathematical determination of masking effects for binocular vision: 74/347/EEC

2.2.2.1. As an alternative to the procedure set out in point 2.2.1, the acceptability of individual masking effects can be determined mathematically. The requirements of points 2.2.1.2, 2.2.1.3, 2.2.1.4, 2.2.1.5 and 2.2.1.6 shall apply in respect of the size, distribution and number of the masking effects. 79/1073/EEC

2.2.2.2. for binocular vision with an inter-ocular distance of 65 mm, the masking effect expressed in mm is given by the formula: 74/347/EEC

$$v = \frac{b - 65}{a} \times 12000 + 65$$

in which:

a is the distance in millimetres between the component obstructing vision and the reference point measured along the visual radius joining the reference point, the centre of the component and the perimeter of the semi-circle of vision;

b is the width in millimetres of the component obstructing vision measured horizontally and perpendicular to the visual radius.

2.3. The test methods referred to under point 2.2 may be replaced by others if the latter can be shown to be equivalent.

2.4. Where, in the case of masking effects, Article 8 (3) of this Directive is to be applied, the procedure used shall be that given under point 2.2.2.

2.5 For the purpose of determining the masking effects in the sector of vision, the masking effects due to the frame of the windscreen and to any other obstacle may, in accordance with the provisions of point 2.2.1.4, be considered as a single effect, provided that the distance between the outermost points of this masking effect does not exceed 700 mm. 79/1073 /EEC

2.6. Windscreen wipers 74/347 /EEC

2.6.1. Tractors fitted with windscreens must also be equipped with motor-driven windscreen wipers and the area swept by these wipers must ensure an unobstructed forward view corresponding to a chord of the semi-circle of vision at least 8 m long within the sector of vision.

2.6.2. The rate of operation of the windscreen wipers must be at least 20 cycles per minute.

74/347/EEC

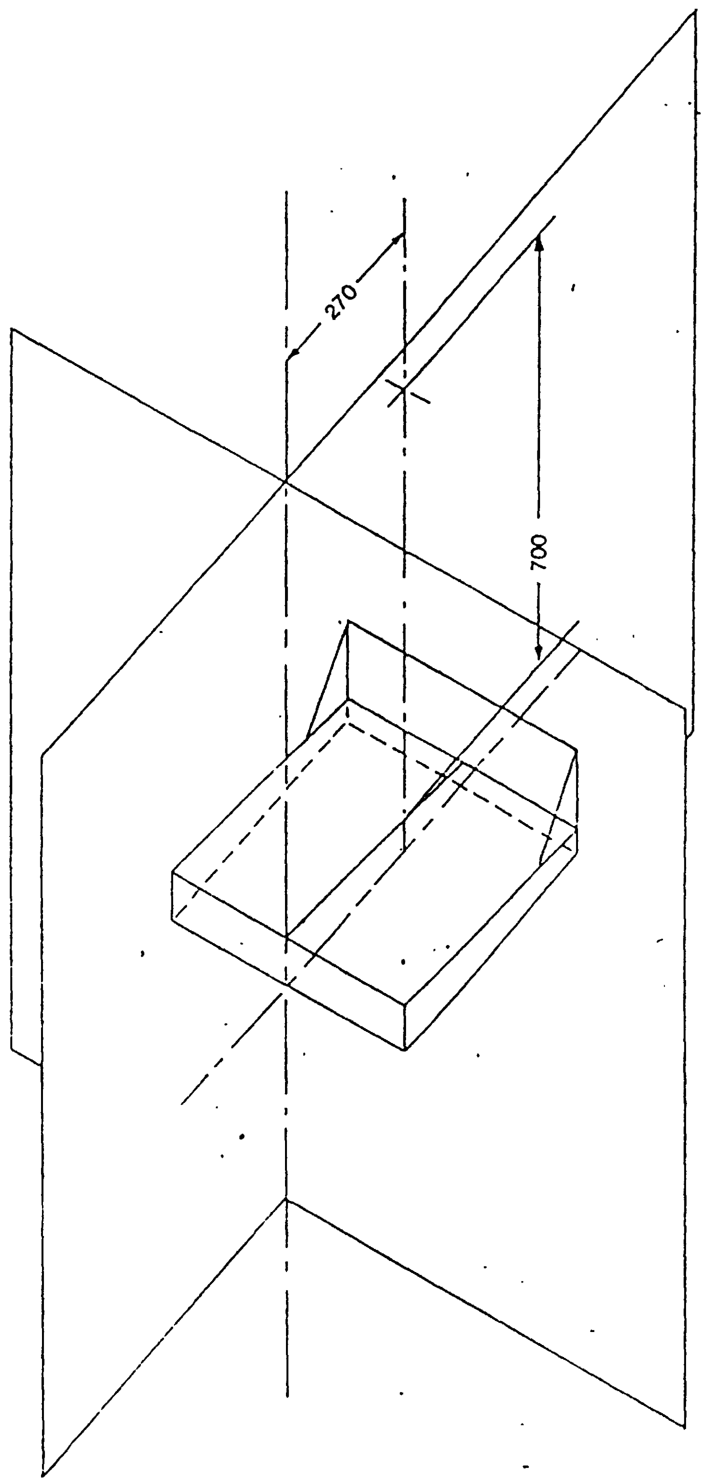


Figure 1

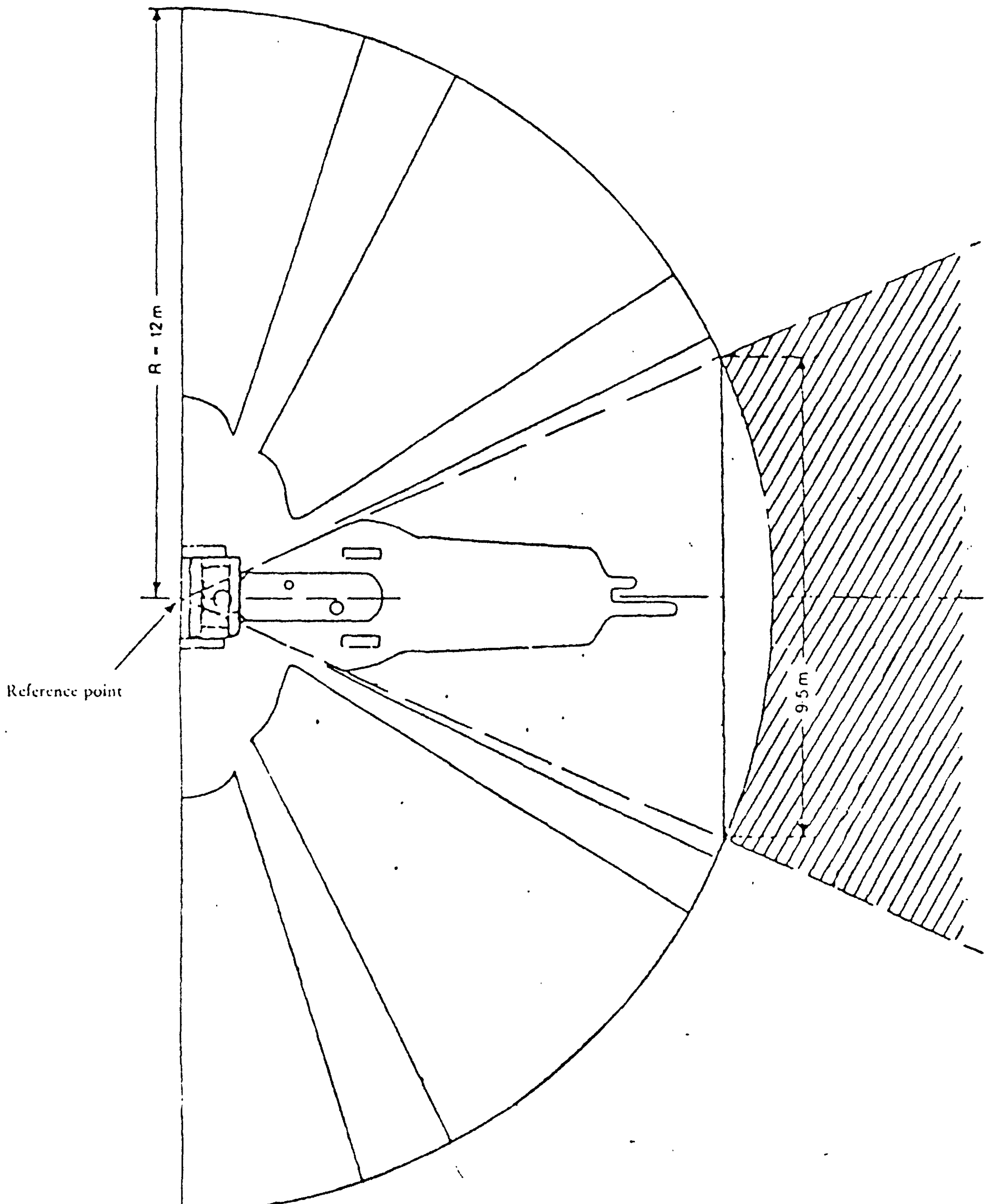
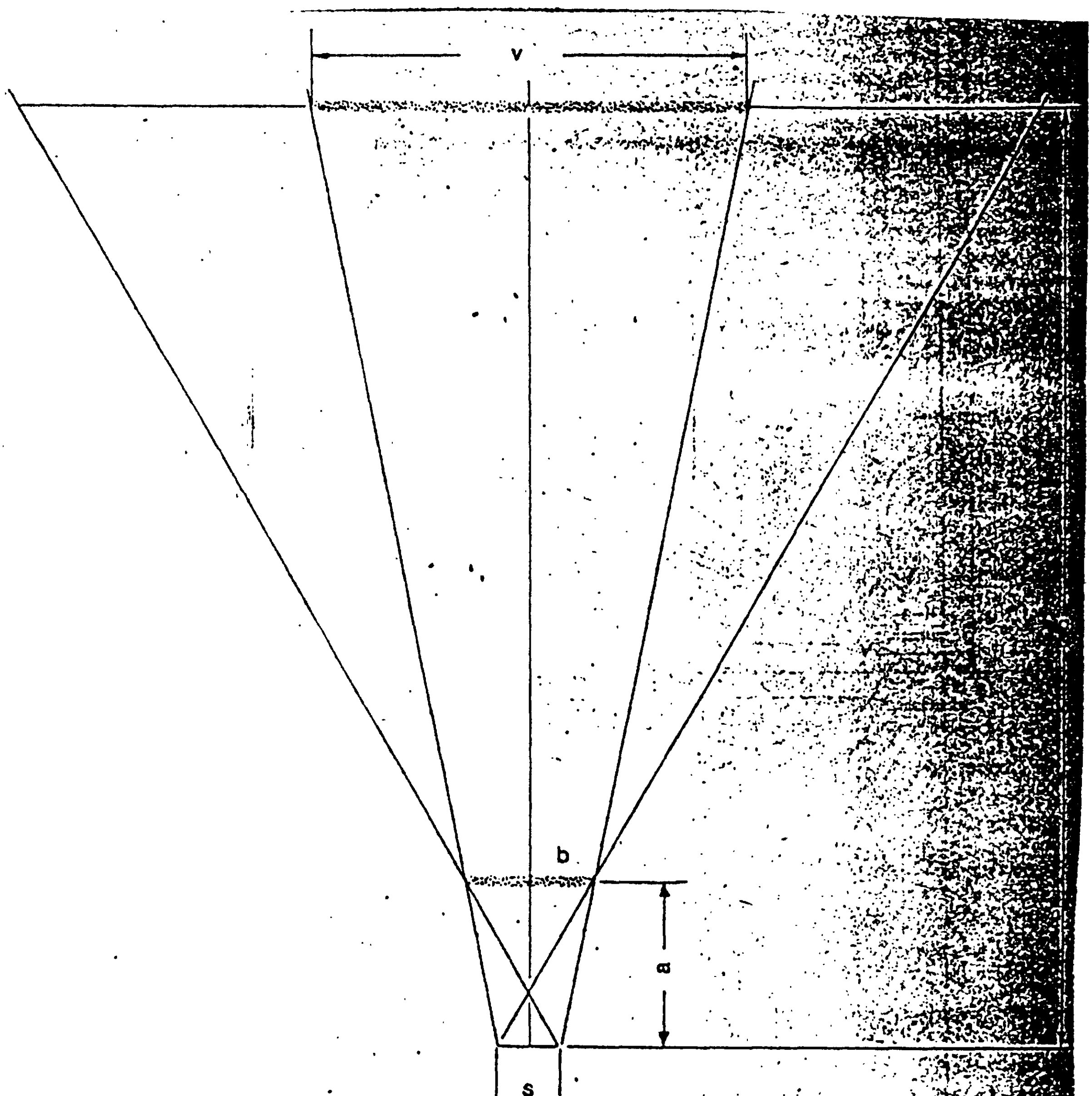


Figure 2



$$\frac{\frac{v}{2} - \frac{s}{2}}{c} = \frac{\frac{b}{2} - \frac{s}{2}}{a}$$

$$v = \frac{b - 65}{a} \cdot 12\,000 + 65$$

Figure 3

ANNEX VI : STEERING EQUIPMENT

75/321 /EEC

1. DEFINITIONS

1.1. 'Steering equipment'

'Steering equipment' means all the equipment the purpose of which is to alter the direction of movement of the tractor.

The steering equipment may be considered to include:

— the steering control;

— the steering gear;

— the steered wheels;

— where applicable, special equipment to produce additional or independent power.

1.1.1. *'Steering control'*

'Steering control' means the part directly operated by the driver in order to steer the tractor.

1.1.2. *'Steering gear'*

'Stearing gear' means all the components between the steering control and the steered wheels, with the exception of the special equipment referred to in point 1.1.4 The steering gear may be mechanical, hydraulic, pneumatic, electric or a combination of any of these.

1.1.3. *'Steered wheels'*

'Steered wheels' means:

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

— all wheels of articulated tractors;

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

Self-tracking castor wheels are not steered wheels.

1.1.4. *'Special equipment'*

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

1.2. 'Different types of steering equipment'

1.2.1. Depending on the source of power which is necessary for the deflection of the steered wheels, the following types of steering equipment are identified:

1.2.1.1. *Manual steering equipment*, in which the steering power is provided solely by the muscular power of the driver;

1.2.1.2. *Assisted steering equipment*, in which the steering power is provided both by the muscular power of the driver and by the special equipment referred to in point 1.1.4; 75/321/EEC

Steering equipment where the steering power is normally provided solely by the special equipment referred to in point 1.1.4, but which in the event of failure of the special equipment enables the muscular power of the driver to be used for steering, shall be considered as 'assisted steering equipment'.

1.2.1.3. *Servo-steering equipment*, in which the steering power is provided solely by the special equipement referred to in point 1.1.4.

1.3. Steering effort

'Steering effort' means the force exerted by the driver on the steering control in order to steer the tractor.

2. CONSTRUCTION, FITTING AND INSPECTION REQUIREMENTS

2.1. General requirements

2.1.1. The steering equipment must ensure easy and safe handling of the tractor and must comply with the detailed requirements set out in point 2.2.

2.2. Detailed requirements

2.2.1. *Steering control*

2.2.1.1. The steering control must be easy to use and grip. It must be designed in such a way as to permit gradual deflection. The direction of movement of the steering control must correspond to the desired change in the direction of the tractor.

2.2.1.2. The steering effort required to achieve a turning circle of 12 m radius, starting from the straight ahead position, must not exceed 25 daN. In the case of assisted steering equipment, that is not connected to other equipment if the auxiliary power supply fails the steering effort required must not exceed 60 da N. 88/411/EEC

2.2.1.3. In order to check compliance with the requirement in point 2.2.1.2, the tractor shall describe a spiral movement at a speed of 10 kilometres per hour, starting from the straight ahead position, on a dry, flat road surface offering good tyre adhesion. The steering effort on the steering control shall be noted until it reaches the position corresponding to the tractor entering a turning circle of 12 m radius. The duration of the manoeuvre (time between the moment when the steering control is first operated and the moment when it reaches the position where the measurements are taken) must not exceed five seconds in normal cases and eight seconds if the special equipment fails. One manoeuvre must be made to the left and one to the right. 75/321/EEC

For the test, the tractor must be loaded to its technically permissible maximum weight; tyre pressures and weight distribution between the axles must conform to the manufacturer's instructions.

2.2.2. *Steering gear*

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

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

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

2.2.2.4. Steering gear which is operated purely hydraulically and the special equipment mentioned in 1.1.4, must meet the following requirements: 75/321 /EEC

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

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

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

2.2.3. *Steered wheels*

2.2.3.1. All the wheels may be steered wheels.

2.2.4. *Special equipment*

2.2.4.1. The special equipment defined in point 1.1.4, used in the types of steering equipment defined in points 1.2.1.2 and 1.2.1.3, shall be acceptable in the following circumstances:

2.2.4.1.1. If the tractor is equipped with assisted steering equipment as defined in point 1.2.1.2, it must be possible to drive it even in the event of failure of the special equipment as already stated in point 2.2.1.2. If the assisted steering equipment does not have its own source of power, it must be fitted with a power reservoir. This power reservoir may be replaced by a self-contained device providing power supply to the steering equipment with priority over the other systems which are linked to the common energy source. Without prejudice to the provisions regarding braking, if there is a hydraulic connection between the hydraulic steering equipment and the hydraulic braking equipment, and if both are supplied from the same energy source, the force required to activate the steering equipemnt shall not exceed 40 daN if either of the systems should fail. If the source of power is compressed air, the air reservoir must be protected by a non-return valve. 86/411 /EEC

75/321 /EEC

Where the steering power is normally provided solely by the special equipment referred to in point 1.1.4, the assisted steering equipment must be fitted with a device such that if, in the event of failure of the special equipment, the steering effort exceeds 25 daN, a visual or acoustic signal must give warning of such failure.

2.2.4.1.2. If the tractor is fitted with servo-steering equipment as defined in point 1.2.1.3, and provided that such equipment has a wholly hydraulic steering gear, it must be possible, should the special device fail, to carry out the two manoeuvres specified in point 2.2.1.3 using a special additional device. The special additional device may be a compressed air or gas reservoir. An oil pump or compressor may be used as the special additional device if that device is worked by the rotation of the tractor wheels and cannot be disconnected from them. In the event of failure of the special equipment, a visual or acoustic signal must give warning of such failure.

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

ANNEX VII
REMOVAL OF INTERFERENCE PART 1 (*)

DEFINITIONS, APPLICATION FOR EEC TYPE APPROVAL, MARKINGS, EEC TYPE APPROVAL, SPECIFICATIONS, TESTS, CONFORMITY OF PRODUCTION

(1.)

2. DEFINITIONS

For the purposes of this Directive,

(2.1.)

2.2. 'Tractor type as regards radio interference suppression' means tractors which do not differ in such essential respects as:

2.2.1. The shapes and constituent materials of the part of the body forming the engine compartment and the part of the passenger compartment nearest to it.

2.2.2. The type of engine (whether two- or four-stroke, number and capacity of cylinders, number of carburettors, arrangement of valves, maximum power and corresponding r.p.m.).

2.2.3 The position or model of the ignition circuit components (coil, distributor, sparking plugs, screening, etc.).

2.2.4. The position of metal components housed in the engine compartment (e.g. heating appliances, spare wheel, air filter, etc.).

2.3. 'Limitation of radio interference' means a reduction of radio interference in the sound-broadcasting and television frequency bands to a level such that there is no appreciable interference with the functioning of receivers not carried on the vehicle itself; this condition is fulfilled if the level of interference remains below the limits laid down in point 6.2.2 below;

2.4. 'Radio interference suppression equipment' means a complete set of components necessary for limiting radio interference from the ignition system of a tractor. Radio interference suppression equipment also includes earthing strips and screening components incorporated specially for radio interference suppression;

2.5. 'Suppression equipment of different types' means sets of equipment which differ in such essential respects as:

2.5.1. That their components bear different trade names or marks.

2.5.2. That the 'high-frequency' characteristics of a component are different or their components differ in shape or size.

2.5.3. That the operating principles of at least one component are different.

2.5.4. That their components are assembled differently.

(*) The text of the Annexes corresponds to that of Council Directive 72/245/EEC of 20 June 1972 on the approximation of the laws of the Member States relating to the suppression of radio interference produced by spark-ignition engines fitted to motor vehicles (OJ No L 152, 6. 7. 1972, p. 15), as amended by Directive 89/491/EEC. (OJ No L 238, 15.8.1989, p. 43).

2.6. 'Suppression equipment component' means one of the individual constituent parts of the suppression equipment.

3. APPLICATION FOR EEC TYPE APPROVAL

3.1. The application for EEC type approval of a tractor type with regard to radio interference suppression shall be submitted by the vehicle manufacturer or by his authorized representative.

3.2. It shall be accompanied by the following documents in triplicate and by the following particulars:

3.2.1. A description of the tractor type with regard to the items mentioned in point 2.2 above, accompanied by an exploded view or a photograph of the engine compartment. The numbers and/or symbols identifying the engine type and the tractor type shall be shown.

3.2.2. A list of the components, duly identified, constituting the radio interference suppression equipment.

3.2.3. Detailed drawings of each component to enable it to be easily located and identified.

3.2.4. Particulars of the nominal value of the direct-current resistances, and, in the case of resistive ignition cables, of their nominal resistance per metre.

3.3. In addition, the application for EEC type approval shall be accompanied by a sample of the radio interference suppression equipment.

3.4. A vehicle representative of the tractor type to be approved shall be submitted to the technical service responsible for the type approval tests.

4. MARKINGS

4.1 The radio interference suppression equipment components shall bear:

4.1.1. The trade name or mark of the manufacturers of the equipment and its components.

4.1.2. The trade description given by the manufacturer.

4.2. The markings shall be repeated on the radio interference suppression cables at intervals of not more than twelve centimetres.

4.3. These markings shall be clearly legible and indelible.

5. TYPE APPROVAL

(5.1.)

(5.2.)

5.3. A form conforming to the model in Part 4 shall be attached to the EEC type approval certificate.

(5.4.)

(5.5.)

(5.6.)

6. SPECIFICATIONS

6.1. General specifications

The components of the radio interference suppression equipment shall be so designed, constructed and fitted as to enable the tractor, in normal conditions of use, to comply with the requirements of this Directive.

6.2. Specifications concerning radio interference.

6.2.1. *Method of measurement*

The interfering radiation set up by the tractor type submitted for approval shall be measured by the method described in Part 2.

6.2.2. *Reference limits*

6.2.2.1. The radiation limits based on quasi-peak measurements shall be 50 µV/m in the 40-75 MHz frequency band and 50-120 µ/Vm in the 75-250 MHz frequency band, this limit increasing linearly with frequencies above 75 MHz.

6.2.2.2. If measurements are made with peak measuring equipment, the readings, expressed in µ/Vm, shall be divided by 10.

6.2.3. On the tractor type submitted for approval in respect of radio interference suppression, the measured values shall be not less than 20 per cent below the reference limits.

7. TESTS

Compliance with the requirements of section 6 above shall be checked in accordance with the method shown in Part 2.

(8.)

9. CONFORMITY OF PRODUCTION

(9.1.)

9.2. When the conformity of a tractor taken from the series is being verified, production shall be deemed to conform to the requirements of this Directive if the levels measured do not exceed by more than 25 % the limits prescribed in point 6.2.2.

9.3. If at least one of the levels measured on the tractor taken from the series exceeds the limits prescribed in point 6.2.2. by more than 25%, the manufacturer may request that measurements be made on a sample of at least six tractors taken from the series. The results for each frequency band shall be interpreted by the statistical method shown in Part 3.

(10.)

(11.)

PART 2

METHOD OF MEASUREMENT OF RADIO INTERFERENCE PRODUCED BY HIGH-VOLTAGE IGNITION SYSTEMS

1. MEASURING APPARATUS

The measuring equipment shall comply with the requirements of Publication No 2 (first edition, 1961) of the International Special Committee on Radio Interference (CISPR) or with the specifications applicable to peak type measuring apparatus given in CISPR Publication No 5 (first edition, 1967).

Note:

Where the available equipment does not fully meet all the CISPR specifications, discrepancies must be clearly stated.

2. EXPRESSION OF RESULTS

The results of measurements must be expressed in µV/m for 120 kHz bandwidth. For statistical purposes, the logarithmic unit dB (µV/m) shall be used. If for certain frequencies the actual bandwidth B (expressed in kHz) of the measuring apparatus differs slightly from 120 kHz, the readings taken should be converted to 120 kHz bandwidth through multiplication by a factor $\frac{120}{B}$.

3. MEASURING SITE

The measuring site shall be a level area free from appreciable wave-reflecting surfaces within an ellipse having a major axis of 20 m and a minor axis of 17·3 m. The antenna and the centre of the engine must be located on the major axis of the ellipse, the plane of symmetry of the tractor being parallel to the minor axis. The antenna and the point of intersection of the side of the engine nearest to the antenna with the major axis must each be located at a focal point of the ellipse. The measuring set, or the test hut or vehicle in which the set is located, may be within the ellipse but horizontally not closer than 3 m to the antenna, in a direction opposite to the tractor being measured. Furthermore, the absence of any extraneous or signal which could materially affect the measurement must be ensured; a check is therefore made, with the engine stopped, before and after taking the measurements, which can be considered satisfactory only if the readings are at least 10 dB above the highest obtained at the pre- and post-measurement checks.

4. TRACTOR

4.1. Only the ancillary electrical equipment necessary for the running of the engine shall be operating.

4.2. The engine shall be at its normal operating temperature. During each measurement, the engine shall be operated as follows:

Number of cylinders	Method of measurement	
	Peak	Quasi-peak
One	Above idling	2 500 r.p.m.
More than one	Above idling	1 500 r.p.m.

4.3. Measurements shall not be made while rain is falling on the vehicle or within 10 minutes after rain has stopped.

5. ANTENNA

5.1. Height

The centre of the dipole shall be 3 m above the ground.

5.2. Distance of measurement

The horizontal distance from the antenna to the nearest metal part of the tractor shall be 10 m.

5.3. Antenna location relative to tractor

The antenna shall be placed successively on the left- and right-hand sides of the tractor at two positions of measurement, with the aerial parallel to the plane of symmetry of the tractor and in line with the engine. (See Appendix to this Part).

5.4. Antenna position

At each of the measuring points, readings shall be taken with the dipole in a horizontal and in a vertical position. (See Appendix to this Part).

5.5. Readings

The maximum of four readings shall be taken as the characteristic reading at the frequency at which the measurements were made.

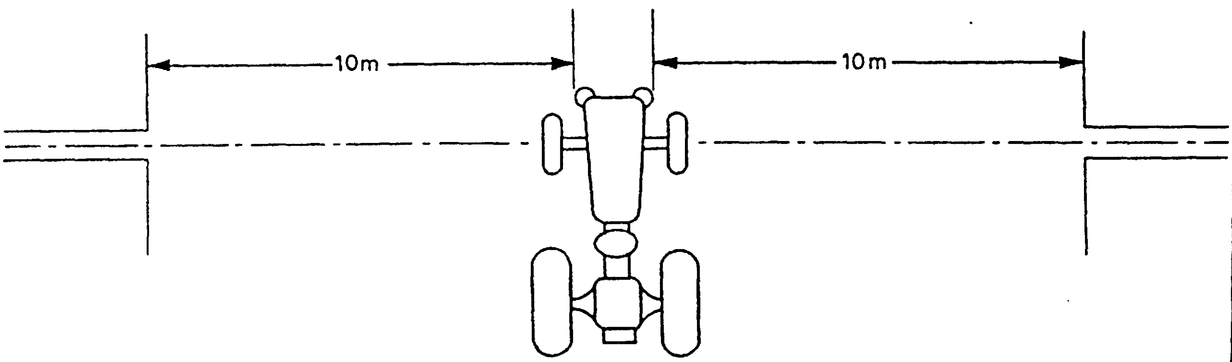
6. FREQUENCIES

Measurements shall be made within the 40 to 250 MHz range. A tractor is considered as very likely to meet the required suppression limits over the whole frequency range if it meets them at the following six frequencies: 45, 65, 90, 150, 180 and 220 (± 5 MHz) (The 5 MHz tolerance for the six frequencies chosen should make it possible to avoid interference from transmissions operating on the nominal frequencies).

Appendix

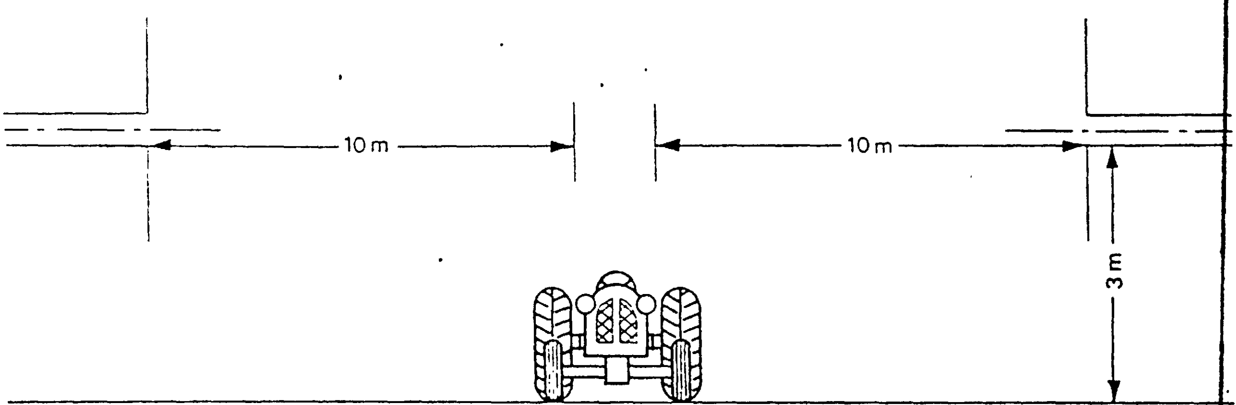
ANTENNA DIRECTION RELATIVE TO TRACTOR

Example



Plan

Dipole antenna in position to measure horizontal component of the radiation



Elevation

Dipole antenna in position to measure horizontal component of the radiation

PART 3

STATISTICAL METHOD OF CHECKING RADIO INTERFERENCE SUPPRESSION

In order to ensure with an 80% probability that 80% of the vehicles conform to a specified limit L, the following condition must be satisfied:

$$\bar{x} + kS_n \leq L$$

where $\bar{x}$ = arithmetic mean of the results on n tractors

k = statistical factor which depends on n as shown in the following table:

n = 6	7	8	9	10	11	12
k = 1·42	1·35	1·30	1·27	1·24	1·21	1 20

S_n = standard deviation of results on n tractors

$S_n{}^2 = \Sigma (x - \bar{x})^2 / (n - 1)$

x = individual result

L = specified limit

S_n, x, $\bar{x}$ and L expressed in dB (μV/m).

If a first sample of n tractors does not meet the specification, a second sample of n tractors shall be tested and the overall results assessed as coming from a sample of 2n tractors.

PART 4

Name of administration

MODEL

COMMUNICATION CONCERNING THE APPROVAL OF AN AGRICULTURAL OR FORESTRY TRACTOR TYPE WITH REGARD TO RADIO INTERFERENCE SUPPRESSION

Type Approval No ....

1. Mark (Trade name) ....

2. Tractor type and commercial description ....

   ....

3. Name and address of manufacturer ....

4. If applicable, name and address of manufacturer's authorized representative ....

   ....

5. Brief description of the radio interference suppression equipment and of the tractor fitted with such equipment ....

   ....

6. Tractor submitted for type approval on ....

7. Technical service responsible for type approval tests ....

   ....

8. Date of report issued by that service ....

9. Number of report issued by that service ....

10. Type approval as regards radio interference suppression has been granted/refused [1]

11. Place ....

12. Date ....

13. Signature ....

14. The following documents, bearing the type approval number shown above, are annexed to this communication:

    .... drawings, diagrams and plans of the engine and of the engine compartment;

    .... photographs of the engine and of the engine compartment;

    .... list of components, duly identified, constituting the radio interference suppression equipment.

---

[1] Delete whichever is inapplicable

Annex VIII

Power connection for lighting and light-signalling devices

75/323 /EEC

The tractor must be equipped with a fixed socket with seven contacts in accordance with recommendation ISO R/1724, first edition, April 1970, allowing for a 12-volt power supply to the lighting and light-signalling devices on tools, machinery or trailers intended for agricultural or forestry use

ANNEX IX : BRAKES

PART 1

DEFINITIONS, APPLICATION FOR EEC TYPE-APPROVAL, EEC TYPE-APPROVAL, CONSTRUCTION AND FITTING REQUIREMENTS

1. DEFINITIONS

1.1. Type of tractor with respect to the braking devices

'Type of tractor with respect to the braking devices' means tractors which do not differ in such essential respects as:

1.1.1. unladen weight, as defined in point 1.18,

1.1.2. maximum weight, as defined in point 1.16,

1.1.3. distribution of the weight between the axles,

1.1.4. technically permissible maximum weight on each axle,

1.1.5. maximum design speed,

1.1.6. different type of braking device (with particular reference to the presence or otherwise of devices for braking a trailer),

1.1.7. number and arrangement of the braked axles,

1.1.8. type of engine,

1.1.9. overall transmission ratio corresponding to maximum speed,

1.1.10 tyre dimensions (braked axles).

1.2. Braking device

'Braking device' means a combination of parts whose function is progressively to reduce the speed of a moving tractor or to bring it to a halt, or to keep it stationary if already halted. These functions are specified in point 4.1.2. A device shall consist of the control, the transmission and the brakes themselves.

1.3. Graduated braking

'Graduated braking' means braking during which, on either the application or release of the brakes, within the normal range of operation of the device:

1.3.1. the driver can at any time increase or reduce the braking force through action on the control,

1.3.2. the braking force acts in the same direction as the action on the control (monotonic function),

1.3.3. it is easy to make a sufficiently fine adjustment to the braking force.

1.4. Control

'Control' means the part actuated directly by the driver to supply to the transmission the energy required for braking or controlling it. This energy may be the muscular energy of the driver, or energy from another source controlled by the driver, or a combination of these various kinds of energy.

1.5. Transmission

'Transmission' means the combination of components situated between the control and the brake and connecting the two functionally. The transmission may be mechanical, hydraulic, pneumatic, electrical, or mixed. Where the braking power is derived from or assisted by a source of energy independent of the driver but controlled by him, the reserve of energy in the device shall likewise be regarded as part of the transmission.

1.6. Brake

'Brake' means the component in which the forces opposing the movement of the tractor develop. It may be a friction brake (when the forces are generated by the friction between the two parts of the tractor moving relatively to one another), an electrical brake (when the forces are generated by electro-magnetic action between two parts of the tractor moving relatively to but not in contact with one another), a fluid brake (when the forces are generated by the action of a fluid situated between two parts of the tractor moving relatively to one another), or an engine brake (when the forces are derived from a controlled increase in the braking action of the engine transmitted to the wheels). A device which mechanically locks the tractor's transmission but which cannot be used when the tractor is in motion shall be regarded as a parking brake.

1.7. Different types of braking devices

'Different types of braking devices' means equipment which differs in such essential respects as:

1.7.1. the characteristics of one or more components, for example the material, shape or size,

1.7.2. the arrangement of the components.

1.8. Braking system component

'Braking system component' means one of the individual parts which, when assembled, constitute the braking device.

1.9. Continuous braking

'Continuous braking' means the braking of combinations of vehicles through an installation having the following characteristics:

1.9.1. a single control which the driver actuates progressively, by a single movement, from his driving seat,

1.9.2. the energy used for braking the vehicles constituting the vehicle combination is supplied from the same source (which may be the muscular energy of the driver),

1.9.3. the braking installation ensures simultaneous or suitably phased braking of each of the constituent vehicles of the combination, whatever their relative positions.

1.10. Semi-continuous braking

'Semi-continuous braking' means the braking of combinations of vehicles through an installation having the following characteristics:

1.10.1. a single control which the driver can actuate progressively, by a single movement, from his driving seat,

1.10.2. the energy used for braking the vehicles constituting the vehicle combination is supplied from several different sources (one of which may be the muscular energy of the driver),

1.10.3. the braking installation ensures simultaneous or suitably phased braking of each of the constituent vehicles of the combination, whatever their relative positions.

1.11. **Independent power-operated braking**

'Independent power-operated braking' means the braking of combinations of vehicles by means of devices having the following characteristics:

1.11.1. a tractor brake control which is independent of the towed vehicle brake control; the latter being in all cases mounted on the tractor in such a way as to be easily actuated by the driver from his driving seat,

1.11.2. the muscular energy of the driver is not the energy used for braking the towed vehicles.

1.12. **Independent braking**

'Independent braking' means the braking of combinations of vehicles by means of devices having the following characteristics:

1.12.1. a tractor brake control which is independent of the trailer brake control, the latter being in all cases mounted on the tractor in such a way as to be easily actuated by the driver from his driving seat,

1.12.2. the muscular energy of the driver is the energy used for braking the towed vehicles.

1.13. Automatic braking

'Automatic braking' means braking of the towed vehicle or vehicles occurring automatically in the event of separation of components of the combination of coupled vehicles, including such separation through coupling breakage, without the braking effectiveness of the remainder of the combination being substantially reduced.

1.14. Inertia braking

'Inertia braking' means braking by utilizing the forces generated by the trailer closing up on the tractor.

1.15. Laden tractor

'Laden tractor' means, except where otherwise stated, a tractor laden to its 'maximum weight'.

1.16. Maximum weight

'Maximum weight' means the maximum technically permissible weight stated by the manufacturer (this weight may be higher than the 'authorized maximum weight').

1.17. Unladen tractor

'Unladen tractor' means the tractor in running order, with full tanks and radiators, with a driver of a mass of 75 kg, but without passengers, optional accessories or load.

1.18. Unladen weight

'Unladen weight' means the weight of the unladen tractor.

2. APPLICATION FOR EEC TYPE-APPROVAL

2.1. An application for EEC type-approval for a type of tractor with respect to the braking devices shall be submitted by the manufacturer or by his authorized representative.

2.2. It shall be accompanied by the following documents in triplicate:

2.2.1. a description of the type of tractor as regards the points mentioned in points 1.1.1 to 1.1.10. The numbers and/or symbols given by the manufacturer or his authorized representative to the type of tractor must be supplied,

2.2.2. a list of parts, each properly identified, which make up the braking device.

2.2.3. a diagram of the braking device showing the position of each of the parts on the tractor, in order to enable the various components to be located and identified.

2.3. The following must also be provided:

2.3.1. a tractor, representative of the type of tractor to be approved,

2.3.2. such drawings as may be requested of maximum A4 size (210 × 297 mm), or folded to this size and drawn to the appropriate scale.

3. EEC TYPE-APPROVAL

The form as illustrated in Part 5 shall be completed and attached to the EEC type-approval certificate.

4. CONSTRUCTION AND FITTING REQUIREMENTS

4.1. General

4.1.1. Braking device

4.1.1.1. The braking device must be so designed, constructed and installed as to enable the tractor in normal use to comply with the undermentioned requirements, despite any vibration to which it may be subjected.

4.1.1.2. In particular, the braking device must be so designed, constructed and installed as to resist corrosion and the effects of ageing during service, which could lead to a sudden loss of braking efficiency.

4.1.2. *Functions of the braking device*

The braking device defined in point 1.2 must meet the following conditions:

4.1.2.1. Service brakes

4.1.2.1.1. The service brake must enable the motion of the tractor to be controlled and the tractor to be stopped safely, quickly and efficiently, at any design speed and with the authorized load on both up and down gradients. It must be possible to regulate its action. These conditions are deemed to be fulfilled if the requirements of Part 2 are satisfied.

The driver must be able to apply the service brake from his seat and retain control of the steering device on the tractor with at least one hand. The service brake of the tractor may comprise right and left hand devices. It must be possible to connect them up so that they can be actuated in a single operation, and possible to disconnect them again.

Each device, right or left hand, must have a system of adjustment, which may be either manual or automatic, enabling the balance of the brakes to be easily restored.

4.1.2.2. Parking brakes

4.1.2.2.1. The parking brake must enable the tractor to be held stationary on an up or down gradient even in the absence of the driver, the working parts being then held in the locked position by a purely mechanical device. This may be achieved by means of a brake acting on the transmission. The driver must be able to apply the parking brake from his seat; a repeated action to obtain the required performance is permitted.

4.2. Characteristics of braking devices

4.2.1. The set of braking devices with which a tractor is equipped must satisfy the requirements laid down for the service and parking brakes.

4.2.2. The service and parking brake devices may have common components, provided that they fulfil the following conditions:

4.2.2.1. there must be at least two controls, independent of each other and readily accessible to the driver from the driving seat; it must be possible for this requirement to be met even when the driver is wearing a safety belt,

4.2.2.2. in the event of a breakage of any component of the braking device other than the brakes (as defined in point 1.6) or of any other failure of the service braking device (malfunction, partial or total exhaustion of an energy reserve), it must be possible to slow the tractor to a halt with a deceleration equal to at least 50 % of the value laid down in point 2.1.1 of Part 2.

These conditions shall be fulfilled when residual braking is achieved on wheels located on both sides of the median longitudinal plane (without the tractor deviating from its course).

For the purposes of this section, the lever and cam assemblies, or similar assemblies, by means of which the brakes are applied, shall not be regarded as liable to failure.

4.2.3. Where use is made of energy other than the muscular energy of the driver, there need not be more than one source of such energy (e.g. hydraulic pump, air compressor, etc.) provided the requirements of point 4.2.2 are fulfilled.

4.2.4. The service braking device must act on both wheels of at least one axle.

4.2.5. The action of the service braking device must be distributed between the wheels of the same axle symmetrically in relation to the median longitudinal plane of the tractor.

4.2.6. The service braking device and the parking braking device must act on braking surfaces permanently connected to the wheels through components of adequate strength. It must not be possible to uncouple a braking surface from the wheels.

When one axle is subject to braking, the differential must not be mounted between the service brake and the wheels of that axle; when two axles are subject to braking, the differential may be mounted between the service brake and the wheels on one of the two axles.

4.2.7. Wear on the brakes must be easily compensated for by means of a system of manual or automatic adjustment. In addition, the control and the components of the transmission and the brakes must possess a reserve of travel such that, when the brakes become heated or when the brake linings have reached a certain degree of wear, effective braking is ensured without an immediate adjustment being necessary.

4.2.8. In hydraulic braking devices, the filling ports of the fluid reservoirs must be readily accessible; in addition, the containers of reserve fluid must be so made that the level of the reserve fluid can be easily checked without the containers having to be opened.

4.2.9. Every tractor fitted with a brake activated from an energy reservoir must, where the prescribed braking performance is impossible without the use of stored energy, be fitted with a warning device, in addition to the pressure gauge, giving a signal which can be seen or heard when the energy, in any part of the installation up to the control valve, falls to 65 % or less of its normal value. This device must be directly and permanently connected to the circuit.

4.2.10. Without prejudice to the requirements of point 4.1.2.1, where the use of an auxiliary energy source is essential for the operation of a braking device, the energy reserve must be such as to ensure that, should the engine stop, the braking performance remains sufficient to bring the tractor to a halt under the prescribed conditions.

4.2.11. Any auxiliary equipment shall draw its energy only in such a way that its operation, even in the event of damage to the energy source, cannot cause the reserves of energy feeding the braking devices to fall below the level indicated in point 4.2.9.

PART 2

BRAKING TESTS AND PERFORMANCE OF BRAKING DEVICES

1. BRAKING TESTS

1.1. General

1.1.1. The performance prescribed for service braking devices shall be based on the mean deceleration calculated over the stopping distance. The stopping distance shall be the distance covered by the tractor from the moment when the driver begins to actuate the control of the device until the moment when the tractor stops.

The performance prescribed for parking braking devices shall be based on the ability to hold the tractor stationary on an up or down gradient.

1.1.2. For the type-approval of any tractor, the braking performance shall be measured during road tests conducted under the following conditions:

1.1.2.1. the tractor's condition as regards weight must be as prescribed for each type of test and be specified in the test report,

1.1.2.2. during the tests the force applied to the brake control in order to obtain the prescribed performance must not exceed 60 daN on the pedal controls and 40 daN on the hand-operated controls,

1.1.2.3. the road must have a surface affording good adhesion,

1.1.2.4. the tests must be performed when there is no wind liable to affect the results,

1.1.2.5. at the start of the tests the tyres must be cold and at the pressure prescribed for the load actually borne by the wheels when the tractor is stationary,

1.1.2.6. the prescribed performance must be obtained without locking of the wheels, without deviation of the tractor from its course, and without abnormal vibration.

1.1.3. During the tests, the tractor shall be fitted with any parts intended by the manufacturer for the operation of the towed vehicle braking devices as referred to in points 1.9, 1.10, 1.11 and 1.12 of Part 1.

1.2. Type 0 test
(ordinary performance test with brakes cold)

1.2.1. *General*

1.2.1.1. The brakes must be cold at the beginning of the test. A brake is deemed to be cold if any one of the following conditions is met:

1.2.1.1.1. the temperature measured on the disc or on the outside of the drum must be below 100 °C,

1.2.1.1.2. in the case of totally enclosed brakes, including oil immersed brakes, the temperature measured on the outside of the housing must be below 50 °C,

1.2.1.1.3. the brakes must not have been actuated for one hour

1.2.1.2. During the braking test, an unbraked axle, when capable of being declutched, must not be connected with a braked axle.

1.2.1.3. The test must be conducted under the following conditions:

1.2.1.3.1. the tractor must be laden to its maximum weight, with an unbraked axle also loaded to its technically permissible maximum weight; the braked axle wheels must be fitted with the largest tyres intended for that tractor type by the manufacturer. For tractors braking on all wheels, the front axle must be laden to its technically permissible maximum weight,

1.2.1.3.2. the test must be repeated on an unladen tractor carrying only the driver and if necessary a person responsible for monitoring the results of the test; the tractor must be fitted with the largest tyres recommended by the manufacturer,

1.2.1.3.3. the limits prescribed for minimum performance, both for tests with the tractor unladen and for tests with it laden, shall be those laid down in point 2.1.1,

1.2.1.3.4. the road must be level.

1.2.2. *The type 0 test must be carried out:*

1.2.2.1. at the maximum design speed with the transmission in neutral,

1.2.2.2. a tolerance of ± 10 % is permitted on the test speed,

1.2.2.3. the minimum prescribed performance must be attained.

1.3. Type I test
(fade test)

1.3.1. Laden tractors shall be tested in such a manner that the energy input is equivalent to that recorded in the same period of time with a laden tractor driven at a steady speed of 80 % ± 5 % of that laid down for type 0 tests on a 10 % down gradient for a distance of 1 km, with the transmission in neutral.

1.3.2. At the end of the test, the residual performance of the service braking device shall be measured under the same conditions as for the type 0 test with the transmission in neutral (under different temperature conditions of course).

2. PERFORMANCE OF BRAKING DEVICES

2.1. Service braking devices

2.1.1. *The service brakes of tractors must:*

2.1.1.1. under type 0 test conditions achieve a mean deceleration, calculated from the stopping distance, of at least 2·4 m/s^2,

2.1.1.2. after the type I test, produce a residual performance not less than 75 % of that prescribed, and not less than 60 % of the value recorded during the type 0 test (with transmission in neutral).

2.2. Parking braking devices

2.2.1. The parking braking device must, even if it is combined with one of the other braking devices, be capable of holding a laden tractor stationary on an 18 % up or down gradient.

2.2.2. On tractors to which the coupling of one or more trailers is authorized, the parking braking device of the tractor must be capable of holding the vehicle combination, comprising an unladen tractor and an unbraked trailer of the same weight (not exceeding three metric tons), stationary on a 12 % up or down gradient.

2.2.3. A parking braking device which has to be actuated several times before attaining the prescribed performance is permissible.

PART 3

SPRING BRAKES

1. DEFINITION

'*Spring brakes*' are braking devices for which the energy required for braking is supplied by one or more springs acting as an energy accumulator.

2. SPECIAL REQUIREMENTS

2.1. A spring brake must not be used as a service brake.

2.2. A small variation in any of the pressure limits which may occur in the brake compression chamber feed circuit must not cause a significant variation in the braking force.

2.3. The feed circuit to the spring compression chamber must include an energy reserve which does not supply any other device or equipment. This requirement shall not apply if the springs can be maintained in the compressed state by using two or more independent systems.

2.4. The device must be so designed that it is possible to apply and release the brakes at least three times starting with an initial pressure in the spring compression chamber equal to the maximum design pressure. This requirement must be met when the brakes are adjusted as closely as possible.

2.5. The pressure in the compression chamber below which the springs begin to actuate the brakes, with the latter adjusted as closely as possible, must not be greater than 80 % of the minimum level of the normal available pressure.

2.6. When the pressure in the spring compression chamber falls to the level at which the brake parts begin to move, a warning signal which can be seen or heard must be activated. Provided this requirements is met, the warning device may be that specified in point 4.2.9 of Part I.

2.7. On tractors fitted with spring brakes and authorized to draw trailers with continuous or semi-continuous brakes, automatic application of the spring brakes must cause the trailer brakes to be applied.

3. RELEASE SYSTEM

3.1. Spring brakes must be so designed that, in the event of failure, it is possible to release them without using their normal control. This may be achieved by the use of an auxiliary device (pneumatic, mechanical, etc.)

3.2. If the operation of the auxiliary device referred to in point 3.1 requires the use of a tool or spanner, the tool or spanner must be kept on the tractor.

PART 4

PARKING BRAKING BY MECHANICAL LOCKING OF THE BRAKE CYLINDERS (LOCK ACTUATORS)

1. DEFINITION

'*Mechanical locking of the brake cylinders*' means a device for ensuring the operation of the parking brake by mechanical wedging of the brake piston rod.

Mechanical locking occurs when the locking chamber is emptied of compressed air; the mechanical locking device shall be designed in such a way that it can be released when the locking chamber is again subjected to pressure.

2. SPECIAL REQUIREMENTS

2.1. When the pressure in the locking chamber approaches the level corresponding to mechanical locking, an optical or acoustic warning system must be activated.

2.2. In the case of brake actuators fitted with a mechanical locking device, the brake actuator must be capable of being actuated by either of two energy reserves.

2.3. The locked brake cylinder may only be released if it is certain that the brake can be operated again after such release.

2.4. In the event of a failure of the source of energy supplying the locking chamber, an auxiliary unlocking device (mechanical or pneumatic, for instance) using, for example, the air in one of the tyres of the tractor, must be provided.

76/432/EEC

PART 5

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE
APPROVAL OF BRAKING DEVICES OF WHEELED AGRICULTURAL OR FORESTRY TRACTORS

(Article 4 (2))

EEC type-approval No ....

1. Make (name of company or firm) ....
2. Type and commercial description ....
3. Name and address of manufacturer ....
4. Name and address of manufacturer's authorized representative (if any) ....
5. Unladen weight of tractor ....
6. Distribution of unladen weight between the axles .... (kg)
7. Maximum weight of the tractor ....
8. Distribution of the maximum weight of the tractor on each axle as referred to in point 1.2.1.3.1 of Part 2 ....
9. Make and type of brake linings ....
10. Engine type ....
11. Overall transmission ratio corresponding to maximum speed ....
....
12. Tyre dimensions:
12.1. Largest tyres (braked axles) ....
....
12.2. Tyres supporting the greatest technically permissible weight (non-braked axle) ....
....
13. Maximum speed of the tractor ....
14. Number and arrangement of braked axles ....
15. Brief description of the braking device ....
16. Weight of tractor at time of testing:

	Unladen	Laden
Axle 1	....	....
Axle 2	....	....

17. Dimensions of the tyres used during the test:

	Axle 1	Axle 2
Tyre dimensions	....	....

18. Result of the braking tests:

18.1. Service braking performance

18.1.1. Type 0 test

	Test speed (km/h)	Performance calculated in m/s²	Measured force applied to the control (daN)
Unladen	....	....	....
Laden	....	....	....
18.1.2. Type I tests	....	....	....

18.2. Parking braking performance: Positive/negative (1)

19. Tractor submitted for EEC type-approval on ....

20. Technical service conducting type-approval tests ....

21. Date of the report issued by that service ....

22. Number of the report issued by that service ....

23. EEC type-approval in respect of braking is granted/refused (1)

24. Place ....

25. Date ....

26. Signature ....

27. The documents referred to in points 2.2.1 to 2.2.3 of Part 1 are annexed hereto.

(1) Delete as appropriate.

76/763, EEC

ANNEX X
DRIVER'S SEAT

I. GENERAL RULES FOR CONSTRUCTION AND FITTING

1. Each seat must be so placed that the passenger is in no danger and creates no impediment to driving the tractor.

2. Each seat must be firmly fixed and properly attached according to the type of tractor, to a structural member of the tractor (chassis, roll-over protection device, platform, etc.).

3. The structural member concerned must be sufficiently strong to support a laden passenger seat.

II. SPECIAL CONSTRUCTION RULES

1. Each seat must be at least 400 mm wide and at least 300 mm deep.

2. Each seat must be fitted with a back-rest not less than 200 mm nor more than 250 mm high which incorporates a lateral support. The above dimensions shall not apply if there is a closed bulkhead behind the passenger. The seat cushion shall be padded or flexible.

3. A suitable rest must be provided for the passenger's feet.

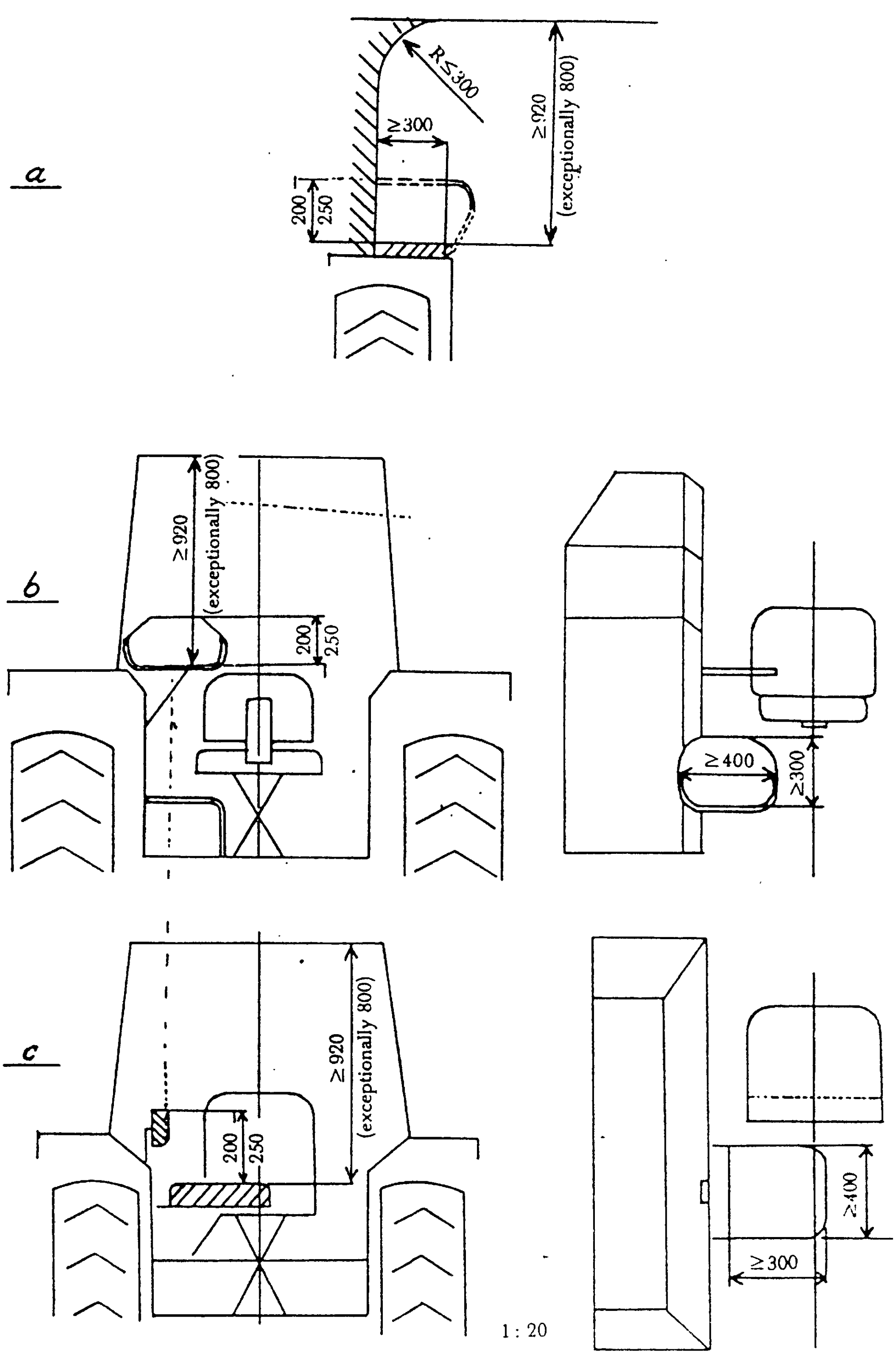
4. There must be a clearance of at least 920 mm above the surface of the passenger seat. However, where a tractor satisfies the requirements relating to the driver's protection and seating, but its construction does not allow for such a clearance for the passenger, the clearance may be reduced to 800 mm, provided that adequate padding is provided immediately above the passenger seat at the level of the roof.

   The upper part of the clearance allowed for the passenger may only be limited at the rear by a radius not exceeding 300 mm (see appended drawing). The vertical clearance is the vertical open space between the front edge of the seat and the roof of the tractor.

5. The passenger seat must not add to the overall width of the tractor.

6. There must not be more than one passenger seat per mudguard, where this is the mounting point.

Appendix


a
R ≤ 300
≥ 300
≥ 920
(exceptionally 800)
200
250
b
≥ 920
(exceptionally 800)
200
250
≥ 400
≥ 300
c
≥ 920
(exceptionally 800)
200
250
≥ 400
≥ 300
1 : 20

ANNEX XI

DRIVER-PERCEIVED NOISE LEVELS

PART 1 : APPARATUS, CONDITIONS AND METHOD OF MEASUREMENT

1. UNIT OF MEASUREMENT AND MEASURING APPARATUS

1.1. Unit of measurement

Noise level shall be measured in dB with A-weighting, expressed as dB (A).

1.2. Measuring apparatus

Driver-perceived noise level shall be measured by means of a sound-level meter as described in the first edition of Publication 179/1965 of the International Electrotechnical Commission.

In the case of variable readings, the average of the maximum values must be taken.

2. CONDITIONS OF MEASUREMENT

Measurements shall be made under the following conditions:

2.1. the tractor must be unladen, i.e. without optional accessories, but must include coolant, lubricant, full fuel tank, tools and driver. The latter may not wear any abnormally thick clothing, scarf or hat. There may be no object on the tractor likely to distort the noise level;

2.2. the tyres must be inflated to the pressure recommended by the tractor manufacturer, the engine, transmission and drive axles must be at normal running temperature and radiator blinds when fitted must be kept open during measurements;

2.3 if it is liable to affect the noise level, extra equipment powered by the engine or self-powered such as windscreen wipers, warm air fan or power take-off, for example, may not be in operation when measurements are being made; parts which normally operate at the same time as the engine, such as the engine cooling fan, for example, must be in operation when measurements are being made;

2.4. the test area must be in an open and sufficiently silent location; it may take the form, for instance, of an open space of 50-metre radius, having a central part with a radius of at least 20 m which is practically level, or of a level section having a solid track with as flat a surface and as few gullies as possible. The track must be as clean and dry as possible (e.g. free of gravel, leaves, snow, etc.). Slopes and irregularities are acceptable only if the variations in noise level caused by them lie within the error tolerances of the measuring equipment;

2.5. the surface of the track must be such as not to cause excessive tyre noise;

2.6. the weather must be fine and dry with little or no wind. The driver-perceived ambient noise level due to the wind or other sources of noise must be at least 10 dB (A) below the noise level of the tractor;

2.7. if a vehicle is used for measurements, it must be towed or driven at sufficient distance from the tractor to avoid all interference. During measurements no object interfering with the measurements or reflective surfaces may be located within 20 m of each side of the test track and less than 20 m to the front or rear of the tractor. This condition can be considered fulfilled if the variations in noise level thus caused remain within the error tolerances; if not, the measurements must be discontinued for the duration of the interference;

2.8. all measurements in a given series must be carried out on the same track.

3. METHOD OF MEASUREMENT

3.1. The microphone must be located 250 mm to the side of the centre plane of the seat, the side being that on which the higher noise level is encountered.

The microphone diaphragm must face forward and the centre of the microphone must be 790 mm above and 150 mm forward of the seat reference point described in Part 3 Excessive vibration of the microphone must be avoided.

3.2. The maximum noise level in dB (A) shall be determined as follows:

3.2.1. all openings (e.g. doors, windows) in tractors having a closed series-produced cab structure must be closed during an initial series of measurements.

3.2.1.1. During a second series of measurements they must be left open, provided that when open they do not create a road safety hazard, but fold-down or fold-up windscreens must remain closed;

3.2.2. noise must be measured using slow sound-level meter response at the load corresponding to the maximum noise in the gear giving the forward speed nearest to 7·25 km/h.

The governor control lever must be fully open. Starting with no load, the load applied must be increased until the maximum noise level is found. After each increase of load, time must be allowed for the noise level to stabilize before making the measurement;

3.2.3. noise must be measured using slow sound-level meter response at the load corresponding to the maximum noise in any gear other than that referred to in point 3.2.2 in which the noise level recorded is at least 1 dB (A) above that recorded in the gear referred to in point 3.2.2.

The governor control lever must be fully open. Starting with no load, the load applied must be increased until the maximum noise level is found. After each increase of load, time must be allowed for the noise level to stabilize before making the measurement;

3.2.4. noise must be measured at the maximum design speed of the unladen tractor.

3.3. The test report shall include noise-level measurements carried out under the following conditions:

3.3.1. in the gear giving the speed nearest to 7·25 km/h;

3.3.2. in any gear, if the conditions described in point 3.2.3 are fulfilled;

3.3.3. at maximum design speed.

4. ASSESSMENT CRITERIA

The measurements described in points 3.2.1, 3.2.2, 3.2.3 and 3.2.4 may not exceed the values laid down in Article 12.

PART 2

APPARATUS, CONDITIONS AND METHOD OF MEASUREMENT

1. UNIT OF MEASUREMENT AND MEASURING APPARATUS

1.1. Unit of measurement

Noise level shall be measured in dB with A-weighting, expressed as dB (A).

1.2. Measuring apparatus

Driver-perceived noise level shall be measured by means of a sound-level meter as described in the first edition of publication 179/1965 of the International Electrotechnical Commission.

In the case of variable readings, the average of the maximum values must be taken.

2. CONDITIONS OF MEASUREMENT

Measurements shall be made under the following conditions:

2.1. the tractor must be unladen, i.e. without optional accessories, but must include coolant, lubricant, full fuel tank, tools and driver. The latter may not wear any abnormally thick clothing, scarf or hat. There may be no object on the tractor likely to distort the noise level;

2.2. the tyres must be inflated to the pressure recommended by the tractor manufacturer, the engine, transmission and drive axles must be at normal running temperature and, if the engine has cooling louvres; these must remain completely open;

2.3. if it is liable to affect the noise level, extra equipment powered by the engine or self-powered such as windscreen wipers, warm air fan or power take-off, for example, may not be in operation when measurements are being made; parts which normally operate at the same time as the engine, such as the engine cooling fan, for example, must be in operation when measurements are being made;

2.4. the test area must be in an open and sufficiently silent location: it may take the form, for instance, of an open space of 50-metre radius, having a central part with a radius of at least 20 m which is practically level, or of a level section having a solid track with as flat a surface and as few gullies as possible. The track must be as clean and dry as possible (e.g. free of gravel, leaves, snow, etc.). Slopes and irregularities are acceptable only if the variations in noise level caused by them lie within the error tolerances of the measuring equipment;

2.5. the surface of the track must be such as not to cause excessive tyre noise;

2.6. the weather must be fine and dry with little or no wind.

The driver-perceived ambient noise level due to the wind or other sources of noise must be at least 10 dB (A) below the noise level of the tractor;

2.7. if a vehicle is used for measurements, it must be towed or driven at sufficient distance from the tractor to avoid all interference. During measurements no object interfering with the measurements or reflective surfaces may be located within 20 m of each side of the test track and less than 20 m to the front or rear of the tractor. This condition can be considered fulfilled if the variations in noise level thus caused remain within the error tolerances; if not, the measurements must be discontinued for the duration of the interference;

2.8. all measurements in a given series must be carried out on the same track.

3. METHOD OF MEASUREMENT

3.1. The microphone must be located 250 mm to the side of the central plane of the seat, the side being that on which the higher noise level is encountered.

The microphone diaphragm must face forward and the centre of the microphone shall be 790 mm above and 150 mm forward of the seat reference point described in Part 3. Excessive vibration of the microphone must be avoided.

3.2. Noise level shall be determined as follows:

3.2.1. the tractor must travel along the section at the same test speed at least three times for at least 10 seconds;

3.2.2. all openings (e.g. doors, windows) in tractors having a closed series-produced cab structure must be closed during an initial series of measurements.

3.2.2.1. During a second series of measurements they must be left open, provided that when open they do not create a road safety hazard, but fold-down or fold-up windscreens must remain closed;

3.2.3. noise must be measured at the maximum rpm using slow sound-level meter response i.e. in the gear giving the speed nearest to 7·25 km/h at the rated rpm. The tractor must be unladen when measurements are being made.

4. ASSESSMENT CRITERIA

The measurements described in points 3.2.2 and 3.2.3 may not exceed the values laid down in Article 12.

PART 3

DETERMINATION OF SEAT REFERENCE POINT

1. DEFINITION

1.1. The seat reference point (S) shall be the point in the central longitudinal plane of the seat where the tangential plane of the lower backrest and a horizontal plane intersect. This horizontal plane cuts the lower surface of the seat-pan board 150 mm in front of the seat reference point.

2. DETERMINATION OF SEAT REFERENCE POINT

2.1. The reference point shall be obtained using the device illustrated in figures 1 and 2 of the Appendix to this Part, which makes it possible to simulate loading by a human occupant.

2.2. The seat must be set at the mid point of the range allowed for vertical adjustment, this adjustment being independent of the horizontal adjustment. For purposes of determining the microphone location referred to in section 3 of Parts 1 and 2 the seat must be at or as near as possible to the mid point of the horizontal adjustment range.

3. DESCRIPTION OF THE DEVICE

3.1. The device referred to in point 2.1 shall consist of a seat-pan board and two backrest boards.

3.2. The lower backrest board shall be jointed in the region of the ischium humps (A) and loin (B), the joint (B) being adjustable in height (see figure 2).

4. SETTING UP THE DEVICE

The device shall be set up as follows:

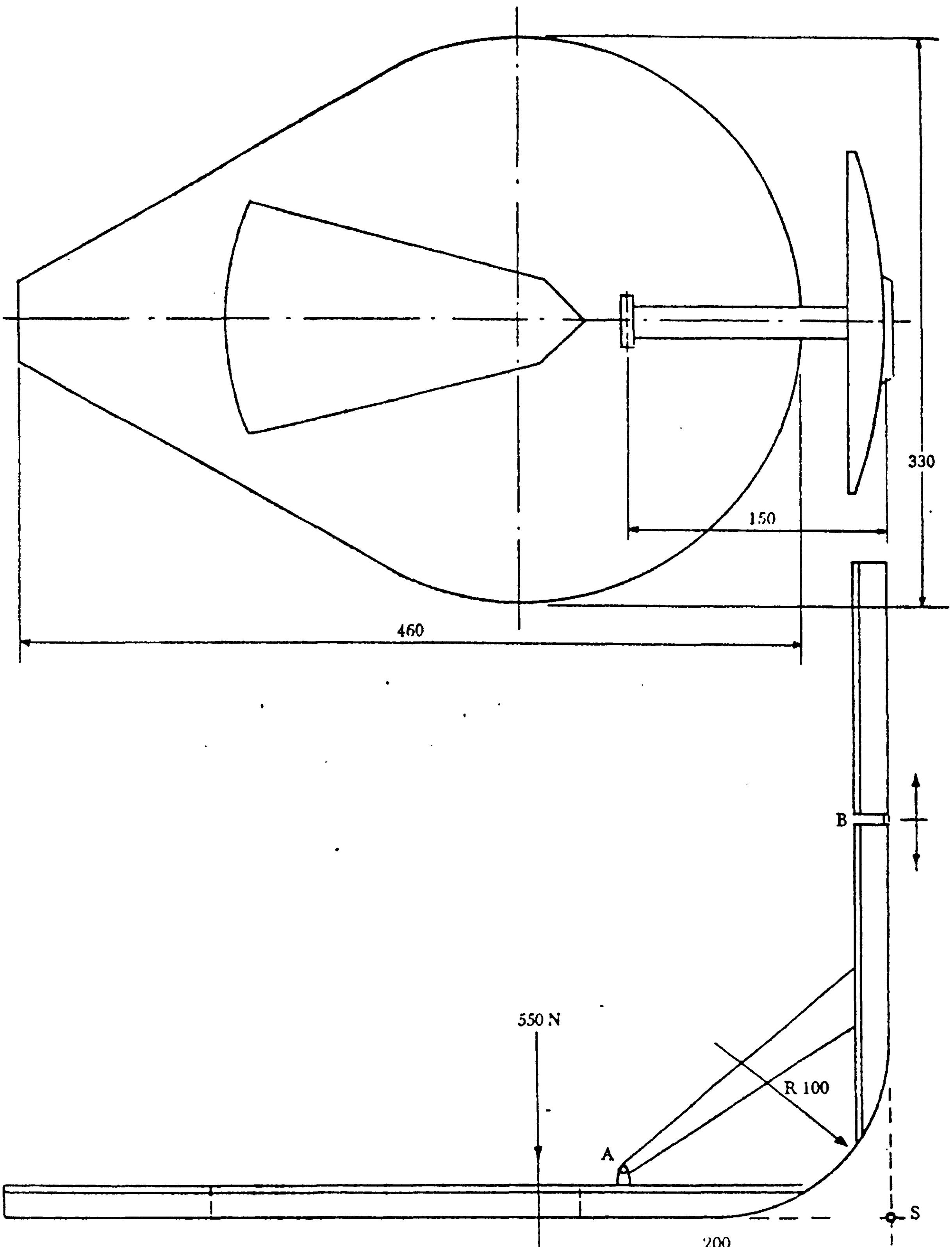
4.1. the device shall be positioned on the seat;

4.2. it shall then be loaded with a force of 550 N at a point 50 mm in front of joint (A), and the two backrest boards shall be lightly pressed tangentially against the backrest;

4.3. if it is not possible to determine a definite tangent to the lower area of the backrest, the lower backrest board in vertical position must be lightly pressed against the backrest;

4.4. in the case of seats with a suspension adjustable to the driver's weight, the suspension shall be set so that the seat is at a point equidistant from its two extreme positions.

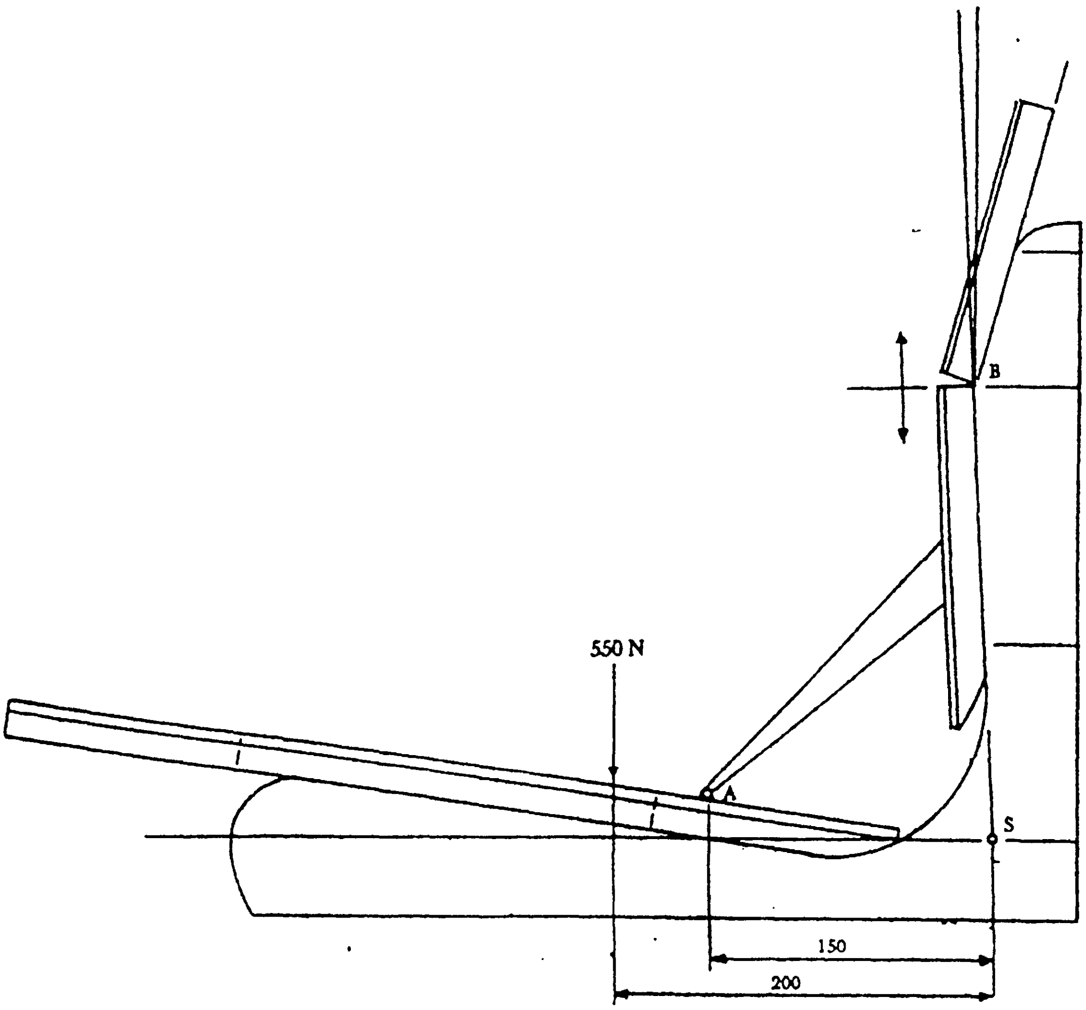
APPENDIX



(Dimensions in millimetres)

Figure 1

Device for determining the seat reference point



(Dimensions in millimetres)

Figure 2

Method of determining the seat reference point.

ANNEX XII

PROTECTION IN CASE OF ROLL-OVER

LIST OF PARTS COMPOSING THE ANNEX

Part 1 : Conditions for EEC component type-approval

Part 2 : Conditions for testing the strength of the roll-over protection structures and of their attachment to tractors

Part 3 : Test procedures

Part 4 : Figures

Part 5 : Test report model

Part 6 : Marks

Part 7 : Model of EEC component type-approval certificate

Part 8 : Conditions for EEC type-approval

Part 9 : Annex to the EEC type-approval certificate for a tractor with regard to the strength of the roll-over protection structures as well as of their attachment to the tractor.

PART 1

CONDITIONS FOR EEC COMPONENT TYPE-APPROVAL

1. DEFINITION

1.1. A *roll-over protection structure* (safety cab or frame) means the structure on a tractor the essential purpose of which is to avoid or limit risks to the driver resulting from roll-over of the tractor during normal use.

1.2. The structures mentioned in point 1.1 are characterized by the fact that, in the event of roll-over, they ensure an unobstructed space inside them large enough to protect the driver.

2. GENERAL REQUIREMENTS

2.1. Every roll-over protection structure and its attachment to a tractor must be so designed and constructed as to fulfil the essential purpose laid down in section 1.

2.2. This requirement shall be checked by one of the two test methods described in Part 3 The method chosen shall take account of the tractor mass as follows:

- for tractors of mass specified by Article 33 — Part 3 B.
- for tractors of mass more than 1·5 tonnes and not more than 3·5 tonnes — Part 3 A.

3. APPLICATION FOR EEC COMPONENT TYPE-APPROVAL

3.1. The application for EEC component type-approval with regard to the strength of a roll-over protection structure and the strength of its attachment to a tractor shall be submitted by the tractor manufacturer or by the manufacturer of the roll-over protection structure or by their authorized representatives.

3.2. The application for EEC component type-approval shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

- general arrangement drawing either to a scale marked on the drawing or giving the main dimensions of the roll-over protection structure. This drawing must in particular show details of the mounting components,
- photographs from side and rear showing mounting details,
- brief description of the roll-over protection structure including type of construction, details of mounting on the tractor and, where necessary, details of cladding, means of access and escape, details of interior padding and features to prevent continuous rolling and details of heating and ventilation,
- details of materials used in structural parts including attaching brackets and fixing bolts (see Part 5).

3.3. A tractor representative of the tractor type for which the protection structure to be approved is intended shall be submitted to the technical service responsible for conducting the component type-approval tests. This tractor shall be fitted with the roll-over protection structure.

3.4. The holder of EEC component type-approval may request its extension to other tractor types. The competent authority which has granted the original EEC component type-approval shall grant the extension if the approved roll-over protection structure and the type(s) of tractor for which the extension is requested comply with the following conditions:

— the mass of the unballasted tractor, as defined in point 1.3 of Part 2, does not exceed by more than 5% the reference mass used in the test,

— the method of attachment and the tractor's components to which the attachments are made are identical,

— any components such as mudguards and bonnet cowls which may provide support for the roll-over protection device are identical,

— the position of the seat has not been changed.

4. MARKINGS

4.1. Every roll-over protection structure conforming to the approved type shall bear the following markings:

4.1.1. the trade mark or name;

4.1.2. a component type-approval mark conforming to the model in Part 6;

4.1.3. serial number of the protection structure;

4.1.4. make and type(s) of tractor(s) for which the protection structure is intended.

4.2. All these particulars must appear on a small plate.

4.3. These markings must be visible, legible and indelible.

Part 2

CONDITIONS FOR TESTING THE STRENGTH OF A ROLL-OVER PROTECTION STRUCTURE AND OF ITS ATTACHMENT TO A TRACTOR

1. GENERAL REQUIREMENTS

1.1. Test purposes

Tests made using special rigs are intended to simulate such loads as are imposed on a roll-over protection structure when a tractor overturns. These tests, described in Part 3 must enable the strength of the roll-over protection structure and the attaching brackets to the tractor to be assessed.

1.2. Preparation for test

1.2.1. A roll-over protection structure must be tested on a tractor of the type for which it is designed. It must be attached to the tractor in accordance with the instructions of the manufacturer of the tractor and/or those of the manufacturer of the roll-over protection structure.

1.2.2. For the tests a tractor must be fitted with all structural components of the series production which may influence the strength of the roll-over protection structure or which may be necessary for the strength test.

Components which may create a hazarad in the zone of clearance must also be fitted so that they may be examined as to their compliance with the requirements of 4.1 of this Part

1.2.3. Tests shall be made with the tractor stationary.

1.3. Tractor mass

The measured mass W used in the formulae (see Part 3A and 3B) , to calculate the height of the fall of the pendulum weight and the crushing force, shall be at least that defined in point 2.4 of Annex I, Part 1 (i.e., excluding optional accessories but including coolant, oils, fuel, tools and driver) plus the roll-over protection structure and less 75 kg. Not included are optional front or rear ballast weights, tyre ballast, mounted implements, mounted equipment or any specialized components.

2. APPARATUS AND EQUIPMENT

2.1. Pendulum weight

2.1.1. A pendulum weight shall be suspended by two chains or wire ropes from pivot points not less than 6 m above the ground. Means shall be provided for adjusting independently the suspended height of the weight and the angle between the weight and the supporting chains or wire ropes.

2.1.2. The weight shall be 2 000 ± 20 kg excluding the weight of the chains or wire ropes which themselves shall not exceed 100 kg. The length of the sides of the impact face shall be 680 ± 20 mm (see Part 4, fig. 4). The weight shall be filled in such a way that the position of its centre of gravity is constant.

2.1.3. Means shall be provided of pulling the weight back as a pendulum to a height which is determined for each test. A quick-release mechanism shall allow the weight to swing downwards without altering the tilt in relation to the supporting chains or wire ropes.

2.2. Pendulum supports

The pendulum pivot points shall be rigidly fixed so that their displacement in any direction does not exceed 1% of the height of fall.

2.3. Lashings

2.3.1. The tractor shall be lashed by means of restraining and tensioning devices to ground rails rigidly attached to a non-yielding concrete base. The rails shall be suitably spaced to enable the tractor to be lashed down as illustrated in Part 4, figs. 5, 6 and 7. For each test the tractor wheels and any axle stands used shall rest on the non-yielding base.

2.3.2. Apart from the tensioning devices and ground rail attachments the tractor shall be lashed down with wire rope of the dimensions specified.

This wire rope shall be any round strand, fibre core, construction 6 × 19 in accordance with ISO 2408. The nominal rope diameter shall be 13 mm.

2.3.3. The central pivot of an articulated tractor shall be supported and lashed down as appropriate for the front, rear and side impacts and for the crushing tests and shall, in addition, be propped from the side for the side impact. The front and rear wheels need not be in line if this makes it more convenient to attach appropriate wire ropes.

2.4. Wheel prop and beam

2.4.1. A beam shall be used as a prop for the wheel in the side impact as shown in Part 4.

2.4.2. A softwood beam of approximately 150 mm square shall be clamped to the floor to brace the tyres on the side opposite the impact as shown in Part 4, figs. 5, 6 and 7.

2.5. Props and lashings for articulated tractors

2.5.1. Additional props and lashings shall be used for articulated tractors. Their purpose is to ensure that the section of the tractor on which the roll-over protection structure is fitted is as rigid as that of a rigid tractor.

2.5.2. Additional specific details are given in Part 3 for the impact and crushing tests.

2.6. Crushing rig

A rig as shown in Part 4, fig. 8, shall be capable of exerting a downward force on a roll-over protection structure through a rigid beam approximately 250 mm wide connected to the load-applying mechanism by means of universal joints. Suitable axle stands shall be provided so that the tractor tyres do not bear crushing force.

2.7. Measuring apparatus

2.7.1. For the tests laid down in Part 3A and 3B a device must be used on which a moving friction collar is tightly fitted on a horizontal rod for the purpose of measuring the difference between maximum momentary deflection and residual deflection during a side impact test.

2.7.2. For the tests laid down in Part 3A, measurements shall be made after the laboratory test to determine whether any part of the protection structure has entered the zone of clearance prescribed in section 2 of Part 3A.

2.7.3. For the tests laid down in Part 3B, equipment must be provided — which may include photographic equipment — so that after the laboratory tests it may be established whether any part of the protection structure has, during these tests, entered or come into contact with the zone of clearance prescribed in section 2 of Part 3B.

77/536/ EEC

2.8. Measurement tolerances

The following tolerances shall apply to measurements made during the tests:

2.8.1. linear dimensions measured during test (except point 2.8.2); protection structure and tractor dimensions, zone of clearance and tyre deflections when lashed for impact tests: ± 3 mm;

2.8.2. height of pendulum weight set for impact tests: ± 6 mm;

2.8.3. measured tractor mass: ± 20 kg;

2.8.4. load applied in crushing tests: ± 2%

2.8.5. angle of weight-supporting chains or wire ropes at the point of impact: ± 2°.

3. TESTS

3.1. General requirements

3.1.1. *Sequence of tests*

3.1.1.1. The list and sequence of tests shall be as follows. The numbers are the points in which the tests are described in Part 3A and 3B.

1. impact from the rear:	1.1,
2. crushing test at the rear:	1.4,
3. impact from the front:	1.2,
4. impact from the side:	1.3,
5. crushing test at the front:	1.5.

3.1.1.2. If, during the test, any part of the restraining equipment moves or breaks, the test shall be repeated.

3.1.1.3. No repairs or adjustments to the tractor or roll-over protection structure may be carried out during the test.

3.1.1.4. The tractor gear-box shall be in neutral and the brakes off throughout the test.

3.1.2. *Track width*

A track width setting for the rear wheels shall be chosen such that as far as possible the roll-over protection structure is not supported by the tyres during the tests.

3.1.3. *Removal of non-hazard-creating components*

All components of the tractor and roll-over protection structure which, as complete units, constitute protection for the driver — including weather protection — shall be supplied with the tractor to be tested. It is permissible to remove front, side and rear windows of safety glass or similar material and any detachable panels, fittings and accessories which have no function of structural strength and which cannot create a hazard in the event of overturning.

3.1.4. *Direction of impacts*

The side of the tractor on which the side impact is truck shall be that which is likely to give the greatest distortion. The rear impact shall be on the corner furthest from the side impact, and the front impact on the corner nearest the side impact.

3.1.5. *Tyre pressures and deflections*

Tyres shall not be water ballasted. Pressures and deflections in those tyres which are lashed in the various tests shall be in accordance with the following table:

	Tyre pressure (bar)				Deflection (mm)	
	Radial-ply tyres		Diagonal-ply tyres		Front	Rear
	Front	Rear	Front	Rear		
Four-wheel drive, front and rear wheels of the same size	1·20	1·20	1·00	1·00	25	25
Four-wheel drive, front wheels smaller than rear	1·80	1·20	1·50	1·00	20	25
Two-wheel drive	2·40	1·20	2·00	1·00	15	25

4. INTERPRETATION OF RESULTS

4.1. A roll-over protection structure submitted for EEC component type-approval shall be considered as having satisfied requirements concerning strength if it fulfils the following conditions:

4.1.1. it is free from fractures and cracks as described in point 3.1 of Part 3A and 3B;

4.1.2. for Part 3 A tests: no part of the zone of clearance is outside the roll-over protection structure;

for Part 3 B tests: no part of the zone of clearance has been entered by the roll-over protection structure during any of the impact or crushing tests or is outside the roll-over protection structure, as described in point 3.2 of Part 3B;

4.1.3. for Part 3 A tests: the difference between the maximum momentary deflection and residual deflection, referred to in point 3.3 of Part 3A, does not exceed 15 cm;

For Part 3 B tests: during the side impact test the difference between the maximum momentary deflection and the residual deflection, referred to in point 3.3 of Part 3B, does not exceed 25 cm.

4.2. There is no other feature presenting a particular hazard to the driver e.g. glass of a type likely to shatter dangerously, insufficient padding inside the roof or where the driver's head may strike.

5. TEST REPORT

5.1. The test report shall be attached to the EEC component type-approval certificate referred to in Part 7. The presentation of the report shall be as shown in Part 5. The report shall include:

5.1.1. a general description of the roll-over protection structure's shape and construction including materials and fixings; external dimensions of tractor with protection structure fitted; main interior dimensions; minimum clearance from steering wheel; lateral distance from steering wheel to protection structure sides; height of protection structure roof above seat or seat reference point and above foot platform if there is one; details of provisions for normal entry and exit and for escape as determined by the protection structure parts; and details of heating and, where appropriate, ventilation system;

5.1.2. details of any special features such as devices to prevent the continuous rolling of the tractor;

5.1.3. a brief description of any interior padding intended to minimize head or shoulder injuries or to effect noise reduction;

5.1.4. a statement of the type of windscreen and glazing fitted.

5.2. The report must identify clearly the tractor type (make, type, commercial description, etc.) used for testing and the types for which the roll-over protection structure is intended.

5.3. If EEC component type-approval is being extended for other tractor types, the report must include the exact reference of the report of the original EEC component type-approval as well as precise indications regarding the requirements laid down in point 3.4 of Part 1.

ANNEX III

TEST PROCEDURES

A — TEST METHOD I

1. IMPACT AND CRUSHING TESTS

1.1. **Impact at the rear**

1.1.1. The tractor shall be so placed in relation to the weight that the weight will strike the roll-over protection structure when the impact face of the weight and the supporting chains or wire ropes are at an angle of 20° to the vertical unless the roll-over protection structure at the point of contact has, during deflection, a greater angle to the vertical. In this case the impact face of the weight shall be adjusted by means of an additional support so that it is parallel to the roll-over protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at an angle of 20° to the vertical. Steps must be taken to reduce the tendency of the weight to turn about the point of contact. The suspended height of the weight shall be so adjusted that the locus of its centre of gravity passes through the point of contact.

The point of impact shall be that part of the roll-over protection structure likely to hit the ground first in a rearward overturning accident, normally the upper edge. The position of the centre of gravity of the weight shall be one-sixth of the width of the top of the roll-over protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the roll-over protection structure.

However, if a curve in the back of the roll-over protection structure starts at a greater distance than this inside this vertical plane, the impact shall be administered at the beginning of the curve, i.e. at the point where this curve is tangential to a line at right angles to the median plane of the tractor (see Part 4, fig. 9).

If a protruding member would present an inadequate area for the weight, a steel plate of appropriate thickness and depth and about 300 mm in length shall be fastened to that member in such a manner that the strength of the roll-over protection structure is not affected.

1.1.2. Tractors with rigid bodies shall be lashed down. The points of attachment of the lashings shall be approximately 2 m behind the rear axle and 1·5 m in front of the front axle. They shall either be in the plane in which the centre of gravity of the pendulum will swing or more than one lashing shall give a resultant force in this plane, as in Part 4, fig. 5.

The lashings shall be tightened so that the deflections in the front and rear tyres are as indicated in point 3.1.5 of Part 2. When the lashings have been tightened, a wooden beam 150 mm square shall be clamped in front of the rear wheels and driven tight against them.

1.1.3. Articulated tractors shall have both axles lashed down. The axle of that section of the tractor on which the roll-over protection structure is mounted shall be treated as the rear axle in Part 4, fig. 5. The point of articulation will then be supported by a beam 100 mm square and will be lashed down firmly by means of wire ropes attached to the ground rails.

1.1.4. The weight shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by the formula:

$$H = 125 + 0{\cdot}020\ W$$

where H is the height of fall in millimetres and W the mass of the tractor as defined in point 1.3 of Part 2.

The weight shall then be released and allowed to crash against the roll-over protection structure.

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1.2. **Impact at the front**

1.2.1. The tractor shall be so placed in relation to the weight that the weight will strike the roll-over protection structure when the impact face of the weight and the supporting chains or wire ropes are at an angle of 20° to the vertical unless the roll-over protection structure at the point of contact has, during deflection, a greater angle to the vertical. In this case the impact face of the weight shall be adjusted by means of an additional support so that it is parallel to the roll-over protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at an angle of 20° to the vertical. Steps must be taken to reduce the tendency of the weight to turn about the point of contact. The suspended height of the weight shall be so adjusted that the locus of its centre of gravity passes through the point of contact.

The point of impact shall be that part of the roll-over protection structure likely to hit the ground first if the tractor overturned sideways whilst travelling forward, normally the top front corner. The position of the centre of gravity of the weight shall be not more than 80 mm from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the roll-over protection structure.

However, if a curve in the front of the roll-over protection structure starts at a greater distance than 80 mm inside this vertical plane, the impact shall be administered at the beginning of the curve, i.e. at the point where this curve is tangential to a line at right angles to the median plane of the tractor (see Part 4, fig. 9).

1.2.2. Tractors with rigid bodies shall be lashed down as indicated in Part 4, fig. 6. The points of attachment of the lashings shall be approximately 2 m behind the rear axle and 1·5 m in front of the front axle.

The lashings shall be tightened so that the deflections in the front and rear tyres are as indicated in point 3.1.5 of Part 2. When the lashings have been tightened, a wooden beam approximately 150 mm square shall be clamped behind the rear wheels and driven tight against them.

1.2.3. Articulated tractors shall have both axles lashed down. The axle of that section of the tractor on which the roll-over protection structure is mounted shall be treated as the front axle in Part 4, fig. 6. The point of articulation shall then be supported by a beam approximately 100 mm square and shall be lashed down firmly by means of wire ropes attached to the ground rails.

1.2.4. The weight shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by the formula:

$$H = 125 + 0{\cdot}020\ W.$$

1.3. **Impact at the side**

1.3.1. The tractor shall be so placed in relation to the weight that the weight will strike the roll-over protection structure when the impact face of the weight and the supporting chains or wire ropes are vertical unless the protection structure at the point of contact is, during deflection, other than vertical. In this case the impact face of the weight shall be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining vertical. The suspended height of the weight shall be so adjusted that the locus of its centre of gravity passes through the point of contact.

The point of impact shall be that part of the roll-over protection structure likely to hit the ground first in a sideways overturning accident, normally the upper edge. Unless it is certain that another part of this edge would hit the ground first, the point of impact shall be in the plane at right angles to the median plane of the tractor and passing through the middle of the seat at the mid-point of adjustment. Steps must be taken to reduce the tendency of the weight to turn about the point of contact.

1.3.2. For rigid tractors, any axle the position of which is rigid relative to the protection structure shall be lashed down on the side on which the impact is to be administered. In the case of a two-wheel drive tractor this will normally be the rear axle; this arrangement is shown in

Part 4, fig. 7. The two lashings shall pass over the axle from points directly below it, one passing to a point of attachment approximately 1·5 m in front of the axle and the other to a point approximately 1·5 m behind the axle. The lashings shall be tightened so that there is a deflection in the tyre adjacent to the lashing as indicated in point 3.1.5 of Part 2. After lashing, a wooden beam shall be placed as a prop against the wheel opposite the weight and secured to the floor so that it is held tightly against the wheel rim during impact as shown in Part 4, fig. 7. The length of the beam shall be chosen so that when in position against the wheel it is at an angle of 30 ± 3° to the horizontal. Its length shall be 20 to 25 times its thickness and its width two to three times its thickness. Both axles shall be prevented from moving sideways by means of a beam clamped to the floor against the outside of the wheel on the side opposite that on which the impact is to be administered.

1.3.3. An articulated tractor must be lashed down so that the section of the tractor bearing the protection structure is fixed rigidly to the ground as in the case of a non-articulated tractor.

Both axles of articulated tractors shall be lashed to the ground. The axle and wheels of that section of the tractor on which the protection structure is mounted shall be lashed and propped as in Part 4, fig. 7. The point of articulation shall be supported by a beam at least 100 mm square and lashed down to the ground rails. A prop will be positioned against the point of articulation and secured to the floor so that it has the same effect as a prop against the rear wheel and provides support similar to that achieved for a rigid tractor.

1.3.4. The weight shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by the formula:

$$H = 125 + 0{\cdot}150\ W.$$

1.4. Crushing at the rear

The tractor shall be positioned in the rig described in point 2.6 of Part 2 and shown in Part 4, figs. 8 and 10, in such a way that the rear edge of the beam is over the rearmost top load-bearing part of the protection structure and the median longitudinal plane of the tractor is midway between the points of application of force to the beam.

The axle stands shall be placed under the axles in such a way that the tyres do not bear the crushing force. The force applied shall correspond to twice the mass of the tractor as defined in point 1.3 of Part 2. It may be necessary to lash down the front of the tractor.

1.5. Crushing at the front

1.5.1. This shall be identical to the crushing test at the rear except that the front edge of the beam shall be over the frontmost top part of the roll-over protection structure.

1.5.2. Where the front part of the protection structure roof will not sustain the full crushing force, the force shall be applied until the roof is deflected to coincide with the plane joining the upper part of the roll-over protection structure with that part of the front of the tractor capable of supporting the tractor's mass when overturned. The force shall then be removed and the tractor re-positioned so that the beam is over that point of the protection structure which would then support the rear of the tractor when completely overturned, as shown in Part 4, fig. 10, and the full force reapplied.

2. ZONE OF CLEARANCE

2.1. The 'zone of clearance' is defined by planes as follows, the tractor being on a horizontal surface:

— horizontal, 95 cm above the compressed seat;

77/536/ EEC

— vertical, perpendicular to the median plane of the tractor and 10 cm behind the back of the seat;

— vertical, parallel to the median plane of the tractor and 25 cm to the left of the centre of the seat;

— vertical, parallel to the median plane of the tractor and 25 cm to the right of the centre of the seat;

— an inclined plane in which lies a horizontal line which is at right angles to the median plane of the tractor, 95 cm above the compressed seat and 45 cm (plus the normal fore and aft movement of the seat) in front of the back of the seat. This inclined plane passes in front of the steering wheel and at its nearest point is 4 cm from the rim of the steering wheel.

2.2. The back of the seat shall be determined ignoring any padding thereon. The seat shall be in its rearmost adjustment for normal seated operation of the tractor and in its highest position if this is independently variable. Where the suspension of the seat is adjustable it shall be at its mean setting and the load on it shall be 75 kg.

3. MEASUREMENTS TO BE MADE

3.1. **Fractures and cracks**

After each test all structural members, joints and attaching brackets on the tractor shall be visually examined for fractures or cracks, any small cracks in unimportant parts being ignored.

3.2. **Zone of clearance**

3.2.1. After each test the roll-over protection structure shall be examined to see whether any part of the protection structure has entered a zone of clearance round the driving seat as defined in section 2.

3.2.2. In addition, the protection structure shall be examined to determine whether any part of the zone of clearance is outside the protection of the protection structure. For this purpose it shall be considered to be outside the protection of the structure if any part of it would have come in contact with flat ground if the tractor had overturned towards the direction from which the impact came. For this purpose the tyre and track setting shall be assumed to be the smallest indicated by the manufacturer.

3.3. **Maximum momentary deflection**

During the side impact test the difference between the maximum momentary deflection and the residual deflection at a height of 950 mm above the loaded seat shall be recorded. One end of the rod described in point 2.7.1 of Part 2 shall be attached to the upper part of the roll-over protection structure and the other end passed through a hole in the vertical standard. The position of the friction collar on the rod after the impact indicates the maximum momentary deflection.

3.4. Permanent deflection

After the final compression test the permanent deflection of the protection structure shall be recorded. For this purpose, before the start of the test, the positions of the main roll-over protection structure members in relation to the seat shall be recorded.

B — TEST METHOD II

1. IMPACT AND CRUSHING TESTS

1.1. Impact at the rear

1.1.1. The tractor shall be so placed in relation to the weight that the weight will strike the roll-over protection structure when the impact face of the weight and the supporting chains or wire ropes are at an angle of 20° to the vertical unless the roll-over protection structure at the point of contact has, during deflection, a greater angle to the vertical. In this case the impact face of the weight shall be adjusted by means of an additional support so that it is parallel to the roll-over protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at an angle of 20° to the vertical. Steps must be taken to reduce the tendency of the weight to turn about the point of contact. The suspended height of the weight shall be so adjusted that the locus of its centre of gravity passes through the point of contact.

The point of impact shall be that part of the roll-over protection structure likely to hit the ground first in a rearward overturning accident, normally the upper edge. The position of the centre of gravity of the weight shall be one-sixth of the width of the top of the roll-over protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the roll-over protection structure.

However, if a curve in the back of the roll-over protection structure starts at a greater distance than this inside this vertical plane, the impact shall be administered at the beginning of the curve, i.e. at the point where this curve is tangential to a line at right angles to the median plane of the tractor (see Part 4, fig. 9).

If a protruding member would present an inadequate area for the weight, a steel plate of appropriate thickness and depth and about 300 mm in length shall be fastened to that member in such a manner that the strength of the roll-over protection structure is not affected.

1.1.2. Tractors with rigid bodies shall be lashed down. The points of attachment of the lashings shall be approximately 2 m behind the rear axle and 1·5 m in front of the front axle. They shall either be in the plane in which the centre of gravity of the pendulum will swing or more than one lashing shall give a resultant force in this plane, as in Part. 4, fig. 5.

The lashing shall be tightened so that the deflections in the front and rear tyres are as indicated in point 3.1.5 of Part 2. After the lashings have been tightened a wooden beam 150 mm square shall be clamped in front of the rear wheels and driven tight against them.

1.1.3. Articulated tractors shall have both axles lashed down. The axle for that section of the tractor on which the roll-over protection structure is mounted shall be treated as the rear axle in Part 4, fig. 5. The point of articulation will then be supported by a beam 100 mm square minimum and will be lashed down firmly by means of wire ropes attached to the ground rails.

1.1.4. The weight shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by the formula:

$$H = 2{\cdot}165 \times 10^{-8} \times WL^2 \text{ or } H = 5{\cdot}73 \times 10^{-2} \times I$$

where:

H = the height of fall in millimetres,

W = the mass of the tractor as defined in point 1.3 of Part 2.

L = the maximum tractor wheelbase in millimetres,

I = the moment of inertia of the rear axle, with wheels removed, in kilograms per square metre (kg/m²).

The weight shall then be released and allowed to crash against the roll-over protection structure.

1.1.5. There shall be no rear impact in the case of a tractor at least 50% of the mass of which, as defined in point 1.3 of Part 2, bears on the front axle.

1.2. Impact at the front

1.2.1. The tractor shall be so placed in relation to the weight that the weight will strike the roll-over protection structure when the impact face of the weight and the supporting chains or wire ropes are at an angle of 20° to the vertical unless the roll-over protection structure at the point of contact has, during deflection, a greater angle to the vertical. In this case the impact face of the weight shall be adjusted by means of an additional support so that it is parallel to the roll-over protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at an angle of 20° to the vertical. Steps must be taken to reduce the tendency of the weight to turn about the point of contact. The suspended height of the weight shall be so adjusted that the locus of its centre of gravity passes through the point of contact.

The point of impact shall be that part of the protection structure likely to hit the ground first if the tractor overturned sideways whilst travelling forward, normally the top front corner. The position of the centre of gravity of the weight shall be not more than 80 mm from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the roll-over protection structure.

However, if a curve in the front of the roll-over protection structure starts at a greater distance than 80 mm inside this vertical plane, the impact shall be administered at the beginning of the curve, i.e. at the point where this curve is tangential to a line at right angles to the median plane of the tractor (see Part 4, fig. 9).

1.2.2. Tractors with rigid bodies shall be lashed down as illustrated in Part 4, fig. 6. The points of attachment of the lashings shall be approximately 2 m behind the rear axle and 1·5 m in front of the front axle.

The lashings shall be tightened so that the deflections in the front and rear tyres are as indicated in point 3.1.5 of Part 2. When the lashings have been tightened, a wooden beam 150 mm square shall be clamped behind the rear wheels and driven tight against them.

1.2.3. Articulated tractors shall have both axles lashed down. The axle of that section of the tractor on which the roll-over protection structure is mounted shall be treated as the front axle in Part 4 fig 6. The point of articulation shall then be supported by a beam 100 mm square minimum and shall be lashed down firmly by means of wire ropes attached to the ground rails.

1.2.4. The weight shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by the formula:

$$H = 125 + 0{\cdot}020\ W.$$

1.3. Impact at the side

1.3.1. The tractor shall be so placed in relation to the weight that the weight will strike the roll-over protection structure when the impact face of the weight and the supporting chains or wire ropes are vertical unless the protection structure at the point of contact is, during deflection, other than vertical. In this case the impact face of the weight shall be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining vertical. The suspended height of the weight shall be so adjusted that the locus of its centre of gravity passes through the point of contact.

The point of impact shall be that part of the protection structure likely to hit the ground first in a sideways overturning accident, normally the upper edge. Unless it is certain that another part of this edge would hit the ground first, the point of impact shall be in the plane at right angles to the median plane of the tractor and passing through the middle of the seat at the mid-point of adjustment. Steps must be taken to reduce the tendency of the weight to turn about the point of contact.

1.3.2. For rigid tractors, any axle the position of which is rigid relative to the protection structure shall be lashed down on the side on which the impact is to be administered. In the case of a two-wheel drive tractor this will normally be the rear axle; this arrangement is shown in Part 4, fig. 7. The two lashings shall pass over the axle from points directly below it, one passing to a point of attachment approximately 1·5 m in front of the axle and the other to a point approximately 1·5 m behind the axle. The lashings shall be tightened so that there is a deflection in the tyre adjacent to the lashing as indicated in point 3.1.5 of Part 2. After lashing, a wooden beam shall be placed as a prop against the wheel opposite the weight and secured to the floor so that it is held tightly against the wheel rim during impact as shown in Part 4.

, fig. 7. The length of the beam shall be chosen so that when in position against the wheel it is at an angle of 30 ± 3° to the horizontal. Its length shall be 20 to 25 times its thickness and its width two to three times its thickness. Both axles shall be prevented from moving sideways by means of a beam clamped to the floor against the outside of the wheel on the side opposite that on which the impact is to be administered. 77/536/ EEC

1.3.3. An articulated tractor must be lashed down so that the section of the tractor bearing the protection structure is fixed rigidly to the ground as in the case of a non-articulated tractor.

Both axles of articulated tractors shall be lashed to the ground. The axle and wheels of that section of the tractor on which the protection structure is mounted shall be lashed and propped as in Part 4 fig. 7. The point of articulation shall be supported by a beam at least 100 mm square and lashed down to the ground rails. A prop will be positioned against the point of articulation and secured to the floor so that it has the same effect as a prop against the rear wheel and provides support similar to that achieved for a rigid tractor.

1.3.4. The weight shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by the formula:

$$H = 125 + 0{\cdot}150\ W.$$

1.4. Crushing at the rear

The tractor shall be positioned in the rig described in point 2.6 of Part 2 and shown in figs. 8 and 10 in such a way that the rear edge of the beam is over the rearmost top load-bearing part of the roll-over protection structure and the median longitudinal plane of the tractor is midway between the points of application of force to the beam.

The axle stands shall be placed under the axles in such a way that the tyres do not bear the crushing force. The force applied shall correspond to twice the mass of the tractor as defined in point 1.3 of Part 2 may be necessary to lash down the front of the tractor.

1.5. Crushing at the front

1.5.1. This test shall be identical to the crushing test at the rear except that the front edge of the beam shall be over the frontmost top part of the roll-over protection structure.

1.5.2. Where the front part of the roll-over protection structure roof cannot sustain the full crushing force, the force shall be applied until the roof is deflected to coincide with the plane joining the upper part of the roll-over protection structure with that part of the front of the tractor capable of supporting the tractor's mass when overturned. The force shall then be removed and the tractor re-positioned so that the beam is over that point of the roll-over protection structure which would then support the rear of the tractor when completely overturned as shown in Part 4, fig. 10, and the full force reapplied.

2. ZONE OF CLEARANCE

2.1. The zone of clearance is illustrated in Part 4, fig. 3, and is defined in relation to a vertical reference plane generally longitudinal to the tractor and passing through a seat reference point, described in point 2.3, and the centre of the steering wheel. The reference plane shall be assumed to move horizontally with the seat and steering wheel during impacts but to remain perpendicular to the floor of the tractor or of the roll-over protection structure if this is resiliently mounted.

Where the steering wheel is adjustable, its position should be that for normal seated driving.

2.2. The boundaries of the zone shall be taken as:

2.2.1. vertical planes 250 mm on either side of the reference plane extending upwards from the seat reference point for 300 mm;

2.2.2. parallel planes extending from the upper edge of planes 2.2.1 to a maximum height of 900 mm above the seat reference point and inclined in such a way that the upper edge of the plane on the side from which the side impact is struck is at least 100 mm from the reference plane;

2.2.3. a horizontal plane 900 mm above the seat reference point;

2.2.4. an inclined plane perpendicular to the reference plane and including a point 900 mm directly above the seat reference point and the rearmost point of the seat structure including its suspension;

2.2.5. a vertical plane perpendicular to the reference plane extending downwards from the rearmost point of the seat;

2.2.6. a curvilinear surface, perpendicular to the reference plane, with a radius of 120 mm tangential to planes 2.2.3 and 2.2.4;

2.2.7. a curvilinear suface, perpendicular to the reference plane, having a radius of 900 mm and extending forward for 400 mm from and tangential to plane 2.2.3 at a point 150 mm forward of the seat reference point;

2.2.8. an inclined plane perpendicular to the reference plane, joining surface 2.2.7 at its forward edge and passing 40 mm from the steering wheel. In the case of a high steering wheel position this plane is replaced by a tangent plane to surface 2.2.7;

2.2.9. a vertical plane, perpendicular to the reference plane, 40 mm forward of the steering wheel;

2.2.10. a horizontal plane through the seat reference point.

2.3. Seat location and seat reference point

2.3.1. For the purpose of defining the zone of clearance in point 2.1, the seat shall be at the rearmost point of any horizontal adjustment range. It shall be set at the mid-point of the vertical adjustment range where this is independent of adjustment of its horizontal position.

The reference point shall be established using the apparatus illustrated in Part 4, figs. 1 and 2, to simulate loading by a human occupant. The apparatus shall consist of a seat pan board and backrest boards. The lower backrest board shall be jointed in the region of the ischium humps (A) and loin (B), the joint (B) being adjustable in height.

2.3.2. The reference point is defined as the point in the median longitudinal plane of the seat where the tangential plane of the lower backrest and a horizontal plane intersect. This horizontal plane cuts the lower surface of the seat pan board 150 mm in front of the abovementioned tangent.

2.3.3. Where a seat suspension is provided with adjustment for the weight of the driver, this shall be set so that the seat is at the mid-point of its dynamic range.

The apparatus shall be positioned on the seat. It shall then be loaded with a force of 550 N at a point 50 mm in front of joint (A), and the two parts of the backrest board shall be lightly pressed tangentially against the backrest.

2.3.4. If it is not possible to determine definite tangents to each area of the backrest (above and below the lumbar region) the following should be done:

2.3.4.1. where no definite tangent to the lower area is possible: the lower part of the backrest board is pressed against the backrest vertically;

2.3.4.2. where no definite tangent to the upper area is possible: the joint (B) is fixed at a height of 230 mm above the seat reference point, if the lower part of the backrest board is vertical. Then the two parts of the backrest board are lightly pressed against the backrest tangentially.

3. MEASUREMENTS TO BE MADE

3.1. Fractures and cracks

After each test all structural members, joints and attaching brackets on the tractor shall be visually examined for fractures or cracks, any small cracks in unimportant parts being ignored.

3.2. Zone of clearance

3.2.1. During each test the roll-over protection structure shall be examined to see whether any part of the roll-over protection structure has entered a zone of clearance round the driving seat as defined in points 2.1 and 2.2.

3.2.2. In addition, the roll-over protection structure shall be examined to determine whether any part of the zone of clearance is outside the protection of the roll-over protection structure. For this purpose it shall be considered to be outside the protection of the roll-over protection structure if any part of it would have come in contact with flat ground if the tractor had overturned towards the direction from which the impact came. For this purpose the tyre and track setting shall be assumed to be the smallest specified by the manufacturer.

3.3. Maximum momentary deflection

During the side impact test the difference between the maximum momentary deflection and the residual deflection at a height of 900 mm above and 150 mm forward of the seat reference point shall be recorded. One end of the rod described in point 2.7.1 of Part 2 shall be attached to the upper part of the roll-over protection structure and the other end passed through a hole in the vertical standard. The position of the friction collar on the rod after the blow indicates the maximum momentary deflection.

3.4. Permanent deflection

After the final compression test the permanent deflection of the protection structure shall be recorded. For this purpose, before the start of the test, the position of the main roll-over protection structure members in relation to the seat reference point shall be recorded.

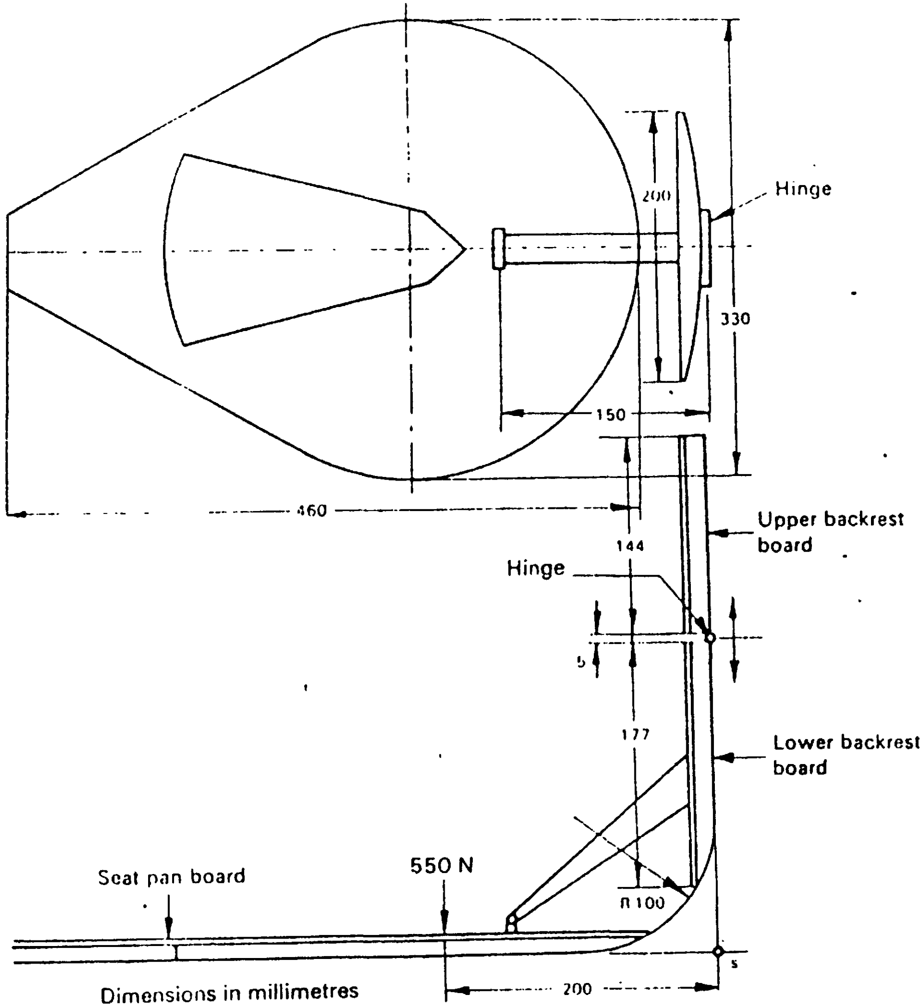


Fig. 1

Apparatus for determination of seat reference point

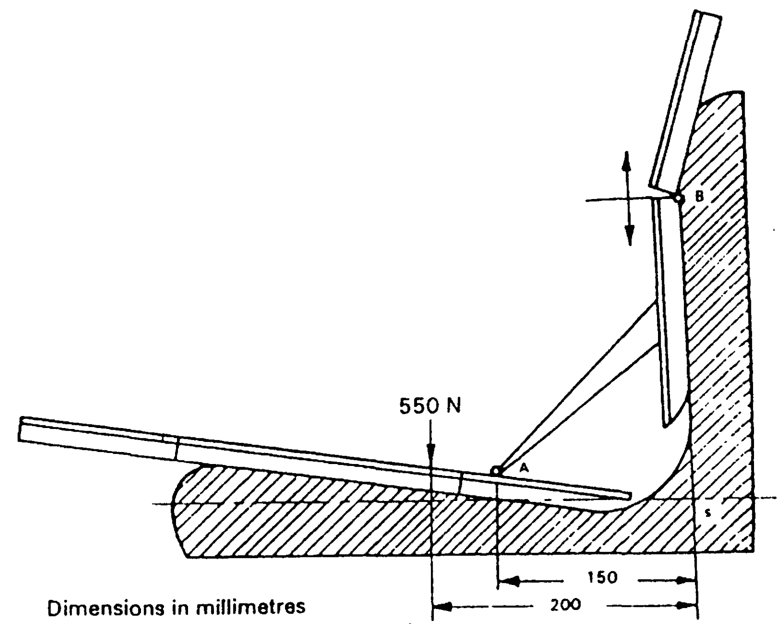


Fig. 2

Method of determining seat reference point

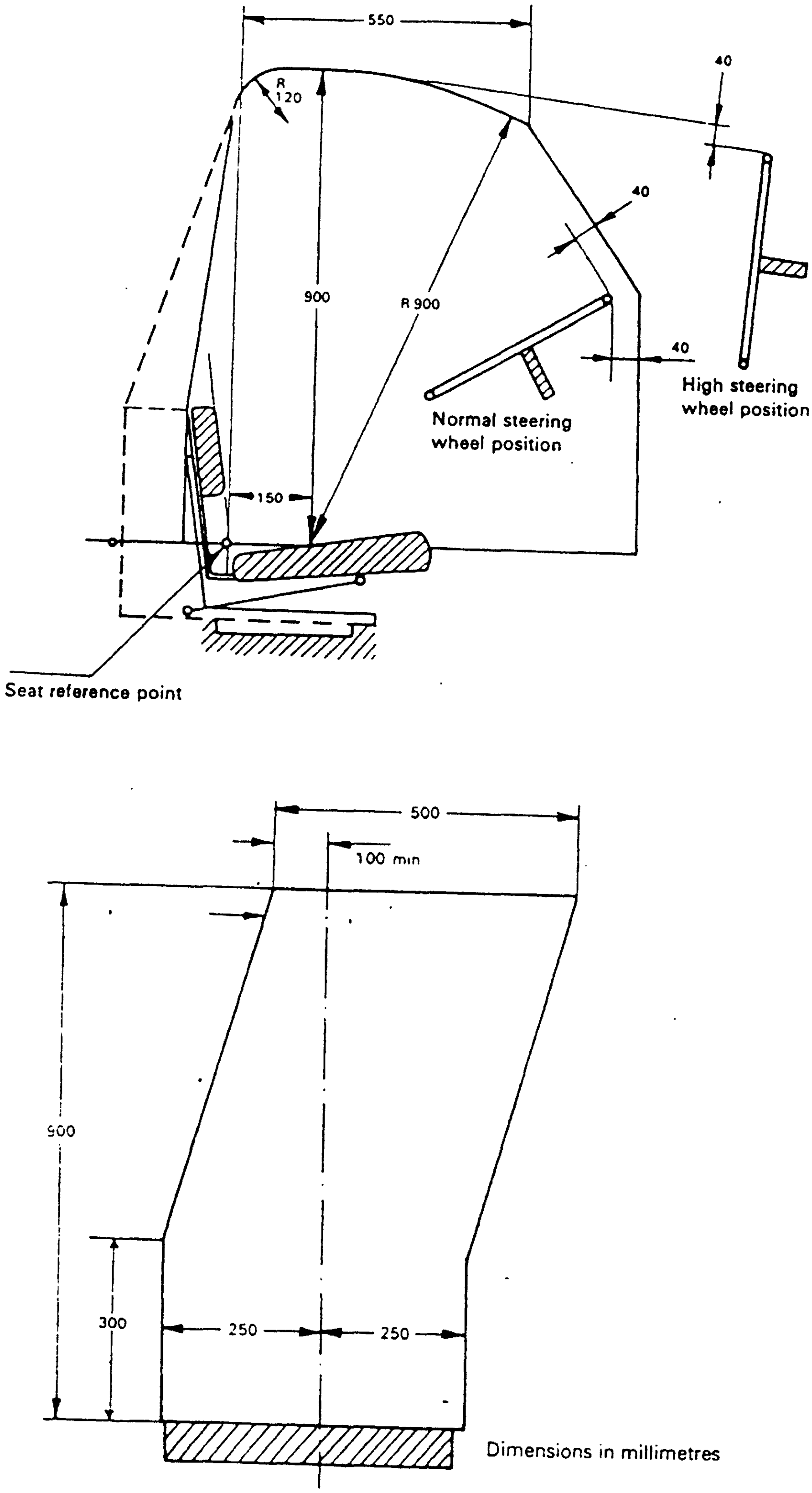


Fig. 3

Zone of clearance

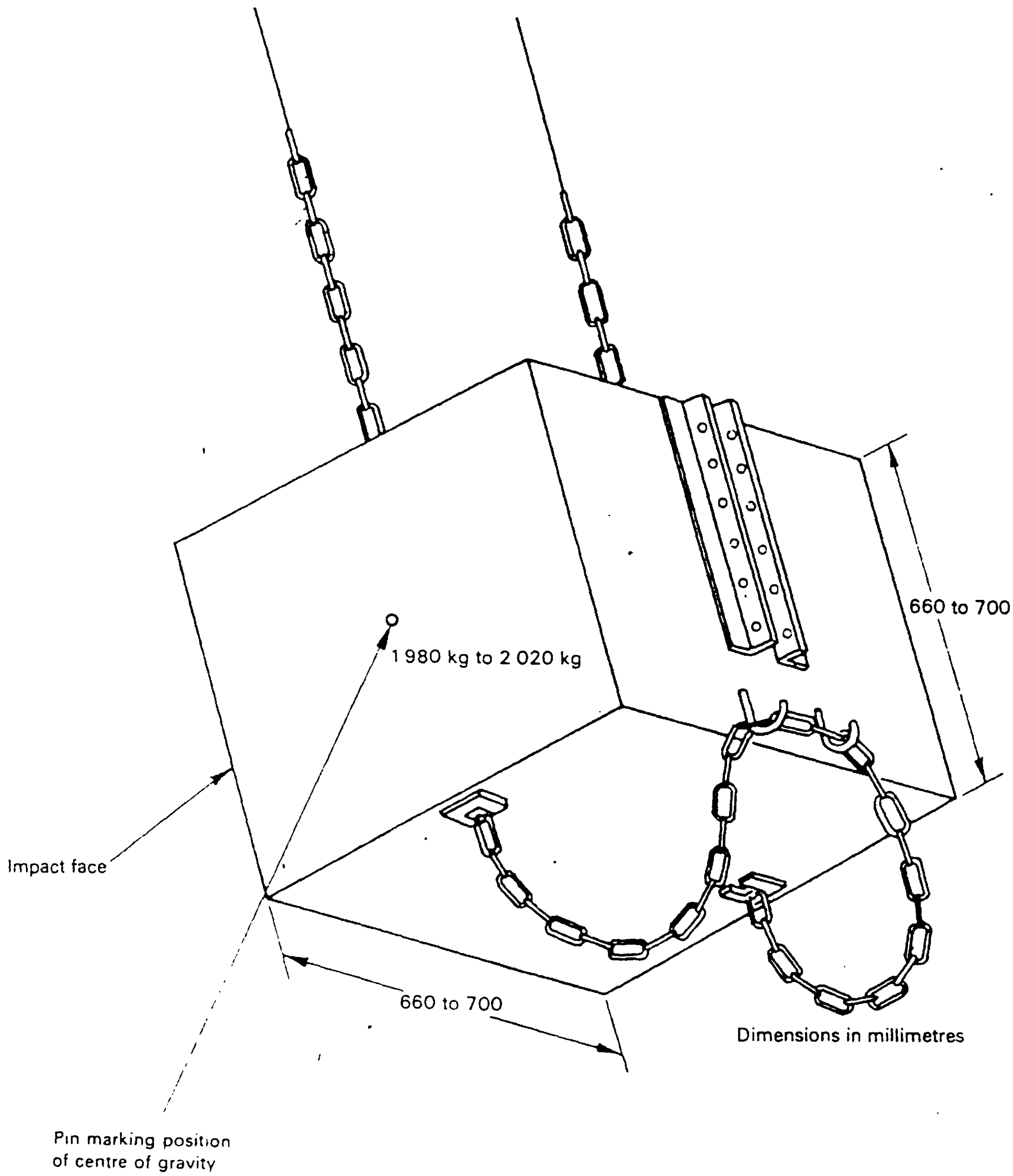


Fig. 4

Illustration of weight

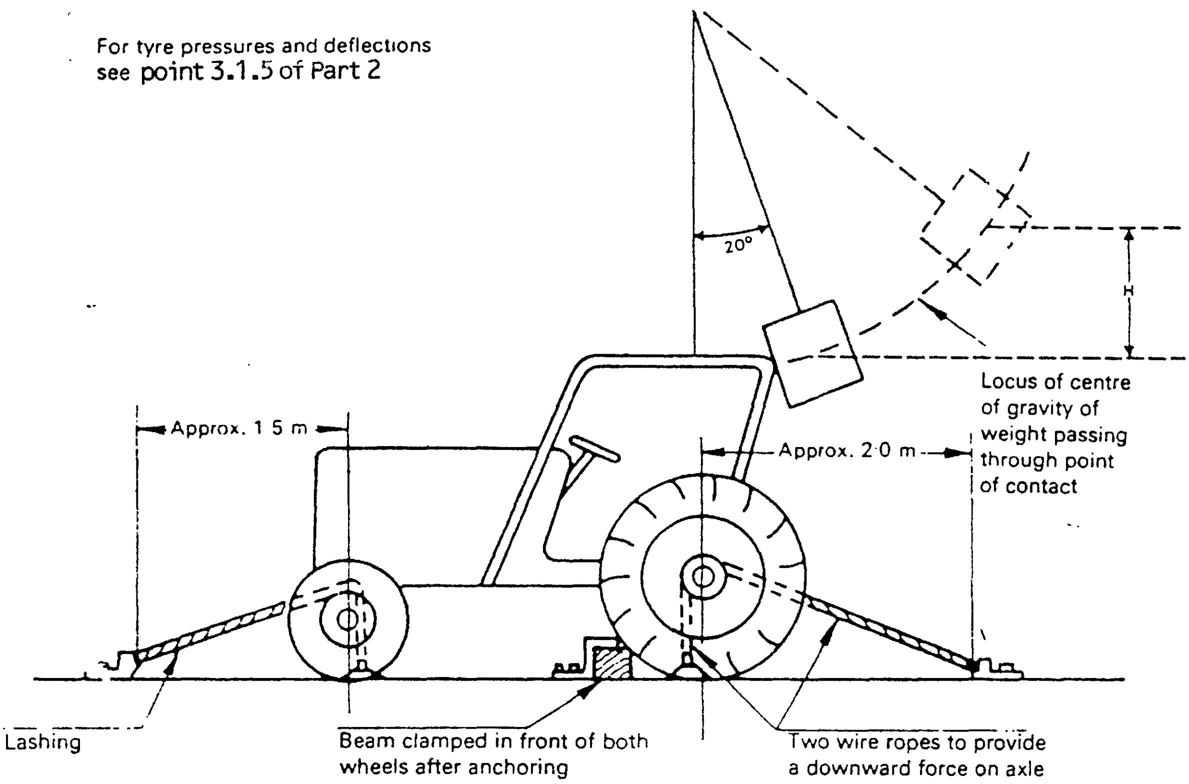


Fig. 5

Impact from rear

Note:

The configuration of the roll over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

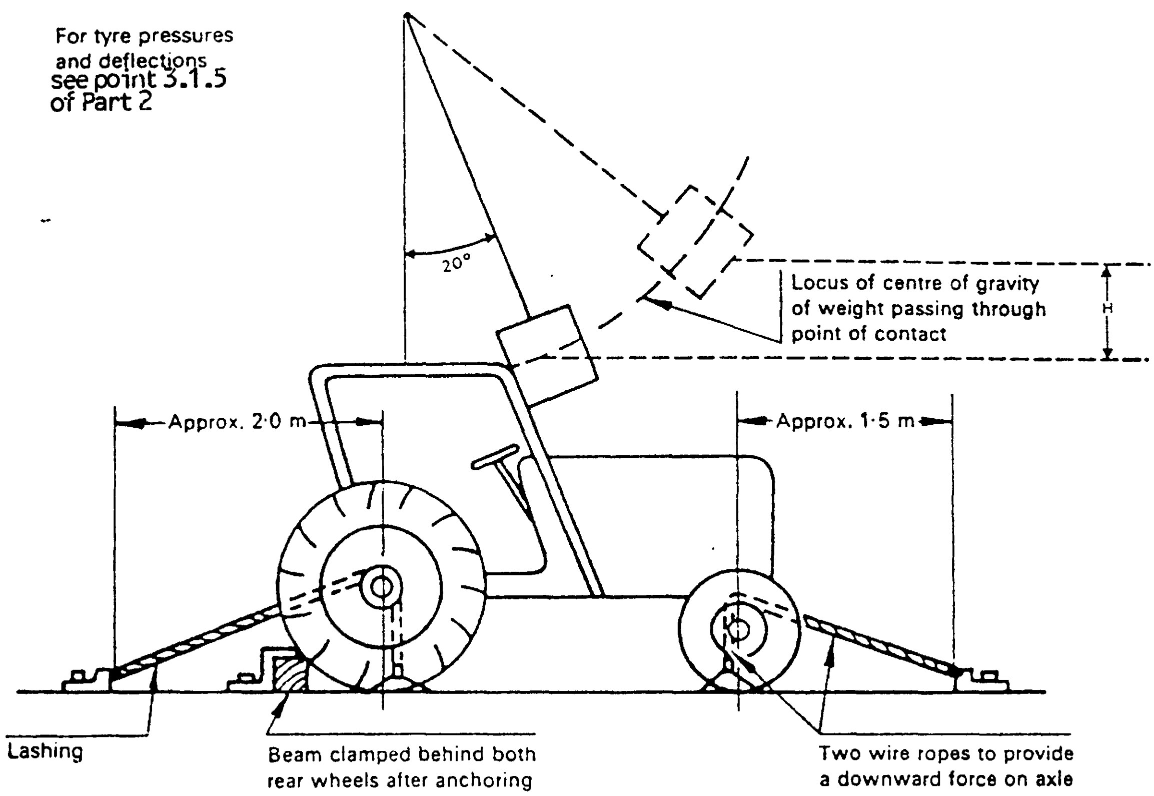


Fig. 6

Impact from front

Note:

The configuration of the roll-over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

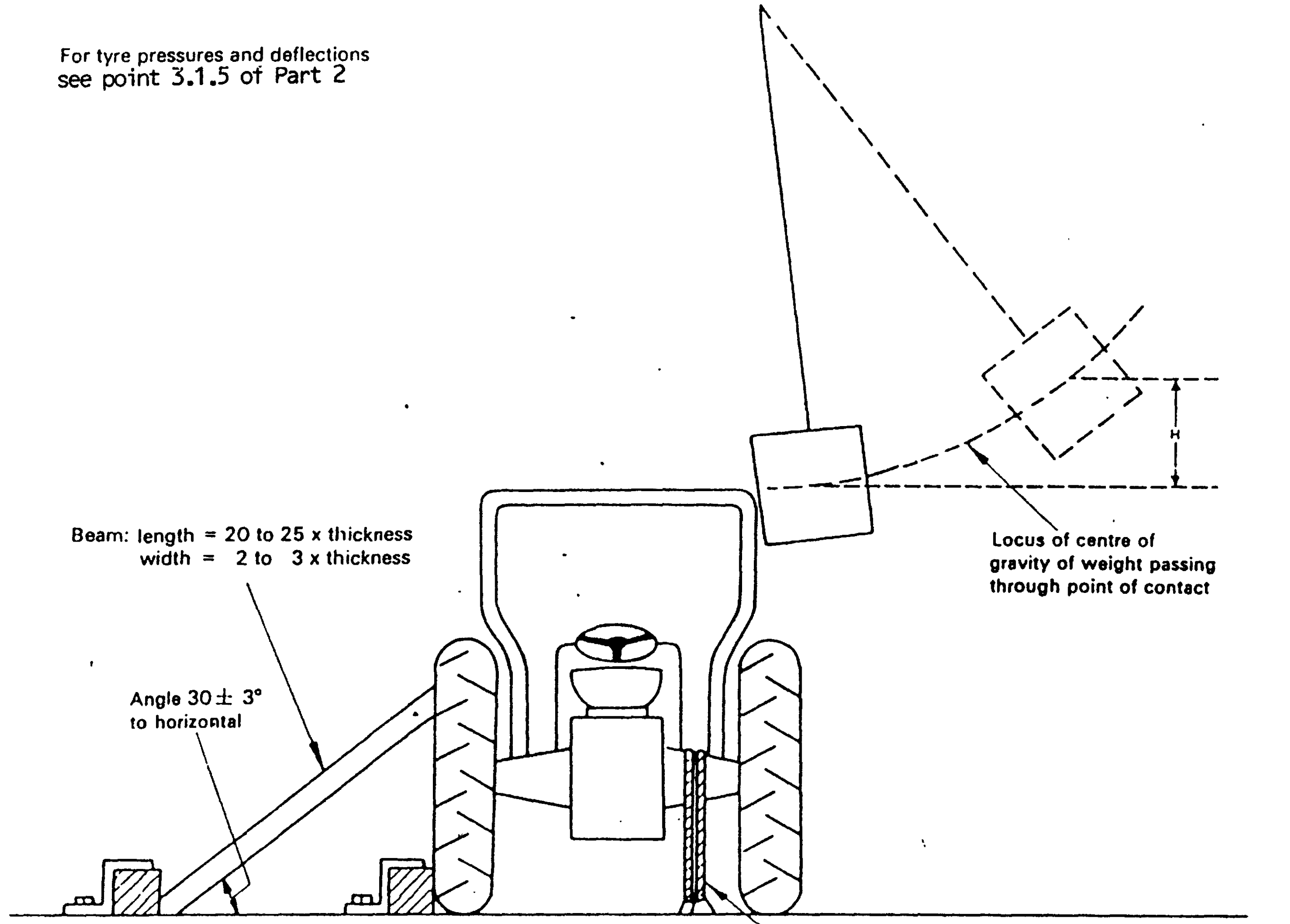


Fig. 7

Impact from side

Note: The configuration of the roll-over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

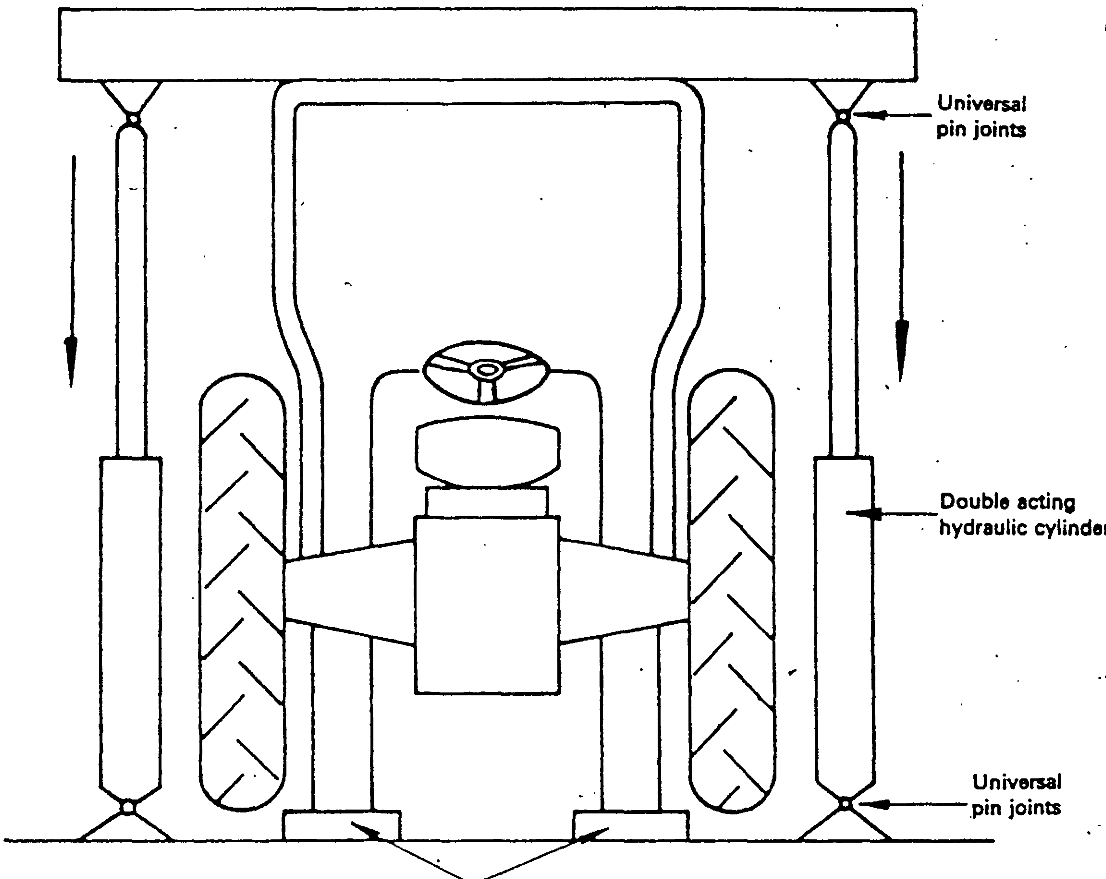


Fig. 8

Crushing test

Note:

The configuration of the roll-over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

	Value of x
Rear impact	One sixth of width of top of protection structure (see 1.1.1 of Part 3-A or 3-B
Front impact	80 mm (see 1.2.1 of Part 3-A or 3-B

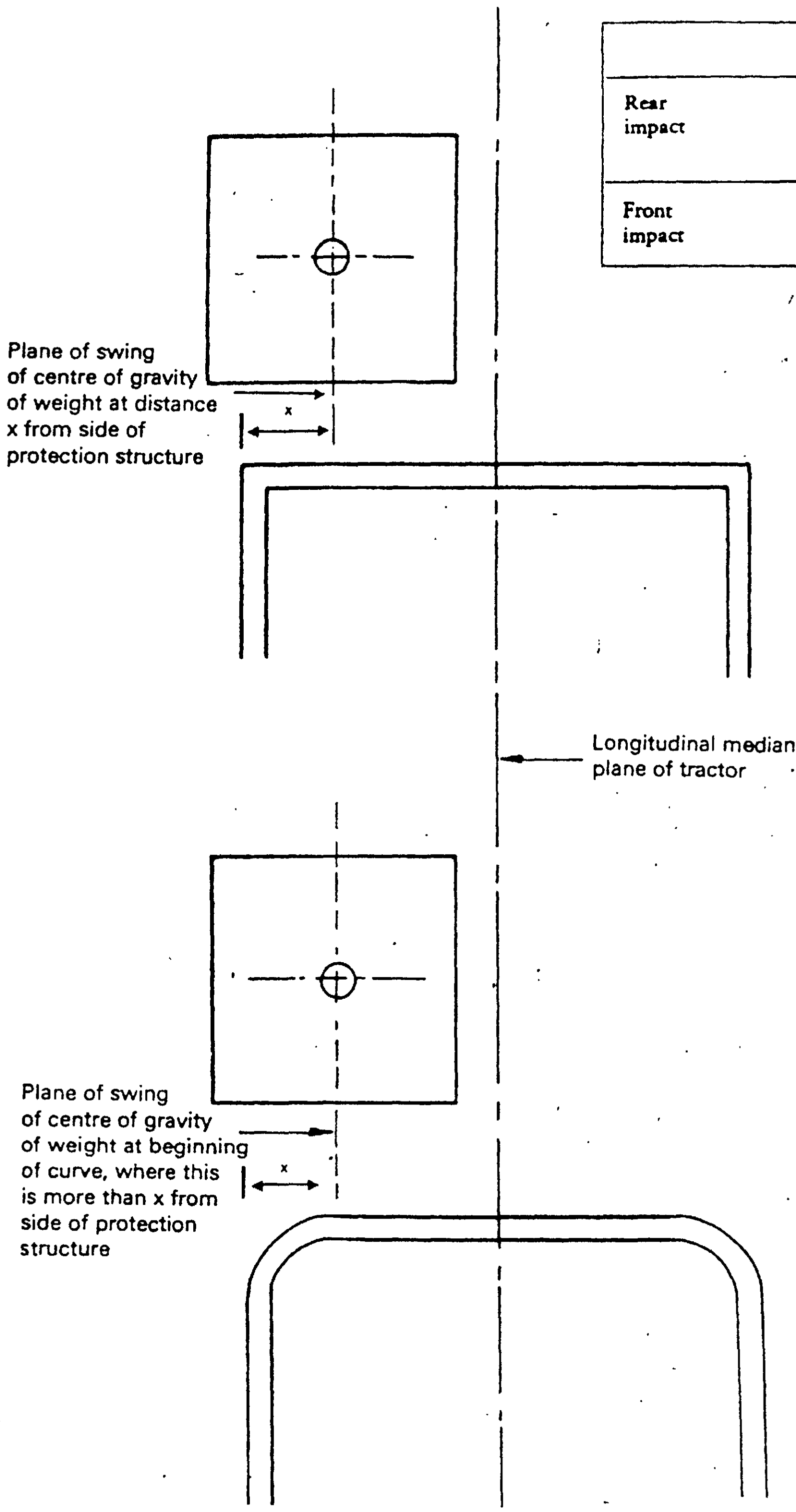


Fig. 9

Plan view of protection structure and weight showing location of plane of swing in front and rear impact tests

Note:

Weight shown on left side of median plane. For each test, the sides on which front and rear impacts are struck and determined in point 3.1.4 of Part 2.

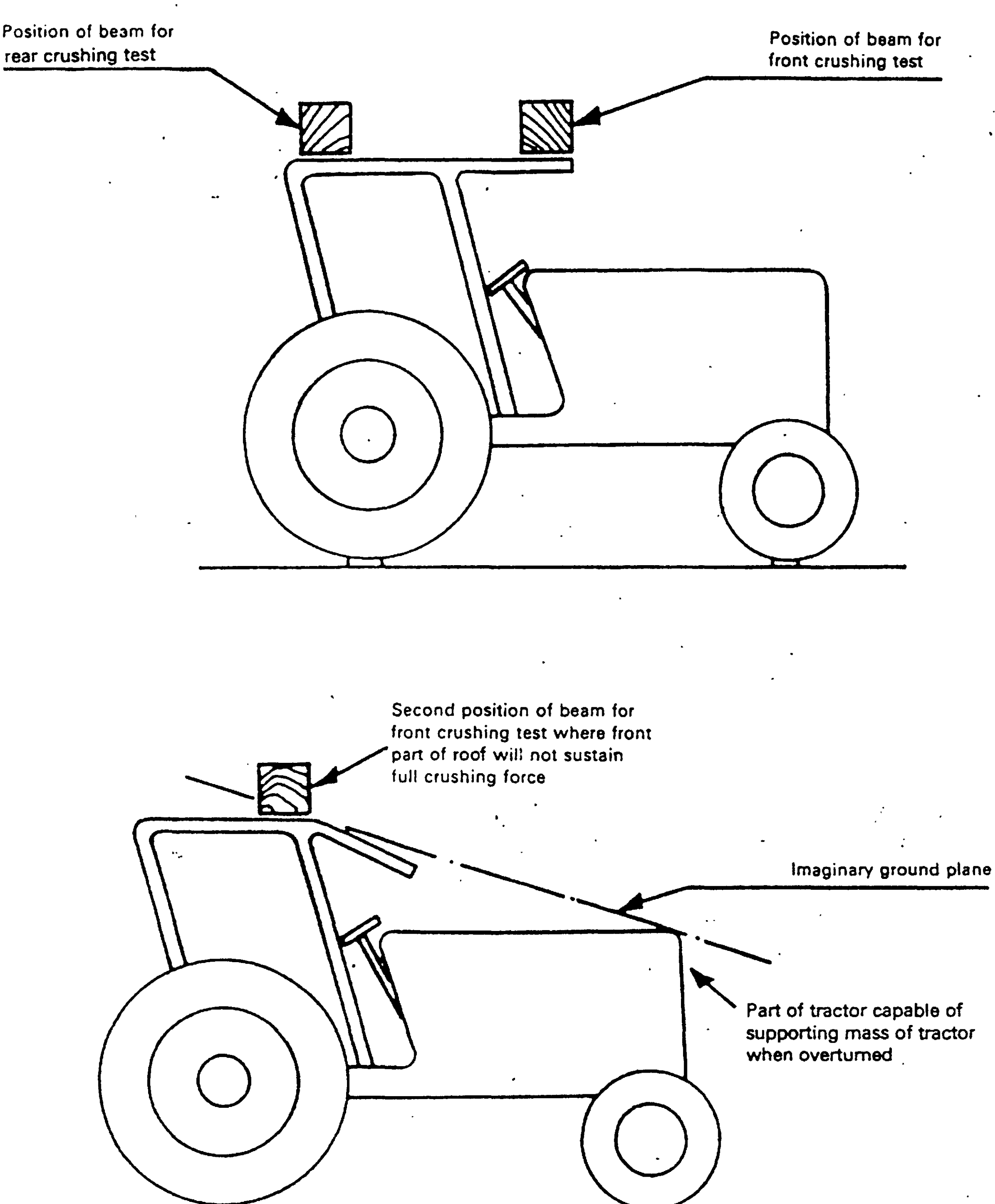


Fig. 10

Position of beam in crushing tests

Note:

The configuration of the roll over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

PART 5

MODEL

REPORT RELATING TO THE EEC COMPONENT TYPE-APPROVAL TEST OF A ROLL-OVER PROTECTION STRUCTURE (SAFETY FRAME OR CAB) WITH REGARD TO ITS STRENGTH AS WELL AS TO THE STRENGTH OF ITS ATTACHMENT TO THE TRACTOR

Protection structure	
Make	
Type	
Tractor make	
Tractor type	
Test method	I/II (1)

Identification of test station

EEC component type-approval No ....

1. Trade mark or name of protection structure ....

....

2. Name and address of manufacturer of tractor or protection structure ....

....

3. If applicable, name and address of tractor or protection structure manufacturer's authorized representative ....

....

4. Specifications of tractor on which the tests are carried out

4.1. Trade mark or name ....

4.2. Type and commercial description ....

4.3. Serial number ....

4.4. Mass of unballasted tractor with roll-over protection structure fitted, without driver ......kg

4.5. Wheelbase/moment of inertia (1) .... mm / kg/m^2 (1)

4.6. Tyre sizes: front ....

rear ....

5. Extension of EEC component type-approval for other tractor types

5.1. Trade mark or name ....

(1) Delete where inapplicable.

5.2. Type and commercial description ....

5.3. Mass of unballasted tractor, with roll-over protection structure fitted, without driver......kg

5.4. Wheelbase/moment of inertia (1) .... mm / kg/m² (1)

5.5. Tyre sizes: front ....

rear ....

6. Specifications of roll-over protection structure

6.1. General arrangement drawing of both the roll-over protection structure and its attachment to the tractor

6.2. Photographs from side and rear showing mounting details

6.3. Brief description of roll-over protection structure including type of construction, details of mounting on the tractor, details of cladding, means of access and escape, details of interior padding, features to prevent continous rolling and details of heating and ventilation

6.4. Dimensions

6.4.1. Height of roof members above the loaded tractor seat above the seat reference point (2)

.... mm

6.4.2. Height of roof members above the tractor foot platform .... mm

6.4.3. Interior with of the roll-over protection structure at 950 mm above the loaded seat/at 900 mm above the seat reference point (2) .... mm

6.4.4. Interior width of the roll-over protection structure at a point above the seat at the height of the centre of the steering wheel .... mm

6.4.5. Distance from the centre of steering wheel to the right-hand side of roll-over protection structure .... mm

6.4.6. Distance from the centre of the steering wheel to the left-hand side of roll-over protection structure .... mm

6.4.7. Minimum distance from the steering wheel rim to the roll-over protection structure......mm

6.4.8. Width of the doorways:

at the top ....mm

in the middle .... mm

at the bottom ....mm

6.4.9. Height of the doorways:

above foot platform .... mm

(1) Delete where inapplicable.
(2) According to the test method used.

above highest mounting step .... mm

above lowest mounting step ....mm

6.4.10. Overall height of the tractor with the roll-over protection structure fitted .... mm

6.4.11. Overall width of the roll-over protection structure .... mm

6.4.12. Horizontal distance to the rear of the protection structure from the back of the loaded seat at a height of 950 mm/from the seat reference point at a height of 900 mm (1) ......

.... mm

6.5. Details and quality of materials used, standards used ....

....

Main frame ....(material and dimensions)

Mountings .... (material and dimensions)

Cladding .... (material and dimensions)

Roof ....(material and dimensions)

Interior padding ....(material and dimensions)

Assembly and mounting bolts ....(grade and dimensions)

7. Test results

7.1. Impact and crushing tests

Impact tests were made to the left/right-hand (2) rear and to the right/left-hand (2) front and right/left-hand side (2). The reference mass used for calculating impact energies and crushing forces was ....kg

The test requirements concerning fractures or cracks, maximum instantaneous deflection and the zone of clearance were satisfactorily fulfilled

7.2. Deflection measured after the tests

Permanent deflection:

rear: left-hand .... mm

right-hand ....mm

front: left-hand .... mm

right-hand ....mm

side sideways:

front ....mm

rear .... mm

top downwards:

front.. mm

rear .... mm

(1) According to the test method used.
(2) Delete where inapplicable.

Difference between maximum momentary and residual deflection during sideways impact test .... mm

8. Report number ....

9. Report date ....

10. Signature ....

PART 6

MARKS

77/536/EEC

The EEC component type-approval mark shall consist of a rectangle surrounding the lower-case letter 'e' followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval:

1 for Germany,

2 for France,

3 for Italy,

4 for the Netherlands,

6 for Belgium, 87/354/EEC

9 for Spain,

11 for the United Kingdom, OJ 302/85

13 for Luxembourg,

18 for Denmark

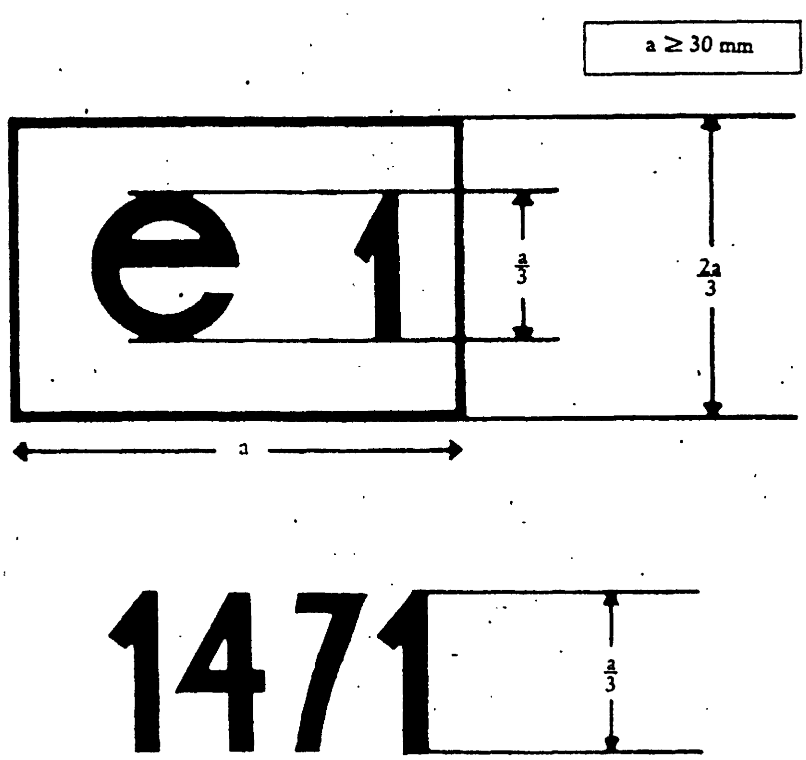
EL for Greece

IRL for Ireland.

21 for Portugal

It must also include in the vicinity of the rectangle the EEC component type-approval number which corresponds to the number of the EEC component type-approval certificate issued with regard to the strength of the type of roll-over protection structure and its attachment to the tractor.

Example of an EEC component type-approval mark



The roll-over protection structure bearing the EEC component type-approval mark shown above is a structure for which EEC component type-approval was granted in Germany (e 1) under the number 1471.

PART 7

MODEL

EEC COMPONENT TYPE-APPROVAL CERTIFICATE

Name of competent authority

Notification concerning the granting, refusal, withdrawal or extension of EEC component type-approval with regard to the strength of a roll-over protection structure (safety cab or frame) and to the strength of its attachment to the tractor

EEC component type-approval No ....
.... extension ([1])

1. Trade name or mark of protection structure ....
....
2. Name and address of manufacturer of protection structure ....
....
3. If applicable, name and address of authorized representative of manufacturer of protection structure ....
4. Trade mark or name, type and commercial description of tractor for which protection structure is intended ....
....
5. Extension of EEC component type-approval for the following tractor type(s) ....
5.1. The mass of the unballasted tractor, as defined in point 1.3 of Part 2 exceeds/does not exceed ([2]) the reference mass used for the test by more than 5%.
5.2. The method of attachment and points of attachment are/are not ([2]) identical.
5.3. All the components likely to serve as supports for the roll-over protection structure are/are not ([2]) identical.
6. Submitted for EEC component type-approval on ....
7. Test station ....
....
8. Date and number of the report of the test station ....
9. Date of granting/refusal/withdrawal of EEC component type-approval ([2]) ....
10. Date of granting/refusal/withdrawal of the extension of EEC component type-approval ([2]) ....
....
11. Place ....
12. Date ....
13. The following documents, bearing the component type-approval number shown above, are annexed to this certificate (e.g. report of the test station) ....
14. Remarks, if any ....
15. Signature ....

([1]) If applicable, state whether this is the first, second, etc. extension of the original EEC component type-approval.
([2]) Delete where inapplicable.

PART 8

CONDITIONS FOR EEC TYPE-APPROVAL

1. The application for EEC type-approval of a tractor, with regard to the strength of a roll-over protection structure and the strength of its attachment to the tractor shall be submitted by the tractor manufacturer or by his authorized representative.

2. A tractor representative of the tractor type to be approved, on which a protection structure and its attachment, duly approved, are mounted, shall be submitted to the technical services responsible for conducting the type-approval tests.

3. The technical service responsible for conducting the type-approval tests shall check whether the approved type of protection structure is intended to be mounted on the type of tractor for which the type-approval is requested. In particular, it shall ascertain that the attachment of the protection structure corresponds to that which was tested when the EEC component type-approval was granted.

4. The holder of the EEC type-approval may ask for its extension for other types of protection structures.

5. The competent authorities shall grant such extension on the following conditions:

5.1. the new type of roll-over protection structure and its tractor attachment have received EEC component type-approval;

5.2. it is designed to be mounted on the type of tractor for which the extension of the EEC type-approval is requested;

5.3. the attachment of the protection structure to the tractor corresponds to that which was tested when EEC component type-approval was granted.

6. A certificate, of which a model is shown in Part 9, shall be annexed to the EEC type-approval certificate for each type-approval or type-approval extension which has been granted or refused.

7. If the application for EEC type-approval for a type of tractor is introduced at the same time as the request for EEC component type-approval for a type of roll-over protection structure intended to be mounted on the type of tractor for which EEC type-approval is requested, the checks laid down in points 2 and 3 will not be made.

PART 9

MODEL

Name of competent authority

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE STRENGTH OF ROLL-OVER PROTECTION STRUCTURES (SAFETY CAB OR FRAME) AND THE STRENGTH OF THEIR ATTACHMENT TO THE TRACTOR

(Article 4 (2))

EEC type-approval No ....
.... extension ([1])

1. Trade name or mark of tractor ....

2. Tractor type ....

3. Name and address of tractor manufacturer ....

4. If applicable, name and address of manufacturer's authorized representative ....

5. Trade name or mark of roll-over protection structure ....

6. Extension of EEC type-approval for the following type(s) of protection structure ....

7. Tractor submitted for EEC type-approval on ....

8. Technical service responsible for EEC type-approval conformity control ....

9. Date of report issued by that service ....

10. Number of report issued by that service ....

11. EEC type-approval with regard to the strength of the roll-over protection structures and the strength of their attachment to the tractor has been granted/refused ([2])

12. The extension of the EEC type-approval with regard to the strength of the roll-over protection structures and the strength of their attachment to tractor has been granted/refused ([2])

13. Place ....

14. Date ....

15. Signature ....

([1]) If applicable, state whether this is the first, second, etc. extension of the original EEC type-approval.

([2]) Delete where inapplicable.

ANNEX XIII
Emission of Pollutants

PART 1 : DEFINITIONS, APPLICATION FOR EEC TYPE-APPROVAL, SYMBOL OF THE CORRECTED ABSORPTION COEFFICIENT, SPECIFICATIONS AND TESTS AND CONFORMITY OF PRODUCTION

1. DEFINITIONS

For the purposes of this Directive:

1.1. *'tractor type as regards the limitation of the emission of pollutants from the engine'* means tractors which do not differ in such essential respects as the tractor and engine characteristics defined in Part 2.

1.2. *'diesel engine'* means an engine which works on the compression-ignition principle;

1.3. *'cold-start device'* means a device which by its operation temporarily increases the amount of fuel supplied to the engine and is intended to facilitate the starting of the engine;

1.4. *'opacimeter'* means an instrument for continuous measurement of the absorption coefficients of the light by the exhaust gases emitted by tractors.

2. APPLICATION FOR EEC TYPE-APPROVAL

2.1. The application for approval must be submitted by the tractor manufacturer or by his duly accredited representative.

2.2. It must be accompanied by the undermentioned documents in triplicate and the following particulars:

2.2.1. a description of the engine type including all the particulars referred to Part 2.

2.2.2. drawings of the combustion chamber and of the upper face of the piston.

2.3. An engine and the equipment prescribed in Part 2, for fitting to the tractor to be approved, shall be submitted to the technical service conducting the approval tests defined in section 5. However, if the manufacturer so requests and the technical service conducting the approval tests agrees, a test may be carried out on a tractor representative of the tractor type to be approved.

3. EEC TYPE-APPROVAL

A certificate conforming to that shown in Part 10 shall be attached to the EEC type-approval certificate.

4. SYMBOL OF THE CORRECTED ABSORPTION COEFFICIENT

(1) The text of the Annexes is similar to that of Regulation No 24 of the UN Economic Commission for Europe; in particular the breakdown into items is the same. For this reason, where an item of Regulation No 24 has no counterpart in this Directive, its number is given in brackets as a token entry.

4.1. To every tractor conforming to a tractor type approved under this Regulation there shall be affixed, conspicuously and in a readily accessible place specified in the Annex to the type-approval certificate shown in Part 10 a symbol being a rectangle surrounding a figure expressing in m^{-1} the corrected absorption coefficient obtained, at the time of approval, during the test under free acceleration, and determined at the time of approval by the method described in point 3.2 of Part 4.

4.2. The symbol must be clearly legible and indelible.

4.3. Part 9 gives an example of the symbol.

5. SPECIFICATIONS AND TESTS

5.1. General

The components liable to affect the emission of pollutants shall be so designed, constructed and assembled as to enable the tractor in normal use, despite the vibration to which it may be subjected, to comply with the provisions of this Directive.

5.2. Specifications concerning cold-start devices

5.2.1. The cold-start device shall be so designed and constructed that it cannot be brought into or kept in action when the engine is running normally.

5.2.2. The provisions of point 5.2.1 above shall not apply if at least one of the following conditions is met:

5.2.2.1. the light absorption coefficient of the gases emitted by the engine at steady speeds when measured by the method described in Part 3 with the cold-start device operating is within the limits prescribed in Part 6.

5.2.2.2. keeping the cold-start device in operation causes the engine to stop within a reasonable time.

5.3. Specifications concerning the emission of pollutants

5.3.1. The emission of pollutants by the tractor type submitted for approval shall be measured by the two methods described in Parts 3 and 4 relating respectively to tests at steady speeds and to tests under free acceleration (1).

5.3.2. The emission of pollutants, as measured by the method described in Part 3, shall not exceed the limits prescribed in Part 6.

5.3.3. In the case of engines with an exhaust-driven supercharger, the absorption coefficient measured under free acceleration shall not exceed the limit prescribed in Part 6 for the nominal flow value corresponding to the maximum absorption coefficient measured during the tests at steady speeds, plus 0·5 m^{-1}.

5.4. Equivalent measuring instruments shall be allowed. If an instrument other than those described in Part 7 is used, proof of its equivalence for the engine considered shall be required.

6. CONFORMITY OF PRODUCTION

6.1. Every tractor in the series must conform, with regard to components affecting the emission of pollutants by the engine, to the tractor type approved.

(1) A test under free acceleration shall be carried out, particularly in order to provide a reference figure for administrations which use this method to check vehicles in use.

6.2. As a general rule conformity of the tractor with the approved type as regards the emission of pollutants from diesel motors shall be verified on the basis of the description given in the Annex to the EEC approval certificate shown in Part 10. In addition:

6.2.1. where a check is carried out on a vehicle taken from the series, the tests shall be carried out as follows:

6.2.1.1. a tractor which has not been run in shall be subjected to the test under free acceleration described in Part 4. The vehicle shall be deemed to conform to the approved type if the absorption coefficient determined does not exceed the figure shown in the approval mark by more than 0·5 m^{-1};

6.2.1.2. if the figure determined in the test referred to in point 6.2.1.1 above exceeds the figure shown in the approval mark by more than 0·5 m^{-1}, a tractor of the type considered or its engine shall be subjected to the test at steady speeds as described in Part 3. The emission levels shall not exceed the limits prescribed in Part 6.

PART 2

ESSENTIAL CHARACTERISTICS OF THE TRACTOR AND THE ENGINE AND INFORMATION CONCERNING THE CONDUCT OF TESTS (1)

1. Description of engine

1.1. Make ....

1.2. Type ....

1.3. Cycle: four-stroke/two-stroke (2)

1.4. Bore .... mm

1.5. Stroke .... mm

1.6. Number of cylinders ....

1.7. Cylinder capacity .... cm^3

1.8. Compression ratio (3) ....

1.9. System of cooling ....

1.10. Supercharger with/without (2) description of the system ....

....

1.11. Air filter: drawings, or makes and types ....

2. Additional anti-smoke devices (if any, and if not covered by another heading)

Description and diagrams ....

3. Air intake and fuel feed

3.1. Description and diagrams of air intakes and their accessories (heating device, intake silencer, etc.)

....

3.2. Fuel feed

3.2.1. Feed pump

Pressure (3) .... or characteristic diagram (3) ....

....

3.2.2. Injector ....

3.2.2.1. Pump

3.2.2.1.1. Make(s) ....

(1) In the case of non-conventional engines and systems, particulars equivalent to those referred to below shall be supplied by the manufacturer.
(2) Delete where inapplicable.
(3) Specify the tolerance.

3.2.2.1.1. Make(s) ....

3.2.2.1.2. Type(s) ....

3.2.2.1.3. Delivery .... mm³ per stroke at pump speed of .... rpm (1)

at full injection; or characteristic diagram (1) (2) ....

Mention the method used: On engine/on pump test bench (2)

3.2.2.1.4. Injection advance ....

3.2.2.1.4.1. Injection advance curve ....

3.2.2.1.4.2. Timing ....

3.2.2.2. Injection piping

3.2.2.2.1. Length ....

3.2.2.2.2. Internal diameter ....

3.2.2.3. Injector(s)

3.2.2.3.1. Make(s) ....

3.2.2.3.2. Type(s) ....

3.2.2.3.3. Starting pressure .... bar (1)

or characteristic diagram (1) (2) ....

3.2.2.4. Governor

3.2.2.4.1. Make(s) ....

3.2.2.4.2. Type(s) ....

3.2.2.4.3. Speed at which cut-off starts under load: .... rpm

3.2.2.4.4. Maximum no-load speed: .... rpm

3.2.2.4.5. Idling speed: .... rpm

3.3. Cold-start system

3.3.1. Make(s) ....

3.3.2. Type(s) ....

3.3.3. Description ....

4. Valve timing

4.1. Maximum lift of valves and angles of opening and closing in relation to dead centres

....

4.2. Reference and/or setting ranges (2) ....

(1) Specify the tolerance.
(2) Delete where inapplicable.

5. Exhaust device

5.1. Description and diagrams ....

5.2. Mean back-pressure at maximum power: .... mm water Pascal (Pa)

6. Transmission

6.1. Moment of inertia of engine flywheel. ....

6.2. Additional moment of inertia with no gear engaged ....

....

7. Additional information on test conditions

7.1. Lubricant used

7.1.1. Make(s) ....

7.1.2. Type(s) ....
(State percentage of oil in mixture if lubricant and fuel mixed)

8. Engine performances

8.1. Idling speed .... rpm ([1])

8.2. Engine speed at maximum power .... rpm ([1])

8.3. Power at the six points of measurement referred to in point 2.1 of Part 3.

8.3.1. Power of the engine measured on the test bench: indicate the standard followed (BSI-CUNA-DIN-GOST-IGM-ISO-SAE, etc.)

8.3.2. Power measured on the wheels of the vehicle

Engine speed (n) rpm	Measured power kW
1.	....
2.	....
3.	....
4.	....
5.	....
6.	....

([1]) Specify the tolerance.

PART 3

TEST AT STEADY SPEEDS

1. INTRODUCTION

1.1. This Annex describes the method of determining emissions of pollutants at different steady speeds at 80% of the maximum load.

1.2. The test may be carried out either on an engine or on a tractor.

2. MEASUREMENT PRINCIPLE

2.1. The opacity of the exhaust gases produced by the engine shall be measured with the engine running under 80% of the maximum load and at steady speed. Six measurements shall be made at engine speeds spaced out uniformly between that corresponding to maximum power and the higher of the following two engine speeds:

— 55% of the engine speed corresponding to maximum power; and

— 1 000 rpm.

The extreme points of measurement shall be situated at the limits of the interval defined above.

2.2. In the case of diesel engines which are fitted with an air supercharger which can be engaged at will, and in which engines the entry into operation of the air supercharger automatically brings about an increase in the quantity of fuel injected; the measurements shall be made both with and without the supercharger working.

For each engine speed, the result of the measurement shall be the higher of the two figures obtained.

3. TEST CONDITIONS

3.1. Tractor or engine

3.1.1. The engine or the tractor shall be submitted in good mechanical condition. The engine shall have been run in.

3.1.2. The engine shall be tested with the equipment described in Part 2.

3.1.3. The settings of the engine shall be those described by the manufacturer and by Part 2.

3.1.4. The exhaust device shall not have any orifice through which the gases emitted by the engine might be diluted.

3.1.5. The engine shall be in the normal working condition prescribed by the manufacturer. In particular, the cooling water and the oil shall each be at the normal temperature indicated by the manufacturer.

3.2. Fuel

The fuel shall be the reference fuel whose specifications are given in Part 5.

3.3. Test laboratory

3.3.1. The absolute temperature T of the laboratory, expressed in Kelvin, and the atmospheric pressure H, expressed in torr, shall be measured, and the factor F shall be determined by the formula

$$F = \left(\frac{750}{H}\right)^{0{\cdot}65} \times \left(\frac{T}{298}\right)^{0{\cdot}5}$$

3.3.2. For a test to be recognized as valid, the factor F shall be such that $0{\cdot}98 \leq F \leq 1{\cdot}02$.

3.4. Sampling and measuring apparatus

The light-absorption coefficient of the exhaust gases shall be measured with an opacimeter satisfying the conditions laid down in Part 7 and installed in conformity with Part 8.

4. LIMIT VALUES

4.1. For each of the six engine speeds at which the absorption coefficient is measured pursuant to paragraph 2.1 above, the nominal gas flow G, expressed in litres per second, shall be calculated by means of the following formulae:

— for two-stroke engines $G = \frac{Vn}{60}$

— for four-stroke engines $G = \frac{Vn}{120}$

where:

V is the cylinder capacity of the engine expressed in litres; and n is the engine speed in revolutions per minute.

4.2. For each engine speed the absorption coefficient of the exhaust gases shall not exceed the limit value given in the table in Part 6 . Where the value of the nominal flow is not one of those given in that table, the limit value applicable shall be obtained by interpolation on the principle of proportional parts.

PART 4

TEST UNDER FREE ACCELERATION

1. TEST CONDITIONS

1.1. The test shall be carried out on the tractor or engine which has undergone the test at steady speeds described in Part 3.

1.1.1. If the engine is tested on a bench the test shall be carried out as soon as possible after the test for measurement of opacity at steady speed. In particular, the cooling water and the oil shall be at the normal temperatures indicated by the manufacturer.

1.1.2. If the test is carried out on a stationary tractor, the engine shall first be brought to normal operating condition by a road run. The test shall be carried out as soon as possible after completion of the road run.

1.2. The combustion chamber shall not have been cooled or fouled by a prolonged period of idling preceding the test.

1.3. The test conditions described in points 3.1, 3.2 and 3.3 of Part 3 shall apply.

1.4. The conditions described in point 3.4 of Part 3, with regard to the sampling and measuring apparatus, shall apply.

2. TEST METHODS

2.1. If the test is a bench test, the engine shall be disconnected from the brake, the latter being replaced either by the rotating parts driven when no gear is engaged or by an inertia substantially equivalent to that of the rotating parts.

2.2. If the test is carried out on a tractor, the gear-change control shall be set in the neutral position and the engine in gear.

2.3. With the engine idling, the accelerator control shall be operated quickly, but not violently, so as to obtain maximum delivery from the injection pump. This position shall be maintained until maximum engine speed is reached and the governor comes into action. As soon as this speed is reached the accelerator shall be released until the engine resumes its idling speed and the opacimeter reverts to the corresponding conditions.

2.4. The operation described in point 2.3 shall be repeated not less than six times in order to clear the exhaust system and to allow for any necessary adjustment of the apparatus. The maximum opacity values read at each successive acceleration shall be noted until stabilized values are obtained. No account shall be taken of the values read while the engine is idling after each acceleration. The values read shall be regarded as stabilized when four consecutive readings are situated within a band width of 0·25 m^{-1} and do not form a decreasing sequence. The absorption coefficient X_M to be recorded shall be the arithmetic mean of these four values.

2.5. Engines fitted with an air supercharger shall be subject, where appropriate, to the following special requirements:

2.5.1. In the case of engines with an air supercharger which is coupled with or driven mechanically by the engine and is capable of being disengaged, two complete measurement cycles with preliminary accelerations shall be carried out, the air supercharger being engaged in one case and disengaged in the other. The measurement result recorded shall be the higher of the two results obtained;

2.5.2. In the case of engines with an air supercharger which can be cut out by means of a driver-operated bypass, the test shall be carried out with and without the bypass. The measurement result recorded shall be the higher of the results obtained.

3. DETERMINATION OF THE CORRECTED VALUE OF THE ABSORPTION COEFFICIENT

3.1. Notation

X_M = value of the absorption coefficient under free acceleration measured as described in point 2.4 of this Part;

X_L = corrected value of the absorption coefficient under free acceleration;

S_M = value of the absorption coefficient measured at steady speed (point 2.1 of Part 3), which is closest to the prescribed limit value corresponding to the same nominal flow;

S_L = value of the absorption coefficient (point 4.2 of Part 3), for the nominal flow corresponding to the point of measurement which gave the value S_M ;

L = effective length of the light path in the opacimeter.

3.2. When the absorption coefficients are expressed in m^{-1} and the effective length of the light path in metres, the correcte value X_L is given by the smaller of the following two expressions:

$$X'_L = \frac{S_L}{S_M} \times X_M \text{ or } X''_L = X_M + 0{\cdot}5$$

PART 5

SPECIFICATIONS OF REFERENCE FUEL PRESCRIBED FOR APPROVAL TESTS AND TO VERIFY CONFORMITY OF PRODUCTION

	Limits and units	Method
Density 15/4 °C	0·830 ± 0·005	ASTM D 1298-67
Distillation		ASTM D 86-67
50 %	min. 245 °C	
90 %	330 ± 10 °C	
Final boiling point	max. 370 °C	
Cetane index	54 ± 3	ASTM D 976-66
Kinematic viscosity at 100 °F	3 ± 0·5 cSt	ASTM D 445-65
Sulphur content	0·4 ± 0·1 % by weight	ASTM D 129-64
Flash-point	min. 55 °C	ASTM D 93-71
Cloud point	max. — 7 °C	ASTM D 2500-66
Aniline point	69 ± 5 °C	ASTM D 611-64
Carbon residue on 10 % bottoms	max. 0·2 % by weight	ASTM D 524-64
Ash content	max. 0·01 % by weight	ASTM D 482-63
Water content	max. 0·05 % by weight	ASTM D 95-70
Copper — corrosion test at 100 °C	max. 1	ASTM D 130-68
Net calorific value	10250 ± 100 kcal/kg 18450 ± 180 BTU/lb	ASTM D 2-68 (Ap. VI)
Strong acid number	nil mg KOH/g	ASTM D 974-64

Note: The fuel must be based only on straight-run distillates, hydrodesulphurized or not, and must contain no additives.

PART 6

LIMIT VALUES APPLICABLE IN THE TEST AT STEADY SPEEDS

Nominal flow G litres/second	*Absorptions coefficient k* m^{-1}
≦ 42	2·26
45	2·19
50	2·08
55	1·985
60	1·90
65	1·84
70	1·775
75	1·72
80	1·665
85	1·62
90	1·575
95	1·535
100	1·495
105	1·465
110	1·425
115	1·395
120	1·37
125	1·345
130	1·32
135	1·30
140	1·27
145	1·25
150	1·225
155	1·205
160	1·19
165	1·17
170	1·155
175	1·14
180	1·125
185	1·11
190	1·095
195	1·08
≧ 200	1·065

Note: Although the above values are rounded to the nearest 0·01 or 0·005, this does not mean that the measurements need to be made to this degree of accuracy.

PART 7

CHARACTERISTICS OF OPACIMETERS

1. SCOPE

This Part defines the conditions to be met by opacimeters used in the tests described in Parts 3 and 4.

2. BASIC SPECIFICATION FOR OPACIMETERS

2.1. The gas to be measured shall be confined in an enclosure having a non-reflecting internal surface.

2.2. In determining the effective length of the light path through the gas, account shall be taken of the possible influence of devices protecting the light source and the photoelectric cell. This effective length shall be indicated on the instrument.

2.3. The indicating dial of the opacimeter shall have two measuring scales, one in absolute units of light absorption from 0 to ∞ (m^{-1}) and the other linear from 0 to 100; both scales shall range from 0 at total light flux to full scale at complete obscuration.

3. CONSTRUCTION SPECIFICATIONS

3.1. General

The design shall be such that under steady-speed operating conditions the smoke chamber is filled with smoke of uniform opacity.

3.2. Smoke chamber and opacimeter casing

3.2.1. The impingement on the photoelectric cell of stray light due to internal reflections or diffusion effects shall be reduced to a minimum (e.g. by finishing internal surfaces in matt black and by a suitable general layout).

3.2.2. The optical characteristics shall be such that the combined effect of diffusion and reflection does not exceed one unit on the linear scale when the smoke chamber is filled with smoke having an absorption coefficient near $1{\cdot}7\ m^{-1}$.

3.3. Light source

The light source shall be an incandescent lamp with a colour temperature in the range 2 800 to 3 250 K.

3.4. Receiver

3.4.1. The receiver shall consist of a photoelectric cell with a spectral response curve similar to the photopic curve of the human eye (maximum response in the range 550/570 nm; less than 4% of that maximum response below 430 nm and above 680 nm).

3.4.2. The construction of the electrical circuit, including the indicating dial, shall be such that the current output from the photoelectric cell is a linear function of the intensity of the light received over the operating-temperature range of the photoelectric cell.

3.5. Measuring scales

3.5.1. The light-absorption coefficient k shall be calculated by the formula $\Phi = \Phi_o \cdot e^{-kL}$, where L is the effective length of the light path through the gas to be measured, Φ_o the incident flux and Φ the emergent flux.

When the effective length L of a type of opacimeter cannot be assessed directly from its geometry, the effective length L shall be determined

— either by the method described in 4 of this Part; or

— through correlation with another type of opacimeter for which the effective length is known.

3.5.2. The relationship between the 0 to 100 linear scale and the light absorption coefficient k is given by the formula

$$k = -\frac{1}{L} \log_e \left(1 - \frac{N}{100}\right)$$

where N is a reading on the linear scale and k the corresponding value of the absorption coefficient.

3.5.3. The indicating dial of the opacimeter shall enable an absorption coefficient of $1{\cdot}7\ m^{-1}$ to be read with an accuracy of $0{\cdot}025\ m^{-1}$.

3.6. **Setting and testing of the measuring apparatus**

3.6.1. The electrical circuit of the photoelectric cell and of the indicating dial shall be adjustable so that the pointer can be reset at zero when the light flux passes through the smoke chamber filled with clean air or through a chamber having identical characteristics.

3.6.2. With the lamp switched off and the electrical measuring circuit open or short-circuited, the reading on the absorption-coefficient scale shall be ∞, and it shall remain at ∞ with the measuring circuit reconnected.

3.6.3. An intermediate check shall be carried out by placing in the smoke chamber a screen representing a gas whose known light-absorption coefficient k, measured as described in point 3.5.1 is between $1{\cdot}6\ m^{-1}$ and $1{\cdot}8\ m^{-1}$. The value of k must be known to within $0{\cdot}025\ m^{-1}$. The check consists in verifying that this value does not differ by more than $0{\cdot}05\ m^{-1}$ from that read on the opacimeter indicating dial when the screen is introduced between the source of light and the photoelectric cell.

3.7. Opacimeter response

3.7.1. The response time of the electrical measuring circuit, being the time necessary for the indicating dial to reach 90% of full-scale deflection on insertion of a screen fully obscuring the photoelectric cell, shall be 0·9 to 1·1 seconds.

3.7.2. The damping of the electrical measuring circuit shall be such that the initial overswing beyond the final steady reading after any momentary variation in input (e.g. the calibration screen) does not exceed 4% of that reading in linear scale units.

3.7.3. The response time of the opacimeter which is due to physical phenomena in the smoke chamber is the time between the beginning of the entry of the gas into the measuring apparatus and the complete filling of the smoke chamber; it shall not exceed 0·4 second.

3.7.4. These provisions shall apply solely to opacimeters used to measure opacity under free acceleration.

3.8. Pressure of the gas to be measured and of scavenging air

3.8.1. The pressure of the exhaust gas in the smoke chamber shall not differ by more than 735 Pa from the atmospheric pressure.

3.8.2. The variations in the pressure of the gas to be measured and of the scavenging air shall not cause the absorption coefficient to vary by more than $0{\cdot}05\ m^{-1}$ in the case of a gas having an absorption coefficient of $1{\cdot}7\ m^{-1}$.

3.8.3. The opacimeter shall be equipped with appropriate devices for measuring the pressure in the smoke chamber.

3.8.4. The limits of pressure variation of gas and scavenging air in the smoke chamber shall be indicated by the manufacturer of the apparatus.

3.9. Temperature of the gas to be measured

3.9.1. At every point in the smoke chamber the gas temperature at the instant of measurement shall be between 70 °C and a maximum temperature, specified by the opacimeter manufacturer, such that the readings over this temperature range do not vary by more than $0{\cdot}1\ m^{-1}$ if the chamber is filled with a gas having an absorption coefficient of $1{\cdot}7\ m^{-1}$.

3.9.2. The opacimeter shall be equipped with appropriate devices for measuring the temperature in the smoke chamber.

4. EFFECTIVE LENGTH 'L' OF THE OPACIMETER

4.1. General

4.1.1. In some types of opacimeter the gas between the light source and the photoelectric cell, or between transparent parts protecting the source and the photoelectric cell, is not of constant opacity. In such cases the effective length L shall be that of a column of gas of uniform opacity which gives the same absorption of light as that obtained when the gas is admitted in a normal way into the opacimeter.

4.1.2. The effective length of the light path is obtained by comparing the reading N of the opacimeter operating normally with the reading N_o obtained with the opacimeter modified so that the test gas fills a well defined length L_o.

4.1.3. It will be necessary to take comparative readings in quick succession to determine the correction to be made for shifts of zero.

4.2. Method of assessment of L

4.2.1. The test gas shall be exhaust gas of constant opacity or a light-absorptive gas of a gravimetric density similar to that of the exhaust gas.

4.2.2. A column of length L_o of the opacimeter, which can be filled uniformly with the test gases, and the ends of which are substantially at right angles to the light path, shall be accurately determined. This length L_o shall be close to the presumed effective length of the opacimeter.

4.2.3. The mean temperature of the test gas in the smoke chamber shall be measured.

4.2.4. If necessary, an expansion tank of compact design and of sufficient capacity to damp the pulsations may be incorporated in the sampling line as near to the probe as possible. A cooler may also be fitted. The addition of the expansion tank and of the cooler must not unduly disturb the composition of the exhaust gas.

4.2.5. The test for determining the effective length shall consist of passing a sample of test gas alternately through the opacimeter operating normally and through the same apparatus modified as indicated in point 4.1.2.

4.2.5.1. The opacimeter readings shall be recorded continuously during the test with a recorder whose response time is equal to or shorter than that of the opacimeter.

4.2.5.2. With the opacimeter operating normally, the reading on the linear scale of opacity is N and that of the mean gas temperature expressed in Kelvin is T.

4.2.5.3. With the known length L_o filled with the same test gas, the reading on the linear scale of opacity is N_o and that of the mean gas temperature expressed in Kelvin is T_o.

4.2.6. The effective length will be

$$L = L_o \frac{T}{T_o} \frac{\log\left(1 - \frac{N}{100}\right)}{\log\left(1 - \frac{N_o}{100}\right)}$$

4.2.7. The test shall be repeated with at least four test gases giving readings evenly spaced between the 20 and 80 on the linear scale.

4.2.8. The effective length L of the opacimeter will be the arithmetic mean of the effective lengths obtained as stated in point 4.2.6 with each of the gases.

PART 8

INSTALLATION AND USE OF THE OPACIMETER

1. SCOPE

This Part specifies the installation and use of opacimeters for the tests described in Parts 3 and 4.

2. SAMPLING OPACIMETER

2.1. Installation for steady-speed tests

2.1.1. The ratio of the cross-sectional area of the probe to that of the exhaust pipe shall not be less than 0·05. The back pressure measured in the exhaust pipe at the intake of the probe shall not exceed 735 Pa.

2.1.2. The probe shall be a tube with an open end facing forwards in the axis of the exhaust pipe, or of the extension pipe if one is required. It shall be situated in a section where the distribution of smoke is approximately uniform. To achieve this, the probe shall be placed as far downstream in the exhaust pipe as possible or, if necessary, in an extension pipe so that, if D is the diameter of the exhaust pipe at the outlet, the end of the probe is situated in a straight portion at least 6D in length upstream of the sampling point and 3D in length downstream. If an extension pipe is used, no air shall be allowed to enter the joint.

2.1.3. The pressure in the exhaust pipe and the characteristics of the pressure drop in the sampling line shall be such that the probe collects a sample substantially equivalent to that which would be obtained by isokinetic sampling.

2.1.4. If necessary, an expansion tank of compact design and of sufficient capacity to damp the pulsations may be incorporated in the sampling line as near to the probe as possible. A cooler may also be fitted. The addition of the expansion tank and cooler shall not unduly disturb the composition of the exhaust gas.

2.1.5. A butterfly valve or other means of increasing the sampling pressure may be placed in the exhaust pipe least three 3D downstream from the sampling probe.

2.1.6. The connecting pipes between the probe, the cooling device, the expansion tank (if required) and the opacimeter shall be as short as possible while satisfying the pressure and temperature requirements described in points 3.8 and 3.9 of Part 7, the pipe shall be inclined upwards from the sampling point to the opacimeter, and sharp bends where soot might accumulate shall be avoided. If not embodied in the opacimeter, a bypass valve shall be provided upstream.

2.1.7. A check shall be carried out during the test to ensure that the requirements of point 3.8 of Part 7 concerning pressure and those of point 3.9 of the said Part, concerning the temperature in the measuring chamber, are observed.

2.2. Installation for tests under free acceleration

2.2.1. The ratio of the cross-sectional area of the probe to that of the exhaust pipe shall not be less than 0·05. The back pressure measured in the exhaust pipe at the intake of the probe shall not exceed 735 Pa.

2.2.2. The probe shall be a tube with an open end facing forwards in the axis of the exhaust pipe, or of the extension pipe if one is required. It shall be situated in a section where the distribution of smoke is approximately uniform. To achieve this, the probe shall be placed as far downstream in the exhaust pipe as possible or, if necessary, in an extension pipe so that, if D is the diameter of the exhaust pipe at the outlet, the end of the probe is situated in a straight portion at least 6 D in length upstream of the sampling point and 3 D in length downstream. If an extension pipe is used, no air shall be allowed to enter the joint.

2.2.3. The sampling system shall be such that at all engine speeds the pressure of the sample at the opacimeter is within the limits specified in point 3.8.2 of Part 7. This may be checked by noting the sample pressure at engine idling and maximum no-load speeds. Depending on the characteristics of the opacimeter, control of sample pressure can be achieved by a fixed restriction or a butterfly valve in the exhaust pipe or extension pipe. Whichever method is used, the back pressure measured in the exhaust pipe at the intake of the probe shall not exceed 735 Pa.

2.2.4. The pipes connecting with the opacimeter shall be as short as possible. The pipe shall be inclined upwards from the sampling point to the opacimeter, and sharp bends where soot might accumulate shall be avoided. A bypass valve may be provided upstream of the opacimeter to isolate it from the exhaust-gas flow when no measurement is being made.

3. FULL-FLOW OPACIMETER

The only general precautions to be observed in steady-speed and free-acceleration tests are the following:

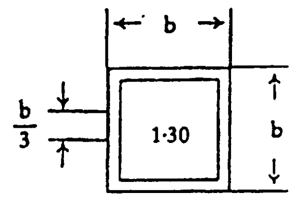
3.1. joints in the connecting pipes between the exhaust pipe and the opacimeter shall not allow air to enter from outside;

3.2. the pipes connecting with the opacimeter shall be as short as possible, as in the case of sampling opacimeters. The pipe system shall be inclined upwards from the exhaust pipe to the opacimeter, and sharp bends where soot might accumulate shall be avoided. A bypass valve may be provided upstream of the opacimeter to isolate it from the exhaust-gas flow when no measurement is being made;

3.3. a cooling system may also be required upstream of the opacimeter.

PART 9

EXAMPLE OF THE SYMBOL OF THE CORRECTED ABSORPTION COEFFICIENT



Minimum dimensions b = 5·6 mm

The above symbol shows that the corrected absorption coefficient is 1·30 m^{-1}.

PART 10

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE ON THE EMISSION OF GASEOUS POLLUTANTS BY DIESEL ENGINES

(Article 4 (2)

EEC type-approval No (1) ....

Registered No (1) ....

1. Trade name or mark of the vehicle ....

2. Vehicle type ....

3. Manufacturer's name and address ....

....

4. If applicable, name and address of manufacturer's representative ....

....

5. Emission levels

5.1. At steady speeds

Engine speed (rpm)	Nominal flow G (litres/second)	Limit absorption values (m^{-1})	Measured absorption values (m^{-1})
1.	....	....	....
2.	....	....	....
3.	....	....	....
4.	....	....	....
5.	....	....	....
6.	....	....	....

5.2. Under free acceleration

5.2.1. Measured absorption value.......... m^{-1}

(1) Delete where inapplicable.

5.2.2. Corrected absorption value.................................... m^{-1}

6. Make and type of the opacimeter ....

7. Engine submitted for approval tests 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 [1] ....

12. Site of approval mark on the vehicle ....

13. Place ....

14. Date ....

15. Signature ....

16. The following documents, bearing the approval number shown above, are annexed in communication:

one copy of Part 2 duly completed together with the drawings and diagrams referred to

.... photograph(s) of the engine.

ANNEX XIV
DRIVER'S SEAT
PART 1

78/764/EEC

1. **Driver's seat**

'Driver's seat' means that seat capable of accommodating one person only, provided for the use of the driver when driving the tractor.

2. **Seat surface**

'Seat surface' means the almost horizontal area of the seat which supports the driver when seated.

3. **Backrest**

'Backrest' means the almost vertical area of the seat supporting the driver's back when seated.

4. **Lateral seat supports**

'Lateral seat supports' means the devices or forms of the seat surface which prevent the driver from sliding sideways.

4.1. **Seat armrests**

'Seat armrests' means the devices on either side of the seat which support the driver's arms when he is seated.

5. **Seat reference point (S)**

'Seat reference point (S)' means the point of intersection in the median longitudinal plane of the seat between the tangential plane at the base of the padded backrest and a horizontal plane. This horizontal plane intersects the lower surface of the seat 150 mm in front of the seat reference point (S) (see Appendix 1 to Part 2.

6. **Depth of the seat surface**

'Depth of the seat surface' means the horizontal distance between the seat reference point (S) and the front edge of the seat surface.

7. **Width of the seat surface**

'Width of the seat surface' means the horizontal distance between the outside edges of the seat surface measured in a plane perpendicular to the median plane of the seat.

8. **Load adjustment range**

'Load adjustment range' means the range between the two loads corresponding to the mean positions in the suspension system curves plotted for the heaviest and lightest driver.

9. **Suspension travel**

"Suspension travel" means the vertical distance between the highest position and the position at a given moment of a point situated on the seat surface 200 mm in front of the seat reference point in the median longitudinal plane. 83/190/CEE

10. Vibration

'Vibration' means the vertical movement up and down of the driver's seat.

11. Vibration acceleration (a)

'Vibration acceleration (a)' means the second differential of the vibration displacement with respect to time. 78/764/CEE

12. Rms value of the acceleration (a_{eff})

'Rms value of the acceleration (a_{eff})' means the square root of the mean square of the accelerations.

83/190/EEC

13. Weighted vibration acceleration (a_w)

'Weighted vibration acceleration (a_w)' means the weighted vibration acceleration determined with the help of a weighting filter in accordance with point 2.5.3.3.5.2 of Part 2.

'a_{wS} = rms value of the weighted seat vibration acceleration measured during a bench test or a standard roadway test;

a_{wB} = rms value of the weighted vibration acceleration measured at the seat attachment during a bench test;

a^*_{wB} = reference rms value of the weighted vibration acceleration measured at the seat attachment;

a^*_{wS} = corrected rms value of the weighted seat vibration acceleration measured during a bench test;

a^*_{wF} = rms value of the weighted vibration acceleration measured at the seat attachment during a standard roadway test.'

Vibration ratio

14. Vibration ratio' means the ratio of the weighted vibration acceleration measured on the driver's seat to that measured at the seat attachment in accordance with point 2.5.3.3.2 of Part 2.

15. Vibration class

'Vibration class' means the class or group of tractors which show the same vibration characteristics.

16. Category A tractor

"Category A tractor" means a tractor which can be assigned to a given vibration class by reason of similar design features.

16.1 The characteristics of these tractors are as follows: 88/465/EEC

Number of axles: two.

Suspension rear axle unsprong

16.2 Category A tractors are subdivided into two classes:

Class I: 1 400 to 3 600 kg unladen mass.
Class II: more than 3 600 to 6 500 kg unladen mass.
Class III: more than 6 500 kg unladen mass.

17. Category B tractor 83/190/EEC

"Category B tractor" means a tractor which cannot be assigned to a vibration class in Category A.

18. Seats of the same type

'Seats of the same type' means seats which do not differ in any essential respects, the only aspects in which the seats may differ being as follows

18.1 dimensions;

18.2 position and inclination of the backrest;

18.3 inclination of the seat surface;

18.4 longitudinal and vertical adjustment of the seat.

PART 2

CONSTRUCTION AND TESTING REQUIREMENTS — EEC COMPONENT TYPE-APPROVAL AND MARKING REQUIREMENTS 78/764/EEC

1. GENERAL REQUIREMENTS

1.1. The driver's seat must be designed to ensure a comfortable position for the driver when controlling and manoeuvring the tractor, and to afford him the utmost protection as regards health and safety.

1.2. The seat must be adjustable in the longitudinal direction and in the height without the use of a tool.

1.3. The seat must be designed to reduce shocks and vibration. It must therefore be well sprung, have good vibration absorption and provide adequate support at the rear and sides.

The lateral support is considered adequate if the seat is designed to prevent the driver's body from slipping sideways.

1.3.1. The seat must be adjustable for persons of different mass. Any adjustment necessary in order to comply with this requirement, must be carried out without the use of tools. 83/19 /EEC

1.4. The seat surface, the backrest, the lateral supports and, where fitted, the removable, folding or fixed armrests, must be padded. 78/7

1.5. The seat reference point (S) must be calculated in the manner specified in Appendix 1 to Part 2.

1.6. Save as otherwise provided, the measurements and tolerances must comply with the following requirements:

1.6.1. the measurements given must be expressed in whole units, if necessary rounded off to the nearest whole number of units;

1.6.2. the instruments used for making measurements must enable the measured value to be rounded off to the nearest whole unit and must be accurate within the following tolerance limits:

— for length: ± 0·5%,

— for angle measurements: ± 1°,

— for determination of the mass of the tractor: ±20 kg,

— for measurement of tyre pressure: ± 0·1 bar; 83/1 C

1.6.3. for all data relating to dimensions, a tolerance of ± 5% is allowed. 78/7 EC

1.7. The seat must undergo the following tests, carried out on the same seat and in the order indicated below:

1.7.1. determination of the suspension characteristics and the range of adjustment to the driver's mass;

1.7.2. determination of lateral stability;

1.7.3. Determination of vertical vibration characteristics. 83/19 /EEC

1.7.4 Determination of the damping characteristics in the resonance range.

1.8. If the seat is manufactured so that it can revolve about a vertical axis then tests are carried out with the seat facing the forward position, locked in a position parallel with the median longitudinal plane of the tractor. 78/764/EEC

1.9. The seat undergoing the above tests must possess the same characteristics with respect to construction and fittings as the seats in series production. 78/764/EEC

1.10. Before the tests are carried out, the seat must have been run in by the manufacturer.

1.11. A test report, which confirms that the seat has completed all the specified tests without damage and which includes details of the seat vibration characteristics, must be prepared by the test laboratory.

1.12. Seats tested for Class I tractors are suitable only for tractors of that class, whereas seats tested for Class II tractors are suitable for Class I or Class II tractors. 88/465/EEC

2. SPECIAL REQUIREMENTS 78/764/EEC

2.1. **Seat surface dimensions**

2.1.1. The depth of the seat surface, measured parallel to and at a distance of 150 mm from the median longitudinal plane of the seat, must be 400 ± 50 mm (see figure below).

2.1.2. The width of the seat surface, measured perpendicular to the median plane of the seat, 150 mm in front of the seat reference point (S) and at not more than 80 mm above that point, must be at least 450 mm (see figure below).

2.1.3. The depth and width of the surface of seats intended for tractors in which the minimum rear-wheel track width does not exceed 1 150 mm may be reduced to not less than 300 and 400 mm respectively if the design of the tractor prevents compliance with the requirements of points 2.1.1 and 2.1.2.

2.2. **Position and inclination of the backrest**

2.2.1. The upper edge of the backrest of the seat must be at least 260 mm above the seat reference point (S) (see figure below).

2.2.2. The backrest must have an inclination of 10 ± 5° (see figure below).

2.3. **Inclination of the seat surface**

2.3.1. The inclination towards the rear (see angle α in the figure below) of the surface of the loaded cushion must be 3 to 12° in relation to the horizontal, measured with the loading device in accordance with Appendix 1.

2.4. Seat adjustment (see figure below)

2.4.1. The seat must be adjustable in the longitudinal direction over a minimum distance of:

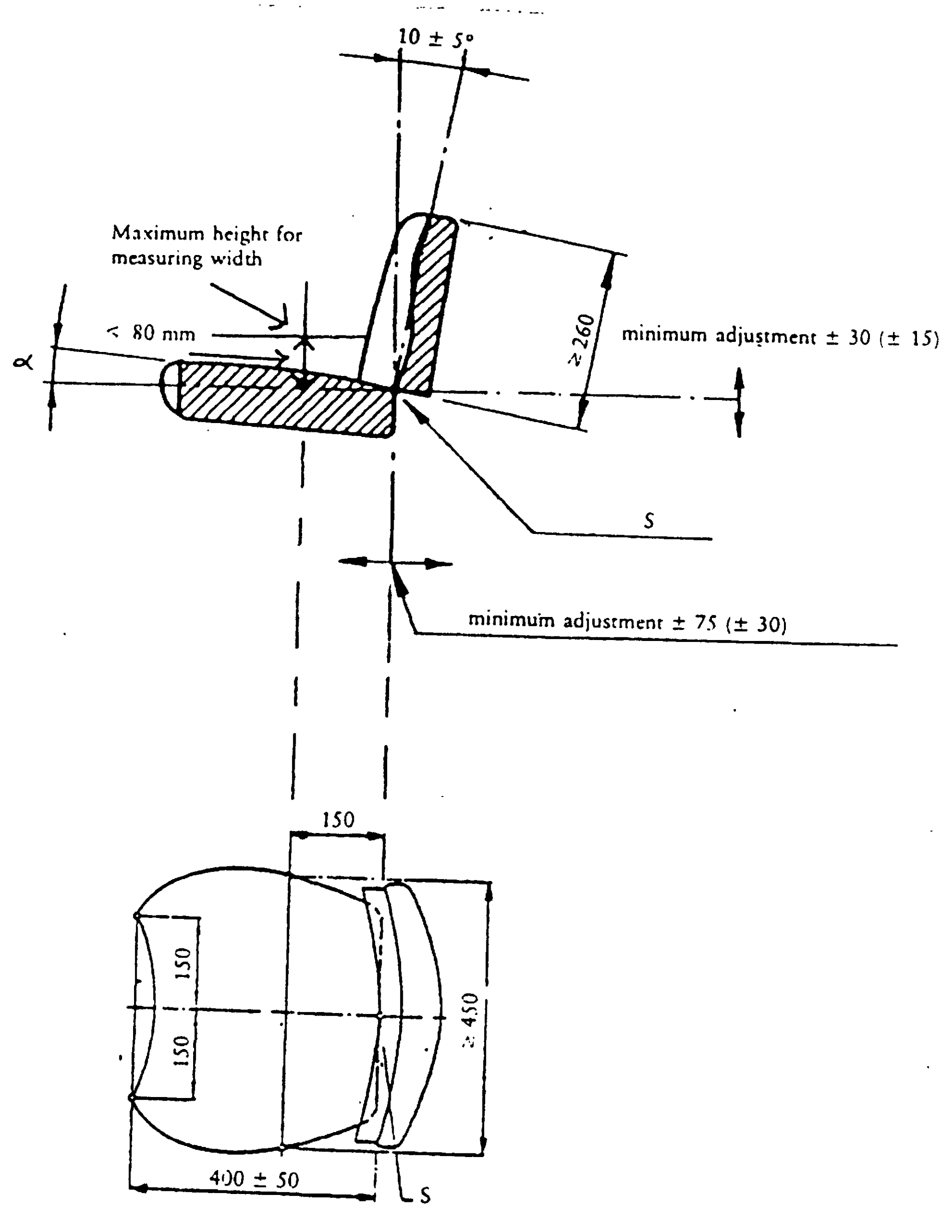
— 150 mm for tractors with a minimum rear-wheel track width of more than 1 150 mm.

— 60 mm for tractors with a minimum rear-wheel track width of 1 150 mm or less.

2.4.2. The seat must be adjustable in the vertical direction over a minimum distance of:

— 60 mm for tractors with a minimum rear-wheel track width of more than 1 150 mm,

— 30 mm for tractors with a minimum rear-wheel track width of 1 150 mm or less.



(Dimensions in millimetres)

78/764/EEC

2.5. Seat tests

'2.5.1. Determination of the suspension characteristics and the range of adjustment to the driver's mass.'

'2.5.1.1. The suspension characteristics are determined by a static test. The range of adjustment to the driver's mass is calculated from the suspension characteristics. These calculations are not necessary in the case of seats that cannot be manually adjusted to the driver's mass.' 83/190/EEC

The seat is mounted on a test stand or on a tractor and a load applied to it, either directly or by means of a special device: this load must not differ by more than 5 N from the nominal load. 78/764/EEC 'The measuring error for the suspension travel shall not exceed ± 1 mm.' 83/190/EEC The load must be applied in accordance with the procedure laid down in section 3 of this Part. 78/764/EEC

'2.5.1.3. A complete characteristic curve representing the deflection of the suspension system must be plotted from zero load to maximum load, and back to zero. The load graduations at which the suspension travel is measured must not exceed 100 N; at least eight measurement points must be plotted at approximately equal intervals in the suspension travel. The point taken as the maximum load should be either that at which no further suspension travel can be measured, or a load of 1 500 N. After each application or removal of the load, the suspension travel must be measured 200 mm in front of the seat reference point in the median longitudinal plane of the seat surface. After application or removal of the load, the seat must be allowed to return to its at-rest position.' 83/190/ EEC

'2.5.1.4. In the case of seats with a mass adjustment scale, the characteristic curves representing the deflection of the suspension system are plotted at mass adjustments for drivers having a mass of 50 and 120 kg. In the case of seats without a mass adjustment scale and with adjustment stops, measurements are taken at the lowest and the highest mass adjustment. In the case of seats without a mass adjustment scale or adjustment stops, the adjustment must be so selected that:

2.5.1.4.1. for the lower mass adjustment limit, the seat just returns to the top of the suspension travel when the load is removed, and

2.5.1.4.2. for the upper mass adjustment limit, the load of 1 500 N depresses the seat to the lowest limit of the suspension travel.'

2.5.1.5. The mean position of the suspension system is the position which the seat assumes when it is depressed by half the full travel of the suspension system. 78/764/ EEC

2.5.1.6. Since the characteristic curves of the suspension system are generally hysteresis loops, the load must be determined by drawing a centre line through the loop (see section 8 of Part 1, and sections A and B of Appendix 2 to Part 2.

'2.5.1.7 To determine the limits of the adjustment range as a function of the driver's mass, the vertical forces determined in accordance with point 2.5.1.6 for points A and B (see Appendix 2 to this Part) must be multiplied by the scale factor 0.13 kg/N. 83/190/ EEC

2.5.2. *Determination of lateral stability*

'2.5.2.1. The seat must be set for the upper limit of the weight adjustment and connected to the test stand or to the tractor in such a way that its base plate rests on a rigid plate (test stand) not smaller than the base plate itself.'

2.5.2.2. A test load of 1 000 N is applied to the surface or cushion of the seat. The point of application must lie 200 mm in front of the seat reference point (S) and alternately on the two sides 150 mm from the plane of symmetry through the seat. 78/764/ EEC

2.5.2.3. During application of the load, the variation in the lateral angle of inclination of the seat surface is measured in the end settings for horizontal and vertical seat adjustment. The permanent deformation close to the point of application of the load is not to be taken into consideration.

'2.5.3. *Determination of the vertical vibration characteristics'* 83/190/EEC

2.5.3.1. Testing on the test stand 78/764/EEC

'2.5.3.1.1. The test stand must simulate the vertical vibrations at the point of attachment of the driver's seat. The vibrations are generated by means of an electro-hydraulic device. The set values to be used are either those specified in Appendices 4, 5a and 5b of this Part for the class of tractor in question or the double-integrated acceleration signals recorded at the seat attachment of a Category B tractor moving at a speed of 12 ± 0,5 km/h on a standard roadway as defined in point 2.5.3.2.1. To generate the vibrations, an uninterrupted double run of the set values must be used. 83/190/EEC 88/465 EEC 83/190/EEC

The transition from the end of the sequence of acceleration signals recorded on the standard roadway in the first run to the start of the second run must be smooth and jolt-free. The measurements must not be made during the first run of the set values or of the acceleration signals. More values than the 700 laid down in Appendices 4, 5a and 5b of this Part. It may be used if these values were calculated, for example, with a cubic Spline function from the original 700 values.' 88/465/EEC 83/190/EEC

2.5.3.1.2. Besides an attachment for the test seat, the platform must contain a steering wheel and footrest. Its configuration must be as shown in Appendix 6. 78/764 EEC

'2.5.3.1.3. The test stand must have a high degree of flexural and torsional rigidity and its bearings and guides must have no more than the technically necessary clearance. If the platform is carried on an oscillating arm, the dimension R must be not less than 2 000 mm (see Appendix 6). The magnitude of the vibration ratio at frequencies between 0,5 and 5,0 Hz shall be within the range 1,00 ± 0,05, measured at intervals not exceeding 0,5 Hz. The phase shift shall not vary by more than 20° throughout the same frequency range.' 83/190 EEC

2.5.3.2. Testing on a standard roadway 78/764/EEC

2.5.3.2.1. The roadway consists of two parallel strips spaced according to the wheel track of the tractor. Both strips must be made of a rigid material, such as wood or concrete, and be formed either of blocks set in a base structure or of a continuous smooth surface. The longitudinal profile of each track strip is defined by the ordinates of elevation in relation to a base level; these ordinates are shown in the tables in Appendix 3 to this Part. With regard to the roadway, the elevation is defined at intervals of 16 cm along each strip. 83/190 /EEC

The roadway must be firmly set in the ground and the distance between the strips must deviate only slightly over its entire length; the tractor's wheels must be fully supported at all times. Where the strips are formed of blocks, these must be 6 to 8 cm thick, with a distance of 16 cm between the centres of the blocks. The length of the standard roadway shall be 100 m.

The measurements must begin as soon as the axis of the rear axle of the tractor is perpendicular to point D = 0 on the roadway, and end as soon as the axis of the front axle of the tractor is perpendicular to point D = 100 of the test roadway (see the table in Appendix 3 to this Part).

'2.5.3.2.2. Measurements shall be taken at a speed of 12 ± 0,5 km/h.

The prescribed speed must be maintained without the use of brakes. The vibrations must be measured on the seat and at the point where the seat is attached to the tractor, with a light and a heavy driver.

The speed of 12 km/h must be reached after a run-up track has been traversed. The surface of this run-up track must be flat and must join the standard roadway without any change in level.'

2.5.3.2.3. The seat must be set for the driver's mass in accordance with the manufacturer's instructions.

2.5.3.2.4. The tractor must be fitted with a protective frame and/or cab unless of a type for which this equipment is not required. It must not carry any ancillary equipment. Moreover, there must be no ballast on the wheels or framework, and no fluid in the tyres. 78/764 /EEC

2.5.3.2.5. The tyres used during the test must have the standard dimensions and ply-rating, as specified in the manufacturer's instructions. The depth of the tread must not be less than 65 % of the depth of a new tread.

2.5.3.2.6. The side-walls of the tyres must not be damaged. The pressure of the tyre must correspond to the arithmetical mean of the reference pressures recommended by the tyre manufacturer. The wheel track must correspond to that used under normal working conditions for the tractor model on which the seat is fitted.

2.5.3.2.7. The measurements at the point of seat attachment and on the seat itself must be made during the same run.

For measuring and recording the vibrations, an accelerometer, a measuring amplifier and a magnetic tape recorder or direct-reading vibration meter shall be used. The specifications for these instruments are as laid down in points 2.5.3.3.2 to 2.5.3.3.6.

2.5.3.3. Specifications for tests on roadway and test stand

2.5.3.3.1. Driver's mass 83/190 /EEC

The tests must be carried out with two drivers: one with a total mass of 59 ± 1 kg, of which not more than 5 kg may be carried in a weighting belt around the body; the other with a mass of 98 ± 5 kg with a maximum mass of 8 kg in the weighting belt.

2.5.3.3.2. Position of the accelerometer 83/190 /EEC

To measure the vibrations transmitted to the driver, an accelerometer is fixed on a flat plate with a diameter of 250 ± 50 mm, the central part of which must be rigid up to a diameter of 75 mm and must include a rigid device to protect the accelerometer. This plate must be placed in the middle of the seat surface between the seat and the driver and have a non-slip surface.

To measure the vibrations at the seat attachment, an accelerometer must be fixed near to this attachment at a point not more than 100 mm from the median longitudinal plane of the tractor and not outside the vertical projection of the seat surface on the tractor.

2.5.3.3.3. Measurement of vibration acceleration 78/764 /EEC

The accelerometer and the associated amplifying and transmitting equipment must respond to vibrations with an r.m.s. value of 0·05 m/s², and be capable of measuring vibrations with an r.m.s. value of 5 m/s² and a crest factor (ratio of peak to r.m.s. value) of 3 without distortion and with a maximum error of ± 2·5 % over the range 1 to 80 Hz.

2.5.3.3.4. Magnetic tape recorder

If a tape recorder is used, it must have a maximum reproduction error of ± 3·5 % in a frequency range of 1 to 80 Hz, including change of tape speed during replay for analysis.

2.5.3.3.5. Vibration meter

2.5.3.3.5.1. Vibrations of more than 10 Hz may be disregarded. It is therefore permissible to connect upstream of the measuring instrument a low-pass filter with a cut-out frequency of about 10 Hz and an attenuation of 12 dB per octave.

2.5.3.3.5.2. This instrument must incorporate an electronic weighting filter between the sensor and the integrator device. The filter must correspond to the curve shown in Appendix 8 and the margin of error must be ± 0·5 dB in the 2 to 4 Hz frequency band and ± 2 dB for the other frequencies.

2.5.3.3.5.3. The electronic measuring device must be capable of indicating either:

— the integral (I) of the square of the weighted vibration acceleration (a_w) for a test time (T)

$$I = \int_0^T (a_w)^2 \, dt$$

or the square root of that integral

or directly the r.m.s. value of the weighted vibration acceleration (a_{weff})

$$a_{weff} = \sqrt{I/T} = \frac{\sqrt{I}}{\sqrt{T}}$$

The inaccuracy of the entire system for measuring the rms value of the acceleration must not exceed +/- 5 % of the measured value. 83/190/EEC

2.5.3.3.6. Calibration 78/764/EEC

All instruments must be regularly calibrated.

2.5.3.3.7. Evaluation of vibration tests

2.5.3.3.7.1. During each test, the weighted vibration acceleration for the whole test time must be determined with the vibration meter specified in point 2.5.3.3.5. 83/190/

2.5.3.3.7.2. The test report must give the arithmetic mean value of the rms values of the weighted seat vibration acceleration (a_{ws}) for both the light driver and the heavy driver. The test report must also give the ratio of the arithmetic mean of the rms values of the weighted vibration acceleration measured on the seat (a_{ws}) to the arithmetic mean of the rms values of the weighted vibration acceleration measured at the seat attachment (a_{wB}). This ratio shall be given to two decimal places.

2.5.3.3.7.3. The ambient temperature during the vibration test must be measured and

2.5.4. *Vibration test for tractor seats in accordance with their intended use* 83/190 /EEC

2.5.4.1. A seat intended for use on a class (or classes) of Category A tractors must be tested on a vibration stand using the appropriate set value signals. 78/764 /EEC

2.5.4.2. A seat intended for use on a type of Category B tractor must be tested on a standard roadway with a tractor of that type. However, a simulation test may also be carried out using a set value signal corresponding to the acceleration curve which was determined during the standard roadway test with the type of tractor for which the seat is intended.

2.5.4.3. A seat intended for use only on a particular type of Category A tractor may also be tested in accordance with the requirements of points 2.5.4.2. In this case, component type-approval will be granted only for the type of tractor for which the test seat is intended.

2.5.5. *Procedure used for determining the weighted vibration acceleration of seats intended for Category A tractors*

2.5.5.1. The test on the vibration test stand shall be carried out in accordance with point 2.5.3.1. the value a_{wB} actually occurring at the seat attachment during measurement must be determined. In the case of deviations from the reference value: 83/190 /EEC

a^*_{wB} = 2,05 m/s² for class I, category A tractors.

a^*_{wB} = 1,5 m/s² for class II, category A tractors. 88/465 /EEC

a^*_{wB} = 1,3 m/s² for class III, category A tractors.

The acceleration a_{wS} measured at the driver's seat must be corrected in accordance with the following equation: 83/190 /EEC

$$a^*_{wS} = a_{wS} \frac{a^*_{wB}}{a_{wB}}$$

2.5.5.2. For each of the two drivers provided for in point 2.5.3.3.1, the weighted acceleration of the vibratory movement shall be measured at the seat for 28 seconds in the case of classes I and III, and for 31 seconds in the case of class II. The measurement must begin at the set value signal corresponding to t_1 = 0 seconds and end at the set value signal corresponding to t = 28 or 31 seconds (see table in Appendices 4, 5a and 5b to this Part. At least two test runs must be carried out. The measured values must not deviate from the arithmetical mean by more than ± 5 %. Each complete set point sequence must be reproduced in 28 or 31 ± 0,5 s. 88/465/EEC

2.5.6. *Procedure used for determining the weighted vibration acceleration of seats intended for Category B tractors.*

2.5.6.1. In accordance with the requirements of point 2.5.4.2, the seat vibration tests are not applicable to a class of tractors, but only to each tractor type for which the seat is intended 83/190 /EEC

2.5.6.2. The standard roadway test must be carried out in accordance with the requirements of points 2.5.3.2 and 2.5.3.3. The vibration acceleration measured on the driver's seat (a_{wS}) need not be corrected. At least two test runs must be carried out on the standard roadway. The measured values must not deviate from the arithmetic mean by more than ± 10%.

2.5.6.3. If a bench test is conducted, it must be carried out in association with a standard roadway test pursuant to the requirements of points 2.5.3.1 and 2.5.3.3.

'2.5.6.4. The vibration test stand shall be adjusted in such a way that the rms value of the weighted vibration acceleration recorded at the seat attachment (a_{wB}) deviates by less than ± 5 % from the rms value of the weighted vibration acceleration at the seat attachment recorded on the standard roadway (a^*_{wF}). 83/190 /EEC

In the event of deviations from the value (a^*_{wF}) measured at the seat attachment during the test run, the weighted vibration acceleration recorded at the driver's seat during the test on the test stand must be corrected as follows:

$$a^*_{wS} = a_{wS} \frac{a^*_{wF}}{a_{wB}}$$

Each of the tests on the test stand must be carried out twice. The measured values must not deviate from the arithmetic mean by more than ± 5%.'

'2.5.7. *Test for determining the damping characteristics in the resonance range*

2.5.7.1. This test is carried out on the test stand as specified in point 2.5.3.1. However, account must be taken of the following:

2.5.7.2. Instead of the set values specified in the second paragraph of point 2.5.3.1.1 (see Appendices 4 and 5 to this Part), sinusoidal oscillations of ± 15 mm amplitude with a frequency of 0,5 to 2 Hz are generated. The frequency range is to be run through with a constant rate of frequency change in not less than 60 seconds or at intervals no greater than 0,05 Hz with increasing frequency, and in an identical manner with decreasing frequency. During this measurement, it is permissible to filter the signals emitted by the accelerometers through a bandpass filter with cut-off frequencies of 0,5 and 2,0 Hz. 88/465 /EEC

2.5.7.3. The seat is to be loaded with a ballast of 40 kg in the first test and with a mass of 80 kg in the second test; the ballast is to be applied on the device illustrated in Figure I of Appendix I to this Part, with the same line of action of the force as when determining the seat reference point. 83/190 /EEC

2.5.7.4. The ratio of the rms values of the vibration acceleration on the seat surface a_{wS} to those at the seat attachment a_{wB}:

$$V = \frac{a_{wS}}{a_{wB}}.$$

is to be determined in the frequency range from 0,5 to 2,0 Hz at intervals no greater than 0,05 Hz.

2.5.7.5. The ratio measured must be given in the test report to two decimal places.'

3. EEC COMPONENT TYPE-APPROVAL AND MARKING REQUIREMENTS

3.1. Conditions necessary for EEC component type-approval of a seat 78/764/ EEC

To be granted EEC component type-approval, a seat must, in addition to fulfilling the requirements set out above, satisfy the following conditions:

3.1.1. the range of adjustment as a function of the driver's mass must extend from at least 50 to 120 kg;

3.1.2. the change in the angle of inclination measured during the lateral stability test must not exceed 5 °;

3.1.3. neither of the two values described in point 2.5.3.3.7.2 must exceed 1.25 m/s².

3.1.4. The ratio referred to in points 2.5.7.4 and 2.5.7.5 shall not exceed the value of 2. 83/190 /EEC

3.2. Application for EEC component type-approval 78/764 /EEC

3.2.1. The application for EEC component type-approval must be submitted by the owner of the trade name or mark or by his authorized representative.

3.2.2. For each type of driver's seat, the application must be accompanied by:

3.2.2.1. a brief technical description, stating in particular the type of tractor or tractors for which it is intended;

3.2.2.2. drawings in triplicate, sufficiently detailed to permit identification of the type of seat and showing in particular its dimensions, its weight, its suspension system and its means of attachment;

3.2.2.3. at least one seat;

3.2.2.4. one tractor (if necessary) representative of the type of tractor for which the seat is intended.

3.3. Inscriptions

3.3.1. The seat submitted for EEC component type-approval must bear the applicant's trade name or mark, clearly and indelibly inscribed.

3.3.2. On each seat there must be a space large enough for the EEC component type-approval mark; this space must be shown on the drawings referred to in point 3.2.2.2.

3.4. EEC component type-approval

3.4.1. If the seat submitted in accordance with point 3.2 complies with the requirements of points 3.1 and 3.3, EEC component type-approval is granted and a component type-approval number allocated.

3.4.2. This number must not be allocated to any other type of seat.

3.5. Marking — 78/764 EEC

3.5.1. Every seat conforming to a type approved in pursuance of this Directive must bear an EEC component type-approval mark.

3.5.2. This mark must consist of:

3.5.2.1. a rectangle surrounding the lower-case letter 'e' followed by the distinguishing number or letters of the Member State which has granted the component type-approval:

1 for Germany,	11 for the United Kingdom
2 for France,	13 for Luxembourg,
3 for Italy,	18 for Denmark,
4 for the Netherlands,	EL for Greece — 87/354/EEC
6 for Belgium,	IRL for Ireland,
9 for Spain	21 for Portugal — JO 302/85

3.5.2.2. the EEC component type-approval number which corresponds to the number of the EEC component type-approval certificate issued for the type of seat, below and close to the rectangle; and

3.5.2.3. the indication, above and close to the rectangle, of the type of Category A tractor for which the seat is intended. This is to be shown as follows:

— for Category A tractors in Class I: I.

— for Category A tractors in Classes I and II: I and II.

II and III: for class II and III, category A tractors'. — 88/465 EEC

If no indication is given above the rectangle, the seat is intended for a Category B tractor.

3.5.3. The EEC component type-approval mark must be affixed to the seat in such a way that it is indelible and clearly legible even when the seat is mounted on the tractor.

3.5.4. An example of the component type-approval mark is given in Appendix 8. — 78/764 EEC

3.5.5. The dimensions of the various parts of this mark must not be smaller than the minimum dimensions specified for marking as illustrated in Appendix 8.

Appendix 1

Method of determining the seat reference point (S)

1. DEFINITION OF THE REFERENCE POINT (S)

'Seat reference point' (S) means the point of intersection in the median longitudinal plane of the seat between the tangential plane at the base of the padded backrest and a horizontal plane. This horizontal plane intersects the lower surface of the seat 150 mm in front of the seat reference point (S).

2. DEVICE FOR DETERMINING THE SEAT REFERENCE POINT (S)

The device illustrated in Figure 1 consists of a seat pan board and backrest boards. The lower backrest boards must be hinged in the region of the ischium humps (A) and the loin (B), the hinge (B) being adjustable in height.

3. METHOD OF DETERMINING THE SEAT REFERENCE POINT (S)

The seat reference point (S) must be obtained by using the device illustrated in Figures 1 and 2, which simulates loading by a human occupant. The device must be positioned on the seat. It must then be loaded with a force of 550 N at a point 50 mm in front of hinge (A) and two parts of the backrest lightly pressed tangentially against the padded backrest.

If it is not possible to determine definite tangents to each area of the padded backrest (below and above the lumbar region) the following procedure must be adopted:

(a) where there is no possibility of defining the tangent to the lowest possible area, the lower part of the backrest board in a vertical position must be lightly pressed against the padded backrest;

(b) where there is no possibility of defining the tangent to the highest possible area, if the lower part of the backrest board is vertical, the hinge must be fixed at a height of 230 mm above the seat reference point (S). The two parts of the backrest board in a vertical position must then be lightly pressed tangentially against the padded backrest.

Figure 1

Device for determining the seat reference point (S)

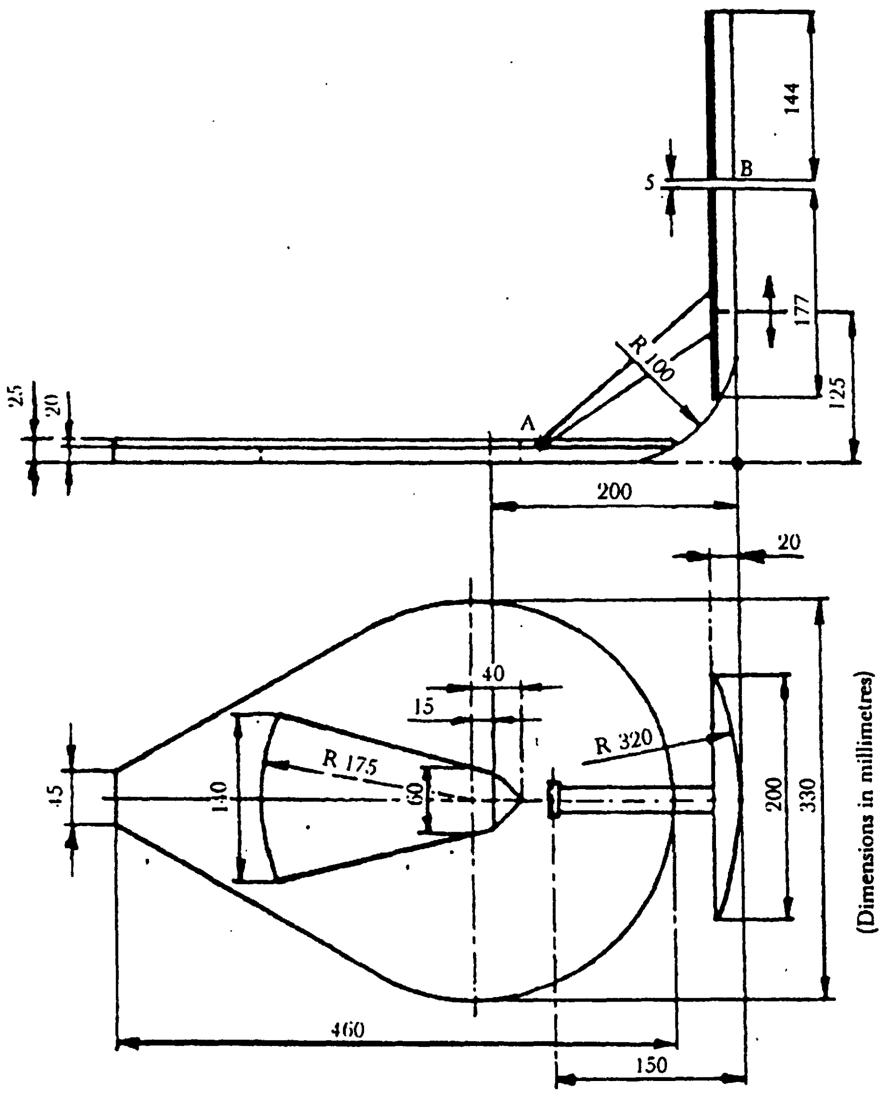
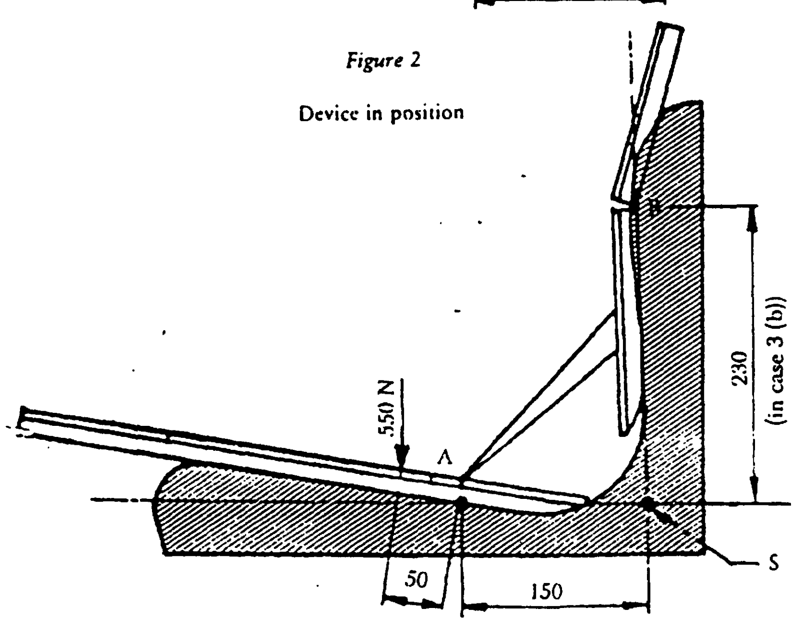


Figure 2

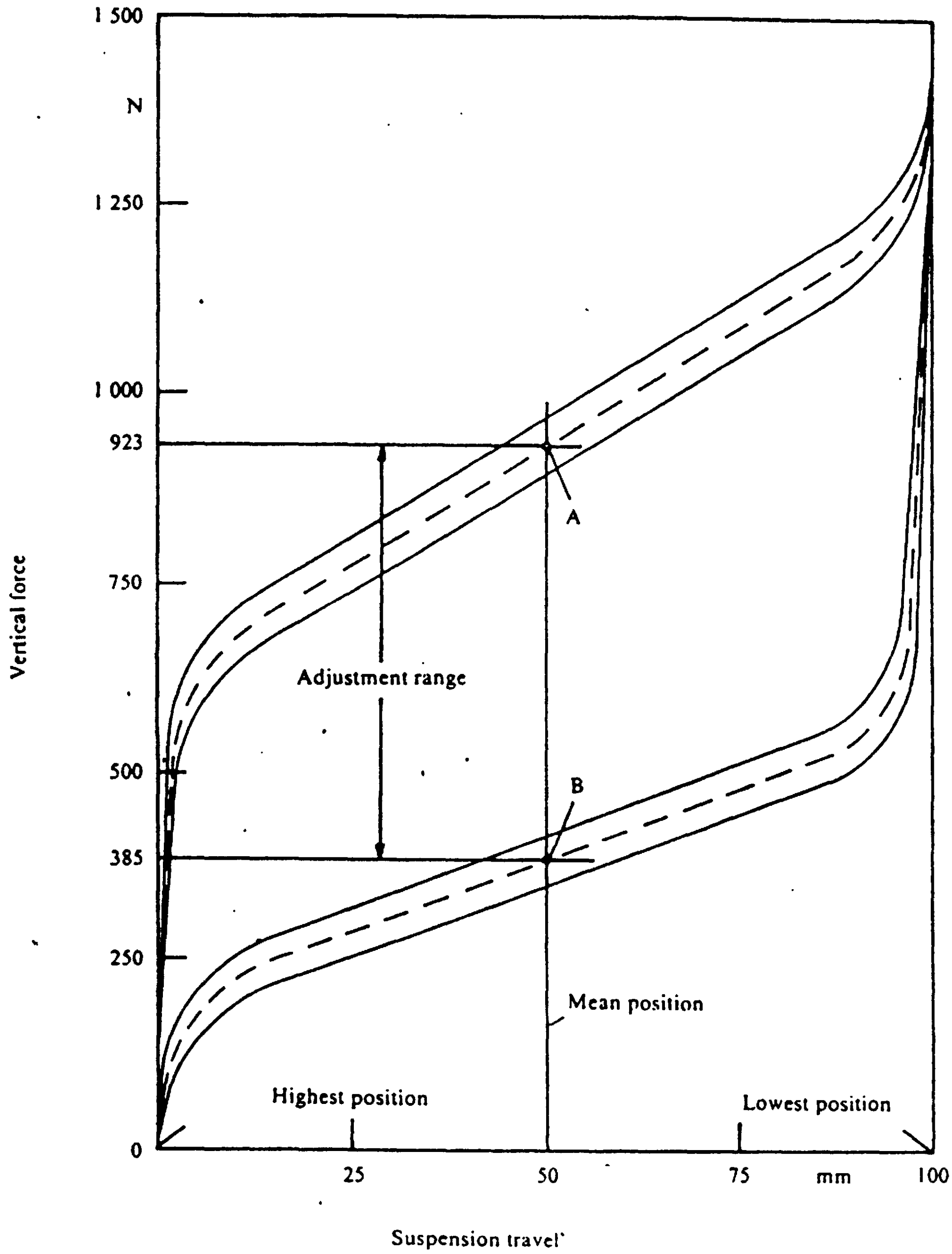
Device in position



83/190/EEC

Appendix 2

Determination of the characteristic curves of the suspension system and the load adjustment range (point 2.5.1)



Appendix 3

83/190/EEC/

Test on standard roadway

Table of elevation ordinates in relation to a basic level defining the surface of each strip of the roadway (point 2.5.3.2.1)

D = distance from starting point (metres)
L = ordinate of the left-hand strip (mm)
R = ordinate of the right-hand strip (mm)

78/764/EEC

D	L	R	D	L	R	D	L	R	D	L	R
0	115	140	7·20	65	90	14·40	65	95	21·60	70	90
0·16	110	125	7·36	75	95	14·56	65	100	21·76	75	95
0·32	110	140	7·52	75	100	14·72	65	90	21·92	75	95
0·48	115	135	7·68	95	95	14·88	65	90	22·08	75	90
0·64	120	135	7·84	115	110	15·04	65	85	22·24	85	90
0·80	120	125	8·00	115	100	15·20	55	85	22·40	85	95
0·96	125	135	8·16	125	110	15·36	65	85	22·58	90	85
1·12	120	125	8·32	110	100	15·52	65	85	22·72	90	85
1·28	120	115	8·48	110	100	15·68	55	75	22·88	95	85
1·44	115	110	8·64	110	95	15·84	55	85	23·04	95	85
1·60	110	100	8·80	110	95	16·00	65	75	23·20	100	85
1·76	110	110	8·96	110	95	16·16	55	85	23·36	100	75
1·92	110	110	9·12	110	100	16·32	50	75	23·52	110	85
2·08	115	115	9·28	125	90	16·48	55	75	23·68	110	85
2·24	110	110	9·44	120	100	16·64	65	75	23·84	110	85
2·40	100	110	9·60	135	95	16·80	65	75	24·00	100	75
2·56	100	100	9·76	120	95	16·96	65	85	24·16	100	75
2·72	95	110	9·92	120	95	17·12	65	70	24·32	95	70
2·88	95	95	10·08	120	95	17·28	65	65	24·48	100	70
3·04	90	95	10·24	115	85	17·44	65	75	24·64	100	70
3·20	90	100	10·40	115	90	17·60	65	75	24·80	115	75
3·36	85	100	10·56	115	85	17·76	50	75	24·96	110	75
3·52	90	100	10·72	115	90	17·92	55	85	25·12	110	85
3·68	90	115	10·88	120	90	18·08	55	85	25·28	100	75
3·84	95	110	11·04	110	75	18·24	65	85	25·44	110	95
4·00	90	110	11·20	110	75	18·40	70	75	25·60	100	95
4·16	90	95	11·36	100	85	18·56	75	75	25·76	115	100
4·32	95	100	11·52	110	85	18·72	95	75	25·92	115	100
4·48	100	100	11·68	95	90	18·88	90	75	26·08	110	95
4·64	100	90	11·84	95	90	19·04	90	70	26·24	115	95
4·80	90	90	12·00	95	85	19·20	95	70	26·40	110	95
4·96	90	90	12·16	100	95	19·36	85	70	26·56	100	95
5·12	95	90	12·32	100	90	19·52	85	75	26·72	100	95
5·28	95	70	12·48	95	85	19·68	75	85	26·88	100	100
5·44	95	65	12·64	95	85	19·84	85	85	27·04	100	95
5·60	90	50	12·80	95	90	20·00	75	90	27·20	100	95
5·76	95	50	12·96	85	90	20·16	85	85	27·36	110	90
5·92	85	50	13·12	85	85	20·32	75	70	27·52	115	90
6·08	85	55	13·28	75	90	20·48	70	75	27·68	115	85
6·24	75	55	13·44	75	95	20·64	65	75	27·84	110	90
6·40	75	55	13·60	75	90	20·80	70	75	28·00	110	85
6·56	70	65	13·76	70	75	20·96	65	75	28·16	110	85
6·72	75	75	13·92	70	90	21·12	70	75	28·32	100	85
6·88	65	75	14·08	70	100	21·28	70	85	28·48	100	90
7·04	65	85	14·24	70	110	21·44	70	85	28·64	90	85

76/764/EEC

D	L	R	D	L	R	D	L	R	D	L	R
28·80	90	75	38·40	110	35	48·00	75	85	57·60	95	115
28·96	75	90	38·56	100	35	48·16	90	95	57·76	85	110
29·12	75	75	38·72	115	35	48·32	95	95	57·92	90	115
29·28	75	75	38·88	100	35	48·48	100	120	58·08	90	110
29·44	70	75	39·04	100	35	48·64	110	100	58·24	90	100
29·60	75	75	39·20	110	30	48·80	115	100	58·40	85	95
29·76	75	85	39·36	110	45	48·96	115	115	58·56	90	95
29·92	85	75	39·52	110	50	49·12	120	115	58·72	85	90
30·08	75	75	39·68	100	55	49·28	120	110	58·88	90	90
30·24	85	75	39·84	110	50	49·44	115	95	59·04	90	95
30·40	75	75	40·00	90	55	49·60	115	90	59·20	90	115
30·56	70	75	40·16	85	55	49·76	115	90	59·36	90	115
30·72	75	75	40·32	90	65	49·92	110	95	59·52	90	115
30·88	85	75	40·48	90	65	50·08	110	100	59·68	85	110
31·04	90	75	40·64	90	70	50·24	100	110	59·84	75	110
31·20	90	85	40·80	95	75	50·40	100	120	60·00	90	115
31·36	100	75	40·96	95	75	50·56	95	120	60·16	90	120
31·52	100	75	41·12	95	75	50·72	95	115	60·32	90	120
31·68	120	85	41·28	90	90	50·88	95	120	60·48	90	120
31·84	115	75	41·44	90	95	51·04	95	120	60·64	95	120
32·00	120	85	41·60	85	95	51·20	90	135	60·80	95	120
32·16	120	85	41·76	85	100	51·36	95	125	60·96	90	120
32·32	135	90	41·92	90	100	51·52	95	120	61·12	90	115
32·48	145	95	42·08	90	95	51·68	100	120	61·28	95	110
32·64	160	95	42·24	85	100	51·84	100	120	61·44	95	110
32·80	165	90	42·40	85	110	52·00	100	120	61·60	100	100
32·96	155	90	42·56	95	110	52·16	100	125	61·76	110	100
33·12	145	90	42·72	95	115	52·32	110	125	61·92	100	100
33·28	140	95	42·88	95	115	52·48	110	125	62·08	100	100
33·44	140	85	43·04	100	100	52·64	100	125	62·24	95	100
33·60	140	85	43·20	100	95	52·80	100	120	62·40	95	100
33·76	125	75	43·36	100	95	52·96	100	120	62·56	95	100
33·92	125	75	43·52	100	90	53·12	110	115	62·72	90	100
34·08	115	85	43·68	110	95	53·28	100	110	62·88	90	100
34·24	120	75	43·84	100	100	53·44	110	110	63·04	90	100
34·40	125	75	44·00	110	90	53·60	95	110	63·20	90	90
34·56	115	85	44·16	100	85	53·76	95	110	63·36	90	90
34·72	115	75	44·32	110	90	53·92	100	110	63·52	85	90
34·88	115	90	44·48	110	85	54·08	95	100	63·68	85	90
35·04	115	100	44·64	100	85	54·24	100	100	63·84	75	85
35·20	120	100	44·80	100	90	54·40	100	100	64·00	75	85
35·36	120	100	44·96	95	90	54·56	100	100	64·16	75	75
35·52	135	95	45·12	90	95	54·72	95	100	64·32	75	75
35·68	135	95	45·28	90	100	54·88	100	100	64·48	70	75
35·84	135	95	45·44	95	100	55·04	100	115	64·64	70	70
36·00	135	90	45·60	90	90	55·20	110	115	64·80	70	55
36·16	120	75	45·76	85	90	55·36	100	110	64·96	70	45
36·32	115	75	45·92	75	90	55·52	110	100	65·12	65	55
36·48	110	70	46·08	85	90	55·68	100	110	65·28	65	55
36·64	100	65	46·24	75	90	55·84	100	110	65·44	65	65
36·80	110	55	46·40	75	90	56·00	100	110	65·60	55	70
36·96	115	55	46·54	75	90	56·16	95	115	65·76	55	75
37·12	100	50	46·72	85	90	56·32	90	110	65·92	55	75
37·28	115	50	46·88	85	85	56·48	95	110	66·08	55	75
37·44	110	50	47·04	90	85	56·64	95	110	66·24	55	85
37·60	100	65	47·20	75	85	56·80	90	100	66·40	55	85
37·76	90	55	47·36	65	75	56·96	100	100	66·56	65	90
37·92	95	55	47·52	70	70	57·12	100	95	66·72	70	90
38·08	90	35	47·68	70	75	57·28	95	100	66·88	70	110
38·24	90	35	47·84	70	75	57·44	100	100	67·04	65	100

76/764/EEC

D	L	R	D	L	R	D	L	R	D	L	R
67·20	55	100	76·00	110	135	84·80	120	155	93·60	120	145
67·36	65	100	76·16	100	125	84·96	115	145	93·76	115	140
67·52	50	100	76·32	100	125	85·12	115	155	93·92	115	140
67·68	50	85	76·48	100	125	85·28	120	160	94·08	115	140
67·84	50	90	76·64	110	125	85·44	120	165	94·24	115	140
68·00	50	100	76·80	115	125	85·60	120	160	94·40	115	140
68·16	55	100	76·96	120	125	85·76	125	165	94·56	115	140
68·32	55	95	77·12	120	125	85·92	135	160	94·72	115	135
68·48	65	90	77·28	120	135	86·08	135	160	94·88	115	135
68·64	50	85	77·44	110	125	86·24	125	155	95·04	110	135
68·80	50	70	77·60	100	125	86·40	125	155	95·20	110	135
68·96	50	70	77·76	120	135	86·56	120	145	95·36	110	135
69·12	50	65	77·92	120	125	86·72	120	145	95·52	115	135
69·28	50	55	78·03	120	125	86·98	110	140	95·68	100	140
69·44	45	50	78·24	115	125	87·04	110	140	95·84	95	135
69·60	35	50	78·40	115	120	87·20	110	140	96·00	100	125
69·76	35	55	78·56	115	120	87·36	110	140	96·16	95	125
69·92	35	65	78·72	110	120	87·52	110	140	96·32	95	125
70·08	35	65	78·88	100	120	87·68	100	135	96·48	95	125
70·24	35	65	79·04	100	120	87·84	100	135	96·64	110	125
70·40	35	55	79·20	95	120	88·00	100	135	96·80	95	120
70·58	45	55	79·36	95	120	88·16	100	125	96·96	95	120
70·72	50	55	79·52	95	125	88·32	110	120	97·12	95	120
70·88	50	50	79·68	95	125	88·48	115	120	97·28	95	110
71·04	50	45	79·84	100	120	88·64	110	120	97·44	100	115
71·20	50	45	80·00	95	125	88·80	110	125	97·60	110	120
71·36	50	50	80·16	95	125	88·96	100	125	97·76	110	115
71·52	45	45	80·32	95	125	89·12	100	125	97·92	100	115
71·68	45	55	80·48	100	120	89·28	95	125	98·08	95	115
71·84	55	65	80·64	100	125	89·44	95	125	98·24	100	115
72·00	55	65	80·80	100	125	89·60	100	120	98·40	95	115
72·16	70	65	80·96	110	125	89·76	100	135	98·52	100	115
72·32	70	75	81·12	115	135	89·92	110	140	98·72	100	110
72·48	75	85	81·28	110	140	90·08	110	135	98·88	110	100
72·64	75	85	81·44	115	140	90·24	110	140	99·04	95	95
72·80	75	90	81·60	110	140	90·40	100	145	99·20	90	100
72·96	85	95	81·76	115	140	90·56	100	155	99·36	90	100
73·12	90	100	81·92	110	140	90·72	110	155	93·52	75	110
73·28	90	110	82·08	110	140	90·88	110	155	99·68	75	115
73·44	90	115	82·24	110	135	91·04	100	155	99·84	75	115
73·60	90	120	82·40	110	135	91·20	110	155	100·00	75	110
73·76	90	115	82·56	100	125	91·36	110	160			
73·92	90	115	87·72	110	125	91·52	115	160			
74·08	110	115	82·88	110	125	91·68	110	155			
74·21	100	100	83·04	100	125	91·84	115	155			
74·40	100	110	83·20	100	120	92·00	115	140			
74·56	100	110	83·36	100	125	92·16	115	155			
74·72	95	115	83·52	100	120	92·32	120	155			
74·88	95	120	83·68	100	135	92·48	125	155			
75·04	95	125	83·84	95	140	92·64	125	155			
75·20	95	135	84·00	100	135	92·80	125	155			
75·36	100	135	84·16	110	140	92·96	120	155			
75·52	100	140	84·32	110	140	93·12	120	145			
75·68	100	140	84·48	110	140	93·28	120	145			
75·84	100	140	84·64	110	140	93·44	115	145			

Appendix 4

Set-value signals for the test-stand inspection of the driver's seat on Category A (Class I) tractors (point 2.5.3.1.1):

PS = set point;

a = amplitude of the set-value signal (in 10^{-4} m);

t = measurement time (in seconds).

When the sequence of signals is repeated in the table for 701 points, points 700 and 0 coincide in time at an amplitude of a = 0:

PS No	a 10^{-4} m	t s
0	0 000	0
1	0 089	.
2	0 215	.
.	.	.
.	.	.
.	.	.
699	0 023	.
700	0 000	28,0

88/465/ EEC

Appendix 5 a

83/190/ EEC

Set-value signals for the test-stand inspection of the driver's seat on Category A (Class II) tractors (point 2.5.3.1.1):

PS = set points;

a = amplitude of the set-value signal (in 10^{-4} m);

t = measurement time (in seconds).

When the sequence of signals is repeated in the table for 701 points, points 700 and 0 coincide in time at an amplitude of a = 0:

PS No	a 10^{-4} m	t s
0	0 000	0
1	0 022	.
2	0 089	.
.	.	.
.	.	.
.	.	.
699	0 062	.
700	0 000	31,0

88/465/EEC

88/465/ EEC

Appendix 5b

Set-value signals for the test-stand testing of drivers' seats for category A tractors in class III (point 2.5.3.1.1)

PS = set point

a = amplitude of the set value signal in mm

t = measurement time in seconds

If the signal sequence is repeated for 701 points in the table, point 700 and 0 merge in time, with amplitude a = 0.

PS No	a mm	t s	PS No	a mm	t s	PS No	a mm	t s	PS No	a mm	t s
1	0	0,000	69	5	1,861	137	−20	3,722	205	−12	5,584
2	−3	0,027	70	−1	1,869	138	−23	3,750	206	−14	5,611
3	−0	0,055	71	−8	1,916	139	−22	3,777	207	−14	5,638
4	2	0,082	72	−14	1,943	140	−18	3,804	208	−12	5,666
5	4	0,109	73	−18	1,971	141	−11	3,832	209	−9	5,693
6	6	0,137	74	−19	1,998	142	−3	3,859	210	−4	5,720
7	6	0,164	75	−17	2,025	143	5	3,887	211	0	5,748
8	5	0,192	76	−13	2,053	144	13	3,914	212	5	5,775
9	3	0,219	77	−6	2,080	145	19	3,941	213	9	5,803
10	1	0,246	78	0	2,108	146	23	3,969	214	13	5,830
11	−0	0,274	79	8	2,135	147	23	3,996	215	15	5,857
12	−2	0,301	80	15	2,162	148	20	4,023	216	15	5,885
13	−4	0,328	81	19	2,190	149	14	4,051	217	13	5,912
14	−4	0,356	82	21	2,217	150	6	4,078	218	9	5,939
15	−4	0,383	83	19	2,244	151	−2	4,106	219	4	5,967
16	−2	0,411	84	15	2,272	152	−11	4,133	220	−1	5,994
17	−1	0,439	85	8	2,299	153	−17	4,160	221	−7	6,022
18	0	0,465	86	0	2,326	154	−21	4,188	222	−11	6,049
19	2	0,493	87	−7	2,354	155	−22	4,215	223	−15	6,076
20	3	0,520	88	−15	2,361	156	−20	4,242	224	−16	6,104
21	4	0,547	89	−19	2,409	157	−14	4,270	225	−16	6,131
22	3	0,575	90	−21	2,436	158	−7	4,297	226	−12	6,158
23	1	0,602	91	−20	2,463	159	0	4,325	227	−7	6,186
24	0	0,630	92	−15	2,491	160	8	4,352	228	−1	6,213
25	−1	0,657	93	−8	2,518	161	14	4,379	229	4	6,240
26	−3	0,684	94	−0	2,545	162	18	4,407	230	10	6,268
27	−4	0,712	95	7	2,573	163	19	4,434	231	16	6,295
28	−4	0,739	96	14	2,600	164	17	4,461	232	17	6,323
29	−4	0,766	97	19	2,628	165	13	4,489	233	17	6,350
30	−2	0,794	98	21	2,655	166	7	4,516	234	14	6,377
31	−0	0,821	99	19	2,662	167	0	4,543	235	9	6,405
32	2	0,848	100	14	2,710	168	−6	4,571	236	3	6,432
33	4	0,876	101	7	2,737	169	−11	4,598	237	−3	6,459
34	6	0,903	102	−0	2,764	170	−14	4,626	238	−10	6,487
35	6	0,931	103	−8	2,792	171	−16	4,653	239	−15	6,514
36	6	0,958	104	−15	2,819	172	−14	4,680	240	−19	6,542
37	4	0,985	105	−19	2,847	173	−11	4,708	241	−19	6,569
38	1	1,013	106	−20	2,874	174	−6	4,735	242	−17	6,596
39	−1	1,040	107	−18	2,901	175	−1	4,762	243	−12	6,624
40	−4	1,067	108	−13	2,929	176	4	4,790	244	−6	6,651
41	−6	1,093	109	−5	2,956	177	8	4,817	245	1	6,678
42	−8	1,122	110	2	2,983	178	12	4,845	246	9	6,706
43	−8	1,150	111	10	3,011	179	13	4,872	247	16	6,733
44	−7	1,177	112	16	3,038	180	13	4,899	248	21	6,761
45	−4	1,204	113	20	3,055	181	11	4,927	249	22	6,783
46	−1	1,232	114	20	3,093	182	7	4,954	250	21	6,815
47	2	1,259	115	17	3,120	183	3	4,981	251	16	6,843
48	6	1,286	116	12	3,148	184	−1	5,009	252	9	6,870
49	8	1,314	117	5	3,175	185	−5	5,036	253	0	6,897
50	10	1,341	118	−3	3,202	186	−9	5,064	254	−8	6,925
51	10	1,369	119	−10	3,230	187	−11	5,091	255	−16	6,952
52	8	1,396	120	−17	3,257	188	−12	5,118	256	−22	6,979
53	4	1,423	121	−20	3,284	189	−12	5,146	257	−25	7,007
54	0	1,451	122	−21	3,312	190	−10	5,173	258	−24	7,034
55	−4	1,478	123	−18	3,339	191	−6	5,200	259	−20	7,062
56	−8	1,505	124	−13	3,367	192	−2	5,228	260	−13	7,089
57	−11	1,533	125	−6	3,396	193	1	5,255	261	−4	7,116
58	−13	1,560	126	2	3,421	194	5	5,283	262	5	7,144
59	−12	1,587	127	10	3,449	195	9	5,310	263	14	7,171
60	−9	1,613	128	16	3,476	196	11	5,337	264	24	7,198
61	−4	1,642	129	21	3,503	197	13	5,365	265	25	7,226
62	6	1,670	130	22	3,531	198	12	5,392	266	26	7,253
63	6	1,697	131	20	3,558	199	11	5,419	267	23	7,281
64	11	1,724	132	15	3,586	200	7	5,447	268	17	7,308
65	15	1,752	133	8	3,613	201	3	5,474	269	8	7,335
66	16	1,779	134	0	3,640	202	−0	5,501	270	−1	7,363
67	14	1,806	135	−8	3,668	203	−5	5,529	271	−11	7,390
68	11	1,834	136	−15	3,695	204	−9	5,556	272	−20	7,417

PS No	s mm	t s	PS No	s mm	t s	PS No	s mm	t s	PS No	s mm	t s
273	−26	7,445	341	−11	9,306	409	6	11,167	477	3	13,028
274	−27	7,472	342	− 3	9,333	410	7	11,195	478	6	13,056
275	−25	7,500	343	4	9,361	411	7	11,222	479	6	13,083
276	−19	7,527	344	11	9,388	412	6	11,249	480	5	13,110
277	−11	7,554	345	16	9,415	413	4	11,277	481	4	13,138
278	− 1	7,582	346	19	9,443	414	1	11,304	482	2	13,165
279	9	7,609	347	19	9,470	415	− 1	11,331	483	0	13,193
280	18	7,636	348	16	9,498	416	− 4	11,359	484	− 0	13,220
281	24	7,664	349	11	9,525	417	− 7	11,386	485	− 1	13,247
282	27	7,691	350	4	9,552	418	− 8	11,413	486	− 2	13,275
283	26	7,718	351	− 2	9,580	419	− 8	11,441	487	− 2	13,302
284	21	7,746	352	− 9	9,607	420	− 6	11,468	488	− 1	13,329
285	13	7,773	353	−14	9,634	421	− 4	11,496	489	− 1	13,357
286	4	7,801	354	−17	9,662	422	− 1	11,523	490	− 0	13,384
287	− 5	7,828	355	−18	9,689	423	1	11,550	491	0	13,412
288	−13	7,855	356	−16	9,717	424	4	11,578	492	1	13,439
289	−20	7,883	357	−12	9,744	425	7	11,605	493	1	13,466
290	−24	7,910	358	− 7	9,771	426	8	11,632	494	1	13,494
291	−25	7,937	359	− 1	9,799	427	8	11,660	495	0	13,521
292	−22	7,965	360	4	9,826	428	7	11,687	496	0	13,548
293	−17	7,992	361	9	9,853	429	5	11,715	497	− 0	13,576
294	− 9	8,020	362	13	9,881	430	2	11,742	498	− 1	13,603
295	− 1	8,047	363	16	9,908	431	− 0	11,769	499	− 1	13,630
296	7	8,074	364	15	9,935	432	− 2	11,797	500	− 1	13,659
297	14	8,102	365	14	9,963	433	− 4	11,824	501	− 1	13,685
298	20	8,129	366	10	9,990	434	− 6	11,851	502	− 1	13,713
299	22	8,156	367	5	10,018	435	− 7	11,879	503	− 1	13,740
300	22	8,184	368	− 0	10,045	436	− 6	11,906	504	− 0	13,767
301	19	8,211	369	− 5	10,072	437	− 6	11,934	505	− 0	13,795
302	13	8,239	370	−10	10,100	438	− 4	11,961	506	0	13,822
303	6	8,266	371	−13	10,127	439	− 3	11,988	507	1	13,849
304	− 1	8,293	372	−15	10,154	440	− 1	12,016	508	1	13,877
305	− 9	8,321	372	−14	10,182	441	0	12,043	509	2	13,904
306	−15	8,348	374	−12	10,209	442	2	12,070	510	2	13,932
307	−19	8,375	375	− 7	10,237	443	4	12,098	511	2	13,959
308	−20	8,403	376	− 2	10,264	444	6	12,125	512	2	13,986
309	−19	8,430	377	2	10,291	445	7	12,152	513	1	14,014
310	−14	8,457	378	8	10,319	446	7	12,180	514	1	14,041
311	− 8	8,485	379	11	10,346	447	7	12,207	515	0	14,068
312	− 0	8,512	380	13	10,373	448	6	12,235	516	− 0	14,096
313	6	8,540	381	13	10,401	449	4	12,262	517	− 1	14,123
314	12	8,567	382	11	10,428	450	1	12,289	518	− 1	14,151
[illegible]	16	8,594	383	7	10,456	451	− 1	12,317	519	− 2	14,178
316	18	8,622	384	2	10,483	452	− 5	12,344	520	− 2	14,205
317	16	8,649	385	− 2	10,510	453	− 8	12,371	521	− 2	14,233
318	12	8,676	386	− 7	10,538	454	−10	12,399	522	− 2	14,260
319	6	8,704	387	−10	10,565	455	−11	12,426	523	− 1	14,287
320	0	8,731	388	−11	10,592	456	−11	12,454	524	− 1	14,316
321	− 7	8,759	389	−11	10,620	457	− 9	12,481	525	− 1	14,342
322	−12	8,786	390	− 8	10,647	458	− 5	12,509	526	− 0	14,370
323	−15	8,813	391	− 5	10,674	459	− 1	12,536	527	− 0	14,397
324	−16	8,841	392	− 0	10,702	460	3	12,563	528	0	14,424
325	−13	8,868	393	3	10,729	461	8	12,590	529	0	14,452
326	− 8	8,895	394	7	10,757	462	11	12,618	530	1	14,479
327	− 1	8,923	395	9	10,784	463	13	12,645	531	2	14,506
328	5	8,950	396	9	10,811	464	12	12,673	532	2	14,534
329	11	8,978	397	8	10,839	465	10	12,700	533	3	14,561
330	15	9,005	398	5	10,866	466	7	12,727	534	4	14,598
331	17	9,032	399	1	10,893	467	2	12,755	535	4	14,616
332	15	9,060	400	− 2	10,921	468	− 2	12,782	536	3	14,643
333	11	9,087	401	− 6	10,949	469	− 6	12,809	537	2	14,671
334	5	9,114	402	− 7	10,975	470	− 9	12,837	538	1	14,698
335	− 2	9,142	403	− 8	11,003	471	−10	12,864	539	− 0	14,725
336	− 9	9,169	404	− 7	11,030	472	−10	12,891	540	− 2	14,753
337	−15	9,196	405	− 5	11,058	473	− 8	12,915	541	− 5	14,780
338	−18	9,224	406	− 2	11,085	474	− 5	12,946	542	− 7	14,807
339	−19	9,261	407	0	11,112	475	− 2	12,974	543	− 8	14,835
340	−16	9,279	408	4	11,140	476	1	13,001	544	− 8	14,862

PS No	a mm	t s	PS No	a mm	t s	PS No	a mm	t s	PS No	a mm	t s
545	− 7	14,890	613	− 3	16,741	681	14	18,612	749	− 9	20,473
546	− 5	14,917	614	2	16,776	682	13	18,639	750	−10	20,500
547	− 1	14,944	615	8	16,803	683	10	18,667	751	− 9	20,526
548	1	14,972	616	12	16,833	684	6	18,694	752	− 7	20,556
549	6	14,999	617	15	16,860	685	1	18,721	753	− 4	20,583
550	9	15,026	618	16	16,888	686	− 3	18,749	754	− 1	20,610
551	12	15,054	619	15	16,915	687	− 6	18,776	755	2	20,637
552	13	15,081	620	12	16,942	688	−11	18,804	756	5	20,665
553	11	15,109	621	8	16,970	689	−13	18,831	757	7	20,692
554	9	15,136	622	2	16,997	690	−13	18,858	758	8	20,719
555	4	15,163	623	− 2	17,024	691	−10	18,886	759	7	20,747
556	− 0	15,191	624	− 8	17,052	692	− 7	18,913	760	5	20,774
557	− 6	15,218	625	−12	17,079	693	− 3	18,940	761	2	20,802
558	−11	15,245	626	−14	17,107	694	1	18,968	762	− 1	20,829
559	−15	15,273	627	−15	17,134	695	4	18,996	763	− 4	20,856
560	−16	15,300	628	−14	17,161	696	7	19,022	764	− 7	20,884
561	−15	15,327	629	−11	17,189	697	8	19,050	765	− 9	20,911
562	−12	15,356	630	− 7	17,216	698	8	19,077	766	− 9	20,938
563	− 6	15,382	631	− 2	17,243	699	6	19,105	767	− 7	20,966
564	− 0	15,410	632	1	17,271	700	4	19,132	768	− 5	20,993
565	6	15,437	633	6	17,298	701	1	19,159	769	− 1	21,021
566	12	15,464	634	9	17,326	702	− 0	19,187	770	2	21,048
567	17	15,492	635	11	17,353	703	− 2	19,214	771	5	21,075
568	19	15,519	636	12	17,380	704	− 2	19,241	772	8	21,103
569	18	15,546	637	11	17,408	705	− 2	19,269	773	10	21,130
570	14	15,574	638	9	17,435	706	− 1	19,296	774	10	21,157
571	8	15,601	639	6	17,462	707	0	19,324	775	8	21,185
572	1	15,629	640	2	17,490	708	1	19,351	776	6	21,212
573	− 6	15,656	641	− 0	17,517	709	2	19,978	777	2	21,239
574	−12	15,683	642	− 3	17,544	710	2	19,406	778	− 1	21,267
575	−17	15,711	643	− 5	17,572	711	1	19,433	779	− 4	21,294
576	−19	15,738	644	− 6	17,599	712	− 0	19,460	780	− 7	21,322
577	−19	15,766	645	− 6	17,627	713	− 2	19,488	781	− 9	21,349
578	−15	15,793	646	− 6	17,654	714	− 5	19,515	782	− 9	21,376
579	−10	15,820	647	− 4	17,681	715	− 6	19,543	783	− 8	21,404
580	− 8	15,848	648	− 3	17,709	716	− 7	19,570	784	− 7	21,431
581	4	15,875	649	− 1	17,736	717	− 7	19,597	785	− 4	21,458
582	11	15,902	650	− 0	17,763	718	− 5	19,625	786	− 1	21,486
583	16	15,930	651	0	17,791	719	− 3	19,652	787	1	21,513
584	18	15,957	652	1	17,818	720	0	19,679	788	4	21,541
585	18	15,984	653	0	17,845	721	3	19,707	789	6	21,568
586	15	16,012	654	0	17,873	722	7	19,734	790	7	21,595
587	10	16,039	655	0	17,900	723	9	19,761	791	7	21,623
588	3	16,066	656	− 0	17,928	724	11	19,789	792	7	21,650
589	− 3	16,094	657	− 0	17,955	725	11	19,816	793	5	21,677
590	−10	16,121	658	− 0	17,982	726	10	19,844	794	3	21,705
591	−15	16,149	659	0	18,010	727	7	19,871	795	0	21,732
592	−17	16,176	660	1	18,037	728	3	19,898	796	− 1	21,760
593	−17	16,203	661	3	18,065	729	− 0	19,926	797	− 4	21,787
594	−15	15,231	662	4	18,092	730	− 4	19,953	798	− 5	21,814
595	−10	16,258	663	5	18,119	731	− 8	19,980	799	− 6	21,842
596	− 3	16,285	664	5	18,147	732	−11	20,008	800	− 5	21,869
597	2	16,313	665	5	18,174	733	−12	20,035	801	− 4	21,896
598	9	16,340	666	4	18,201	734	−12	20,063	802	− 2	21,924
599	14	16,368	667	2	18,229	735	−10	20,090	803	− 0	21,951
600	16	16,395	668	− 0	18,256	736	− 7	20,117	804	2	21,978
601	17	16,422	669	− 3	18,283	737	− 3	20,145	805	4	22,006
602	14	16,450	670	− 6	18,311	738	0	20,172	806	5	22,033
603	10	16,477	671	− 9	18,339	739	5	20,199	807	5	22,061
604	5	16,504	672	−10	18,366	740	8	20,227	808	4	22,088
605	− 1	16,532	673	−10	18,393	741	11	20,254	809	3	22,115
606	− 7	16,559	674	− 9	18,420	742	12	20,282	810	0	22,143
607	−12	16,587	675	− 6	18,448	743	11	20,309	811	− 1	22,170
608	−15	16,614	676	− 3	18,475	744	9	20,336	812	− 3	22,197
609	−16	16,641	677	1	18,502	745	6	20,354	813	− 5	22,225
610	−16	16,669	678	6	18,530	746	1	20,391	814	− 6	22,252
611	−13	16,696	679	10	18,557	747	− 2	20,418			
612	− 8	16,728	680	12	18,585	748	− 6	20,446			

/465/EEC

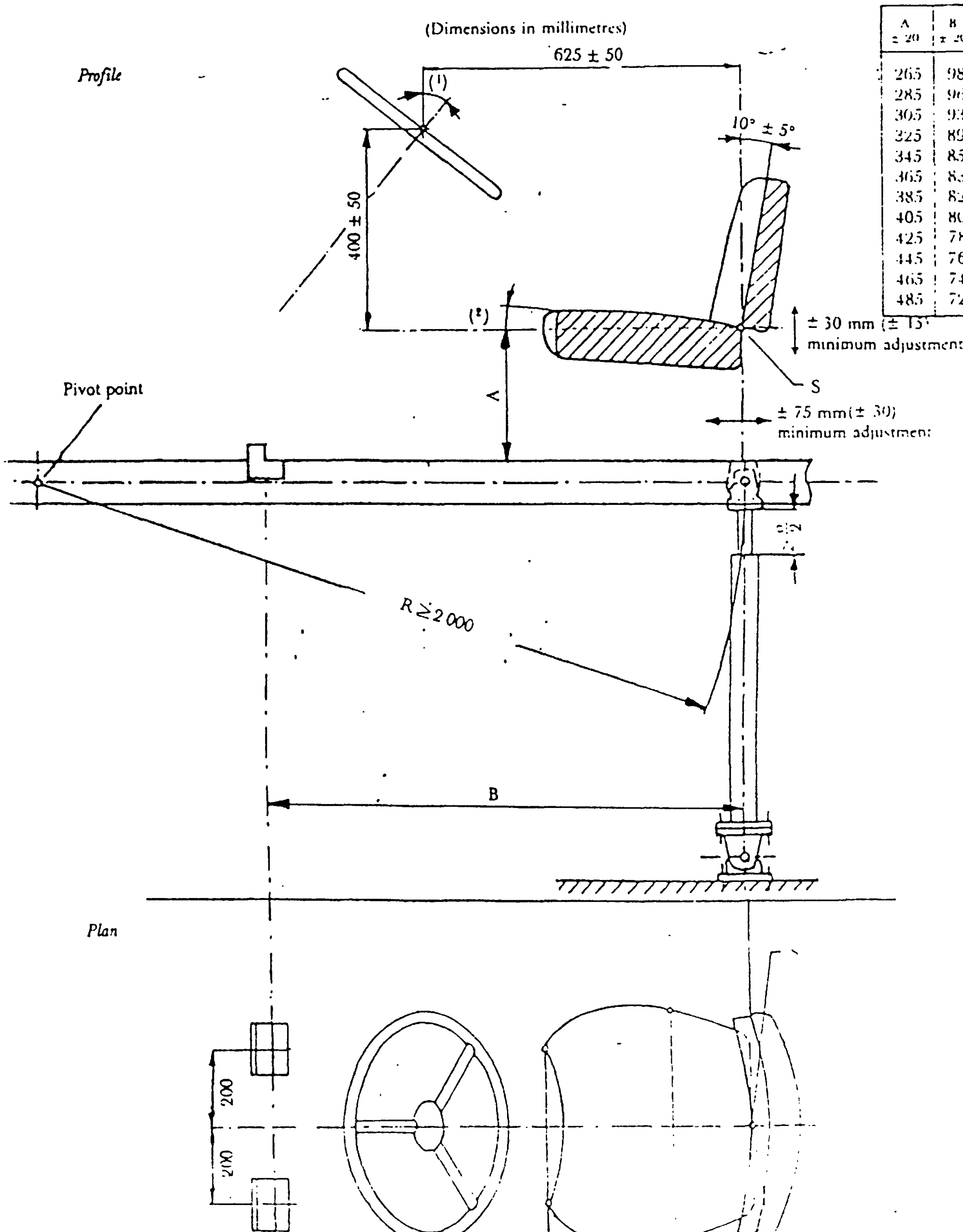
PS No	s mm	t s	PS No	s mm	t s	PS No	s mm	t s	PS No	s mm	t s
815	− 5	22,280	867	−16	23,703	919	4	25,126	972	− 2	26,577
816	− 4	22,307	868	−12	23,730	920	8	25,153	973	0	26,604
817	− 3	22,334	869	− 7	23,758	921	11	25,181	974	3	26,631
818	− 0	22,362	870	− 1	23,785	922	12	25,208	975	6	26,659
819	1	22,389	871	4	23,812	923	11	25,236	976	9	26,686
820	4	22,416	872	9	23,840	924	9	25,263	977	10	26,714
821	5	22,444	873	12	23,867	925	4	25,290	978	11	26,741
822	6	22,471	874	14	23,894	926	− 0	25,318	979	10	26,768
			875	13	23,922	927	− 5	25,345	980	8	26,796
824	6	22,526	876	11	23,949	928	− 9	25,372	981	5	26,823
825	5	22,553	877	7	23,977	929	−12	25,400	982	1	26,850
826	3	22,581	878	2	24,004	930	−13	25,427	983	− 3	26,878
827	0	22,608	879	− 1	24,031	931	−12	25,455	984	− 7	26,905
828	− 2	22,635	880	− 6	24,059	932	− 9	25,482	985	−10	26,933
829	− 4	22,663	881	− 9	24,086	933	− 5	25,509	986	−12	26,960
830	− 7	22,690	882	−11	24,113	934	− 0	25,537	987	−13	26,987
831	− 8	22,717	883	−11	24,141	935	4	25,564	988	−12	27,015
832	− 9	22,745	884	− 9	24,168	936	8	25,591	989	−10	27,042
833	− 8	22,772	885	− 6	24,196	937	11	25,619	990	− 6	27,069
834	− 7	22,800	886	− 3	24,223	938	13	25,645	991	− 2	27,097
835	− 4	22,827	887	0	24,250	939	13	25,674	992	2	27,124
836	− 1	22,854	888	4	24,278	940	11	25,701	993	6	27,152
837	2	22,882	889	7	24,305	941	7	25,728	994	10	27,179
838	6	22,909	890	9	24,332	942	3	25,756	995	12	27,206
839	9	22,936	891	9	24,360	943	− 1	25,783	996	14	27,234
840	11	22,964	892	8	24,387	944	− 5	25,810	997	13	27,261
841	12	22,991	893	6	24,414	945	− 8	25,839	998	11	27,288
842	11	23,019	894	3	24,442	946	−10	25,855	999	8	27,316
843	9	23,046	895	− 0	24,469	947	−11	25,892	1 000	3	27,343
844	5	23,073	896	− 3	24,497	948	−10	25,920	1 001	− 0	27,370
845	0	23,101	897	− 6	24,524	949	− 8	25,947	1 002	− 5	27,399
846	− 5	23,128	898	− 8	24,551	950	− 6	25,975	1 003	− 9	27,426
847	− 9	23,155	899	− 9	24,579	951	− 2	26,002	1 004	−12	27,453
848	−13	23,183	900	− 8	24,606	952	0	26,029	1 005	−13	27,480
849	−15	23,210	901	− 6	24,633	953	3	26,057	1 006	−13	27,507
850	−15	23,238	902	− 2	24,661	954	5	26,084	1 007	−11	27,535
851	−13	23,265	903	0	24,688	955	7	26,111	1 008	− 7	27,562
852	− 9	23,292	904	4	24,716	956	8	26,139	1 009	− 2	27,589
853	− 3	23,320	905	7	24,743	957	8	26,166	1 010	1	27,617
854	3	23,347	906	8	24,770	958	7	26,194	1 011	6	27,644
855	9	23,374	907	9	24,798	959	6	26,221	1 012	9	27,672
856	14	23,402	908	7	24,825	960	4	26,248	1 013	11	27,699
857	18	23,429	909	5	24,852	961	2	26,276	1 014	12	27,726
858	18	23,457	910	1	24,880	962	0	26,303	1 015	10	27,754
859	16	23,484	911	− 2	24,907	963	− 2	26,330	1 016	8	27,781
860	12	23,511	912	− 6	24,935	964	− 4	26,358	1 017	4	27,808
861	5	23,539	913	− 8	24,962	965	− 5	26,385	1 018	0	27,836
862	− 1	23,566	914	−10	24,989	966	− 6	26,413	1 019	− 3	27,863
863	− 7	23,593	915	− 9	25,017	967	− 7	26,440	1 020	− 6	27,891
864	− 13	23,621	916	− 7	25,044	968	− 7	26,467	1 021	− 8	27,918
865	−16	23,648	917	− 3	25,071	969	− 7	26,495	1 022	− 9	27,945
866	−17	23,675	918	0	25,099	970	− 6	26,522	1 023	− 8	27,973
						971	− 4	26,549	1 024	0	28,000

APPENDIX 6

'Test stand (point 2.5.3.1); example of construction (dimensions in mm)'

83/190/EEC

76/763/EEC



A ± 20	B ± 20
265	985
285	960
305	935
325	895
345	855
365	835
385	825
405	805
425	785
445	765
465	745
485	725

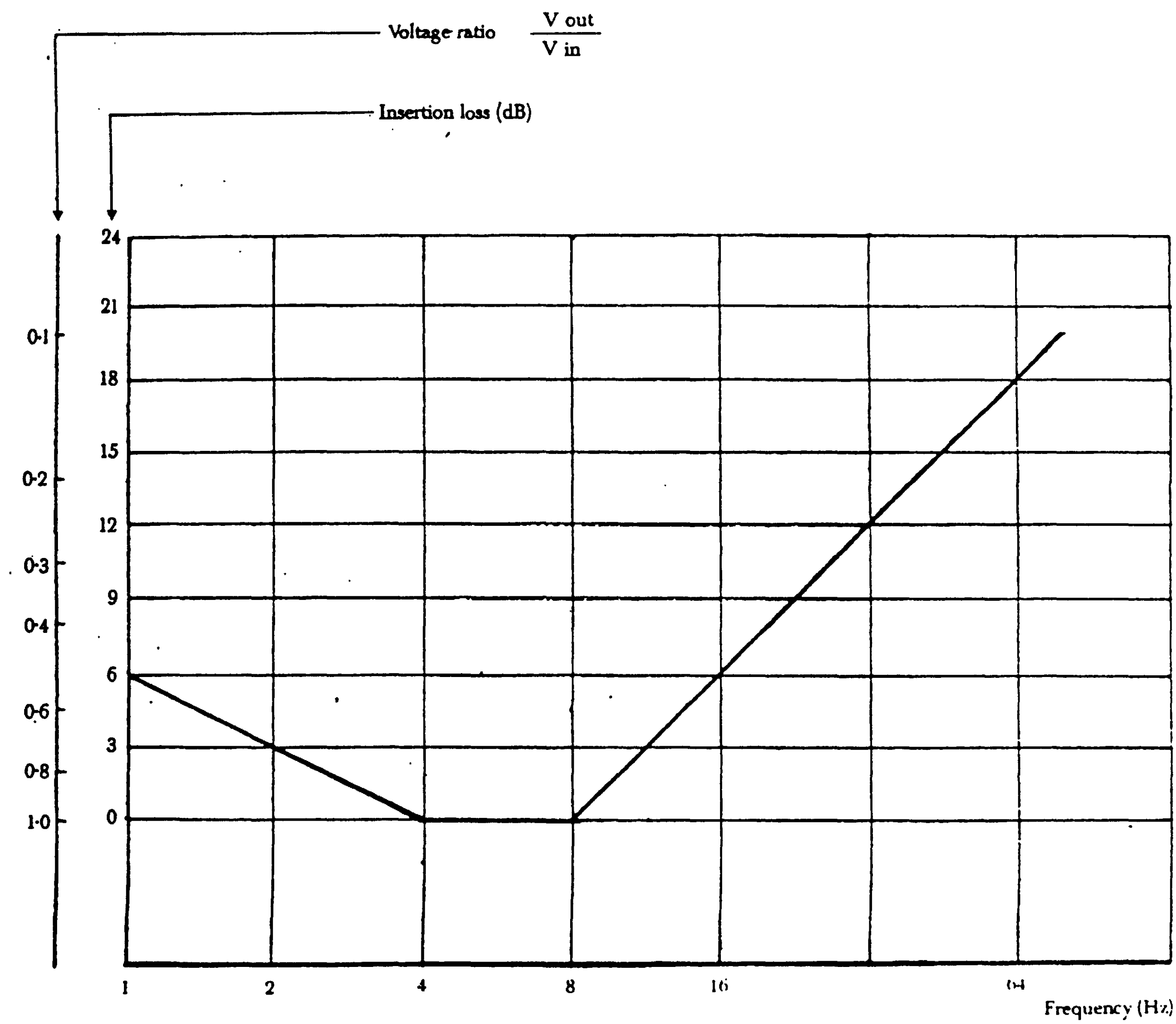
(1) The angle of the steering column in relation to the vertical depends on the [illegible]

(2) The rearward inclination of the surface of the fitted seat cushion must be 3 to 12 [illegible] in relation to the horizontal [illegible] with the loading device in accordance with Appendix 1 to this Part. The choice of the angle of inclination within this class depends on the position when seated.

APPENDIX 7

EEC 83/19C

Characteristic of the filter of the vibration measuring instrument (point 2.5.3.3.5)

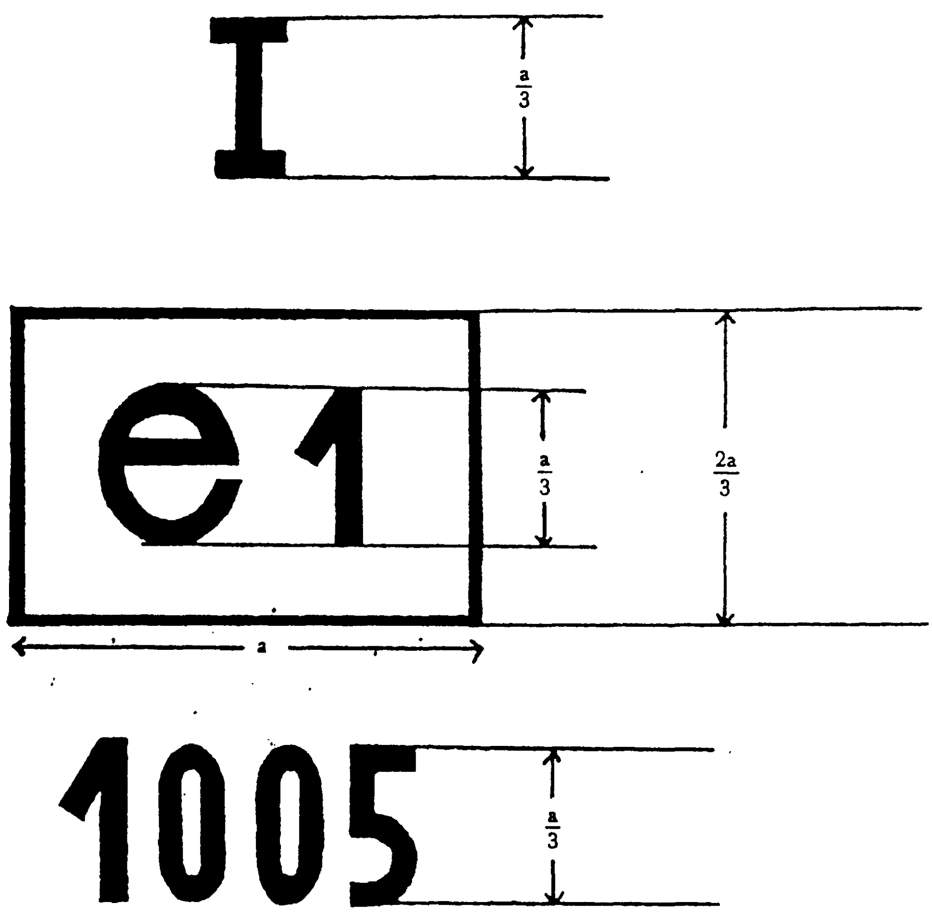


Appendix 8

Example of an EEC component type-approval mark point 3.5)

83/190/ EEC

a ≥ 15 mm



The seat bearing the EEC type-approval mark above is a seat intended for a Category A tractor in Class I and approved in Germany (e1) under number 1 005.

PART 3

78/764/EEC

MODEL EEC COMPONENT TYPE-APPROVAL CERTIFICATE

Name of administration

Notification concerning the grant, refusal, withdrawal or extension of EEC component type-approval for a type of driver's seat for a wheeled agricultural or forestry tractor

EEC component type-approval No ....

1. Trade name or mark of seat ....

....

2. Name and address of seat manufacturer ....

....

3. If applicable, name and address of manufacturer's authorized representative ....

....

4. Mark, type and trade name of tractor(s) for which seat is intended (¹)..

....

5. Date of submission for EEC component type-approval ....

6. Test laboratory ....

....

7. Date and number of laboratory report ....

8. Date on which EEC component type-approval was granted/refused/withdrawn (²) ....

....

9. Place ....

10. Date ....

11. A note describing the seat, particularly the range of adjustment, the total weight, the suspension system characteristics, type and thickness of padding and directions for attachment, is attached to this certificate. Designs of the sides of the seat in DIN A4 form (210 × 297 mm) with a lateral and frontal view are enclosed with this note.

'This note must be sent to the competent authorities of the other Member States if they so request.' 83/190/EEC

12. Remarks 78/764/EEC

....

13. Signature ....

(¹) In the case of a seat intended for a tractor in Class I or II, state the class(es) of the tractor(s) for which the seat is intended.
(²) Delete whichever is inapplicable.

78/764/ EEC

PART 4

DRIVER'S SEAT INSTALLATION REQUIREMENTS FOR EEC TYPE-APPROVAL OF A TRACTOR

1. Every driver's seat must bear the EEC component type-approval mark and comply with the following installation requirements:

1.1. the driver's seat must be installed in such a way that:

1.1.1. the driver is assured of a comfortable position for driving and manoeuvring the tractor;

1.1.2. the seat is easily accessible;

1.1.3. the driver, when seated in the normal driving position, can easily reach the various controls of the tractor that are likely to be actuated during operation;

1.1.4. no part of any of the seat or tractor components is likely to cause the driver to suffer cuts or bruises;

1.1.5. where the seat is adjustable only in length or height, its plane of symmetry must coincide or be parallel with the median longitudinal plane of the tractor;

1.1.6. where the seat is designed to revolve round a vertical axis it must be capable of being locked in all or certain positions and in any case in the position mentioned in point 1.1.5.

2. The holder of the EEC type-approval may request that it be extended to other types of seat. The competent authorities must grant this extension on the following conditions:

2.1. the new type of seat has received EEC component type-approval;

2.2. it has been designed to be installed on the type of tractor for which the extension of the EEC type-approval has been requested;

2.3. it is installed in such a manner as to comply with the installation requirements in this Part.

3. Seats intended for tractors with a minimum rear-wheel track of not more than 1 150 mm may have the following minimum dimensions in respect of the depth and width of the seat surface:

— depth of seat surface: 300 mm;

— width of seat surface: 400 mm.

This provision is applicable only if the values specified for the depth and the width of the seat surface (i.e. 400 ± 50 mm and at least 450 mm respectively) cannot be adhered to on grounds relating to the tractor.' 83/190/ EEC

4. A certificate conforming to the model shown in Part 5 to be attached to the EEC type-approval certificate for each type-approval or extension of type-approval granted or refused.

PART 5

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR WITH REGARD TO THE DRIVER'S SEAT

(Article 4 (2)

Name of administration

EEC type-approval No ....

.... extension (¹)

1. Trade name or mark of tractor ....

   ....

2. Type of tractor ....

3. Name and address of tractor manufacturer ....

   ....

4. If applicable, name and address of authorized representative 78/764/EEC

   ....

5. Trade name or mark of driver's seat and component type-approval number ....

   ....

6. Extension of EEC type-approval of the tractor to cover the following seat type ....

   ....

7. Tractor submitted for EEC type-approval on ....

8. Technical department responsible for checking conformity for the purpose of EEC type-approval

   ....

9. Date of report issued by that department ....

10. Number of report issued by that department ....

11. EEC type-approval with respect to the driver's seat has been granted/refused (²)

12. An extension of EEC type-approval with respect to the driver's seat has been granted/refused (²)

13. Place ....

14. Date ....

15. Signature ....

(¹) Where appropriate, state whether the extension of the initial EEC type-approval is the first, second, etc.

(²) Delete whichever is inapplicable.

78/933/EEC

ANNEX XV

LIGHTS AND SIGNALING

PART 1

INSTALLATION OF LIGHTING AND LIGHT-SIGNALLING DEVICES

1. DEFINITIONS

1.1. Tractor type with regard to the installation of lighting and light-signalling devices

'Tractor type with regard to the installation of lighting and light-signalling devices' means tractors which do not differ in such essential respects as:

1.1.1. the dimensions and exterior shape of the tractor;

1.1.2. the number and positioning of the devices.

The following are likewise considered not to be tractors of a different type: tractors which differ within the meaning of points 1.1.1 and 1.1.2 above, but not in such a way as to entail a change in the type, number, positioning and geometric visibility of the lamps prescribed for the tractor type in question, and tractors on which optional lamps are fitted or are absent.

1.2. Transverse plane

'Transverse plane' means a vertical plane perpendicular to the median longitudinal plane of the tractor.

1.3 Unladen tractor

'Unladen tractor' means the tractor in running order, as defined in point 2.4 of Part 1, model information document, to Annex I.

1.4. Laden tractor

'Laden tractor' means the tractor loaded to its technically permissible maximum weight, as stated by the manufacturer, who shall also fix the distribution of this weight between the axles.

1.5. Lamp

'Lamp' means a device designed to illuminate the road (headlamp) or to emit a light signal. Rear registration-plate lamps and reflex reflectors shall likewise be regarded as lamps.

1.5.1. *Equivalent lamps*

'Equivalent lamps' means lamps having the same function and authorized in the country in which the tractor is registered; such lamps may have different characteristics from those installed on the tractor when it is approved, on condition that they satisfy the requirements of this Annex.

1.5.2. *Independent lamps*

'Independent lamps' means lamps having separate lenses, separate light sources, and separate lamp bodies.

1.5.3. *Grouped lamps*

'Grouped lamps' means devices having separate lenses and separate light sources, but a common lamp body.

1.5.4. *Combined lamps*

'Combined lamps' means devices having separate lenses but a common light source and a common lamp body.

1.5.5. *Reciprocally incorporated lamps*

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

1.5.6. *Concealable illuminating lamp*

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

1.5.6.1. Variable-position lamps

'Variable position lamps' means lamps installed on the tractor which can move in relation to it and whose lenses cannot be concealed.

1.5.7. *Main-beam headlamp*

'Main-beam headlamp' means the lamp used to illuminate the road over a long distance ahead of the tractor.

1.5.8. *Dipped-beam headlamp*

'Dipped-beam headlamp' means the lamp used to illuminate the road ahead of the tractor without causing undue dazzle or discomfort to oncoming drivers and other road-users.

1.5.9. *Front fog-lamp*

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

1.5.10. *Reversing lamp*

'Reversing lamp' means the lamp used to illuminate the road to the rear of the tractor and to warn other road-users that the tractor is reversing or about to reverse.

1.5.11. *Direction-indicator lamp*

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

1.5.12. *Hazard-warning signal*

'Hazard-warning signal' means the device permitting the simultaneous operation of all of a tractor's direction indicator lamps to draw attention to the fact that the tractor temporarily constitutes a special danger to other road-users.

1.5.13. *Stop lamp*

'Stop lamp' means the lamp used to indicate to other road-users to the rear of the tractor that the latter's driver is applying the service brake.

1.5.14. *Rear registration-plate lamp*

'Rear registration-plate lamp' means the device used to illuminate the space intended to accommodate the rear registration plate; it may consist of different optical elements.

1.5.15. *Front position (side) lamp*

'Front position (side) lamp' means the lamp used to indicate the presence and the width of the tractor when the latter is viewed from the front.

1.5.16. *Rear position (side) lamp*

'Rear position (side) lamp' means the lamp used to indicate the presence and the width of the tractor when the latter is viewed from the rear.

1.5.17. *Rear fog-lamp*

'Rear fog-lamp' means the lamp used to render the tractor more readily visible from the rear in dense fog.

1.5.18. *Parking lamp*

'Parking lamp' means the lamp used to draw attention to the presence of a stationary tractor, without a trailer, in a built-up area. In such circumstances it replaces the front and rear position (side) lamps.

1.5.19. *End-outline marker lamp*

'End-outline marker lamp' means the lamps fitted to the extreme outer edge as close as possible to the top of the tractor and intended clearly to indicate the tractor's overall width. This signal is intended, for certain tractors, to complement the tractor's front and rear position (side) lamps by drawing particular attention to its bulk.

1.5.20. *Reflex reflector*

'Reflex reflector' means a device used to indicate the presence of a tractor by the reflection of light emanating from a light source not connected to the tractor, the observer being situated near the source.

For the purposes of this Directive the following are not considered as reflex reflectors:
— retro-reflecting number plates,
— other plates and retro-reflecting signals which must be used to comply with a Member State's specifications for use as regards certain categories of vehicles or certain methods of operation.

1.5.21. *Work lamp*

'Work lamp' means a device for illuminating a working area or process.

1.6. **Illuminating surface of a lamp**

1.6.1. *Illuminating surface of a lighting device*

'Illuminating surface of a lighting device' (points 1.5.7 to 1.5.10) means the orthogonal projection of the full aperture of the reflector in a transverse plane. If the lamp glass (or glasses) extend(s) over part only of the full aperture of the reflector, then the projection of that part only is taken into account. In the case of a dipped-beam headlamp, the illuminating surface is limited on the side of the cut-off by the apparent projection of the line of the cut-off on to the lens. If the reflector and glass are adjustable, the mean adjustment should be used.

1.6.2. *Illuminating surface of a signalling lamp other than a reflex reflector*

'Illuminating surface of a signalling lamp other than a reflex reflector' (points 1.5.11 to 1.5.19) means the orthogonal projection of the lamp in a plane perpendicular to its axis of reference and in contact with the exterior light-emitting surface of the lamp, this projection being bounded by the edges of screens situated in this plane, each allowing only 98 % of the total luminous intensity of the light to persist in the direction of the axis of reference. To determine the lower, upper and lateral limits of the illuminating surface, only screens with horizontal or vertical edges shall be used.

1.6.3. *Illuminating surface of a reflex reflector*

'Illuminating surface of a reflex reflector' (point 1.5.20) means the orthogonal projection of the reflecting surface of the reflex reflector in a plane perpendicular to its axis of reference and bounded by planes touching the outer edges of the light projection surface of the reflex reflector and parallel to this axis. To determine the lower, upper and lateral limits of the illuminating surface, only vertical and horizontal planes shall be used.

1.6.4. *Exterior light-emitting surfaces*

'Exterior light-emitting surfaces', for a defined direction of observation, means the orthogonal projection of the surface of light emission in a plane perpendicular to the direction of observation (see drawing in Appendix 1).

1.7. **Axis of reference**

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

1.8. **Centre of reference**

'Centre of reference' means the intersection of the axis of reference with the exterior light-emitting surface, specified by the manufacturer of the lamp.

1.9. **Angles of geometric visibility**

'Angles of geometric visibility' means the angles which determine the field of the minimum solid angle in which the exterior light-emitting surface of the lamp must be visible. That field of the solid angle is determined by the segments of a sphere of which the centre coincides with the centre of reference of the lamp and the equator is parallel with the ground. These segments are determined in relation to the axis of reference. The horizontal angles β correspond to the longitude and the vertical angles α to the latitude. There must be no obstacle on the inside of the angles of geometric visibility to the propagation of light from any part of the exterior light-emitting surface of the lamp.

This shall not apply to any obstacles existing at the time when the lamp is approved if approval is required.

1.10. **Extreme outer edge**

'Extreme outer edge' on either side of the tractor means the plane parallel with the median longitudinal plane of the tractor and coinciding with its lateral outer edge, disregarding the projection:

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

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

1.10.3. of rear-view mirrors;

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

1.10.5. of customs seals affixed to the tractor and devices for securing and protecting such seals.

1.11. **Overall width**

'Overall width' means the distance between the two vertical planes defined in 1.10 above.

1.12. **A single lamp**

'A single lamp' means any combination of two or more lamps, whether identical or not, having the same function and colour, if it comprises devices, the projection of whose aggregate light-emitting surfaces in a given transverse plane occupies 60 % or more of the area of the smallest rectangle circumscribing the projections of the light-emitting surfaces of the aforementioned lamps, provided that such combination is, where approval is required, approved as a single lamp.

This possible combination does not apply to main-beam headlamps, dipped-beam headlamps and front fog lamps.

1.13. **Two lamps or an even number of lamps**

'Two lamps' or 'an even number of lamps' means a single light-emitting surface in the shape of a band, if placed symmetrically in relation to the median longitudinal plane of the tractor and extending on both sides to within not less than 400 mm of the extreme outer edge of the tractor, and being not less than 800 mm long. The illumination of such a surface shall be provided by not less than two light sources placed as close as possible to its ends. The light-emitting surface may be constituted by a number of juxtaposed elements on condition that the projections of the several individual light-emitting surfaces in the same transverse plane occupy not less than 60 % of the area of the smallest rectangle circumscribing the projections of those individual light-emitting surfaces.

1.14. **Distance between two lamps**

'Distance between two lamps' which face in the same direction, means the distance between the orthogonal projections in a plane perpendicular to the direction in question of the outlines of the two illuminating surfaces as defined according to the case mentioned in section 1.6.

1.15. **Optional lamp**

'Optional lamp' means a lamp the presence of which is left to the discretion of the manufacturer.

1.16. **Operational tell-tale**

'Operational tell-tale' means a tell-tale showing whether a device that has been actuated is operating correctly or not.

1.17. **Circuit-closed tell-tale**

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

2. APPLICATION FOR EEC TYPE-APPROVAL

2.1. The application for EEC approval of a tractor type with regard to the installation of its lighting and light-signalling devices shall be submitted by the tractor manufacturer or his representative.

2.2. It shall be accompanied by the following documents in triplicate, and by the following particulars:

2.2.1 a description of the tractor type as regards the particulars referred to in point 1.1; 78/933/EEC

2.2.2. a list of devices prescribed by the manufacturer for the lighting and light-signalling assembly. The list may include several types of device for each operation. Each type must be duly identified (for example component type-approval mark, name and address of manufacturer, etc.). The list may also include the following additional particulars in respect of each operation: 'or equivalent devices';

2.2.3. layout drawing of the lighting and light-signalling equipment as a whole, showing the position of the various lamps of the tractor;

2.2.4. layout drawing(s) for each individual lamp showing the illuminating surfaces as defined in point 1.6.

2.3. An unladen tractor fitted with lighting and light-signalling equipment as described in point 2.2.2 and representative of the tractor type to be approved, must be submitted to the technical authority conducting approval tests.

2.4. The document provided for in Part 2 shall be attached to the type-approval document.

3. GENERAL SPECIFICATIONS

3.1. The lighting and light-signalling devices must be so fitted that under normal conditions of use, and notwithstanding any vibration to which they may be subjected, they retain the characteristics laid down in this Annex and enable the tractor to comply with the requirements of this Annex. In particular, it shall not be possible for the adjustment of the lamps to be inadvertently disturbed.

3.1.1. Tractors must be equipped with electrical connectors to enable a detachable light-signalling system to be used. In particular tractors must be fitted with the permanently connected socket outlet recommended in standard ISO R 1724 (Electrical connections for vehicles with 6 or 12 volt electrical systems applying more specifically to private motor cars and lightweight trailers or caravans) (first edition, April 1970) or ISO R 1185 (Electrical connections between towing and towed vehicles having 24 volt electrical systems used for international commercial transport purposes) (first edition, March 1970). In the case of standard ISO R 1185, the function of contact 2 shall be restricted to the rear position (side) lamp and to the end-outline marker lamp on the left-hand side.

3.2. The illuminating lamps described in points 1.5.7, 1.5.8 and 1.5.9 must be so fitted that a correct setting of their alignment can easily be performed.

3.3. For all light-signalling devices, the reference axis of the lamp when fitted to the tractor must be parallel with the bearing plane of the tractor on the road and with the longitudinal plane of the tractor. In each direction a tolerance of ± 3° shall be allowed. In addition, any specific instructions as regards fitting laid down by the manufacturer must be complied with.

3.4. In the absence of specific instructions, the height and alignment of the lamps shall be checked with the unladen tractor placed on a flat, horizontal surface.

3.5. In the absence of specific requirements, lamps constituting a pair shall:

3.5.1. be fitted to the tractor symmetrically in relation to the median longitudinal plane;

3.5.2. be symmetrical to one another in relation to the median longitudinal plane;

3.5.3. satisfy the same colorimetric characteristics;

3.5.4. have substantially identical photometric characteristics.

3.6. On tractors whose external shape is asymmetrical, the requirements of points 3.5.1 and 3.5.2 shall be satisfied as far as possible. These requirements shall be regarded as having been met if the distance of the two lamps from the median longitudinal plane and from the bearing plane on the ground is the same

3.7. Lamps having different functions may be independent or be grouped, combined or reciprocally incorporated in one device, provided that each such lamp complies with the requirements applicable to it.

3.8. The maximum height above ground shall be measured from the highest point and the minimum height from the lowest point of the illuminating surface.

3.9. In the absence of specific requirements no lamps other than direction indicator lamps and the hazard warning signal may emit a flashing light. 78/933/EEC

3.10. No red light shall be visible towards the front and no white light other than that from the reversing lamp or work lamps shall be visible towards the rear.

This requirement is considered to have been met if:

3.10.1. for the visibility of a red light towards the front: there is no direct visibility of a red light if viewed by an observer moving within zone 1 in a transverse plane situated 25 m in front of the tractor (see Appendix 2, Figure 1);

3.10.2. for the visibility of a white light towards the rear: there is no direct visibility of a white light if viewed by an observer moving within zone 2 in a transverse plane situated 25 m behind the tractor (see Appendix 2, Figure 2).

3.10.3. Zones 1 and 2, as seen by the observer, are limited in their respective planes as follows:

3.10.3.1. as regards height, by two horizontal planes which are 1 m and 2·2 m respectively above the ground;

3.10.3.2. as regards width, by two vertical planes which make an angle of 15° towards the front and rear respectively, and towards the outside by reference to the median plane of the tractor, passing through the point (or points) of contact of vertical planes which are parallel with the median longitudinal plane of the tractor, and limiting the overall width of the tractor when on wide track.

If there are several points of contact, the one furthest towards the front shall be selected for zone 1 and the one furthest towards the rear shall be selected for zone 2.

3.11. The electrical connections must be such that the front and rear position (side) lamps, the end-outline marker lamps if they exist, and the rear registration plate lamp can only be switched on and off simultaneously.

3.12. The electrical connections must be such that the main-beam and dipped-beam headlamps, and the front and rear fog lamps cannot be switched on unless the lamps referred to in point 3.11 are also switched on. This requirement shall not apply, however, to main-beam or dipped-beam headlamps when their luminous warnings consist of the intermittent lighting up at short intervals of the dipped-beam headlamps or the intermittent lighting up of the main-beam headlamps or the alternate lighting up at short intervals of the dipped-beam and main-beam headlamps.

3.13. The colours of the light emitted by the lamps or reflectors are as follows:

— main-beam headlamp: white or selective yellow,
— dipped-beam headlamp: white or selective yellow,
— front fog-lamp: white or yellow,
— reversing lamp: white,
— direction indicator lamp: amber,
— hazard-warning signal: amber,
— stop lamp: red,
— rear registration-plate lamp: white,
— front position (side) lamp: white; selective yellow is permitted if the front position (side) lamp is a selective yellow headlamp,
— rear position (side) lamp: red,
— rear fog-lamp: red,
— parking lamp: white in front, red at the rear, amber if incorporated in the side direction indicator lamps,
— work lamp: no specifications,
— end-outline marker lamp: white in front, red at the rear,
— rear reflex reflector, non-triangular: red.

However, as long as all the requirements necessary for obtaining EEC vehicle type-approval do not apply, the choice of the colour of the light emitted by main-beam and dipped-beam headlamps and front fog-lamps shall be left to the Member States

3.14. The function of the circuit-closed tell-tales may be fulfilled by operational tell-tales.

3.15. **Concealable lamps**

3.15.1. The concealment of lamps shall be prohibited, with the exception of main-beam headlamps, dipped-beam headlamps and front fog-lamps, which may be concealed when not in use.

3.15.2. An illuminating device in the position of use shall remain in that position if the malfunction referred to in point 3.1.5.2.1 occurs alone or in conjunction with one of the malfunctions described in point 3.1.5.2.2.

3.15.2.1. The absence of power for manipulating the lamp.

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

3.15.3. In the event of a defect in the concealment control, a concealed lighting device shall be capable of being moved into the position of use without the aid of tools.

3.15.4. It must be possible to move illuminating devices into the position of use and to switch them on by means of a single control, without excluding the possibility of moving them into the position of use without switching them on. However, in the case of grouped-main-beam and dipped-beam headlamps, the control referred to above is required only to activate the dipped-beam headlamps.

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

3.15.6. At temperatures of – 30 to + 50 °C an illuminating device must be capable of reaching the fully-open position within three seconds of initial operation of the control.

3.16. **Variable position lamps**

3.16.1. In the case of tractors having a track width of 1 150 mm or less, the position of the direction indicator lamps, the front and rear position (side) lamps and the stop lamps may be varied, provided that:

3.16.1.1. these lamps remain visible even when their position is altered;

3.16.1.2. these lamps may be locked in the position required by traffic conditions. Locking must be automatic.

4. INDIVIDUAL SPECIFICATIONS

4.1. **Main-beam headlamp**

4.1.1. *Presence*

Optional.

4.1.2. *Number*

Two or four.

4.1.3. *Arrangement*

No individual specifications.

4.1.4. *Position*

4.1.4.1. Width:

The outer edges of the illuminating surface must in no case be closer to the extreme outer edge of the tractor than the outer edges of the illuminating surface of the dipped-beam headlamps.

4.1.4.2. Height:

No individual specifications.

4.1.4.3. Length:

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

4.1.5. *Geometric visibility*

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

4.1.6. *Alignment*

Towards the front.

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

4.1.7. *May be 'grouped'*

with the dipped-beam headlamp and the other front lamps.

4.1.8. *May not be 'combined'*

with any other lamp.

4.1.9. *May be 'reciprocally incorporated'*

4.1.9.1. with the dipped-beam headlamp, unless the main-beam headlamp swivels according to the angle of lock of the steering;

4.1.9.2. with the front position (side) lamp;

4.1.9.3. with the front fog-lamp;

4.1.9.4. with the parking lamp.

4.1.10. *Electrical connections*

4.1.10.1 The main-beam headlamps may be switched on either simultaneously or in pairs. For changing over from the dipped to the main beam at least one pair of main beams must be switched on. For changing over from the main to the dipped beam all main-beam headlamps must be switched off simultaneously.

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

4.1.11. *Circuit-closed tell-tale*

Mandatory.

4.1.12. *Other requirements*

4.1.12.1. The aggregate maximum intensity of the main beams which can be switched on simultaneously must not exceed 225 000 cd.

4.1.12.2. This maximum intensity shall be obtained by adding together the individual maximum intensities measured at the time of component type-approval and shown on the relevant approval certificates.

4.2. Dipped-beam headlamps

4.2.1. *Presence*

Mandatory.

4.2.2. *Number*

Two

4.2.3. *Arrangement*

No individual specifications.

4.2.4. *Position*

4.2.4.1. Width:

No individual specifications.

4.2.4.2. Height above the ground:

4.2.4.2.1. if only two dipped-beam headlamps are fitted:

— minimum 500 mm,

— maximum 1 200 mm.

This distance may be increased to 1 500 mm, if the height of 1 200 mm cannot be observed due to the design, taking account of the conditions of use of the tractor and its working equipment;

4.2.4.2.2. in the case of tractors equipped for the fitting of portable devices at the front, two dipped-beam headlamps in addition to the lamps mentioned in point 4.2.4.2.1 shall be allowed at a height not exceeding 2 800 mm if:

— the electrical connections are such that two pairs of dipped-beam headlamps cannot be switched on at the same time,

— the additional dipped-beam headlamps are reciprocally incorporated or grouped with additional front position (side) lamps.

4.2.4.3. Length:

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

4.2.5. *Geometric visibility*

Defined by angels α and β as specified in point 1.9:

α = 15° upwards and 10° downwards,

β = 45° outwards and 5° inwards.

Within this field, almost the whole of the light-emitting surface of the light must be visible.

The presence of panels or other items of equipment near the lamp must not give rise to secondary effects causing discomfort to other road users.

4.2.6. *Alignment*

4.2.6.1. The alignment of the dipped-beam headlamps must not vary according to the angle of lock of the steering.

4.2.6.2. If the height of the dipped-beam headlamps is equal to or greater than 500 mm and equal to or less than 1 200 mm, it must be possible to lower the dipped beam by between 0·5 and 4 %;

4.2.6.3. If the height of the dipped-beam headlamps is greater than 1 200 but not greater than 1 500 mm, the limit of 4 % laid down in point 4.2.6.2 shall be increased to 6%; the dipped-beam headlamps referred to in point 4.2.4.2.2 must be aligned in such a way that, measured at 15 m from the lamp, the horizontal line separating the lit zone from the unlit zone is situated at a height equivalent to only half the distance between the ground and the centre of the lamp.

4.2.7. *May be 'grouped'*

with the main-beam headlamp and the other front lamps.

4.2.8. *May not be 'combined'*

with any other lamp

4.2.9. *May be 'reciprocally incorporated'*

4.2.9.1. with the main-beam headlamp, unless the latter swivels according to the angle of lock of the steering;

4.2.9.2. with the other front lamps.

4.2.10. *Electrical connections*

The control for changing over to the dipped beam must switch off all main-beam headlamps simultaneously.

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

4.2.11. *Circuit-closed tell-tale*

Optional

4.2.12. *Other requirements*

The requirements of point 3.5.2 shall not apply to dipped-beam headlamps.

4.3. **Front fog-lamp**

4.3.1. *Presence*

4.3.2. *Number*

Two

4.3.3. *Arrangement*

No individual specifications.

4.3.4. *Position*

4.3.4.1. Width:

No individual specifications.

4.3.4.2. Height:

Not less than 250 mm above the ground.

No point on the illuminating surface must be higher than the highest point on the illuminating surface of the dipped-beam headlamp.

4.3.4.3. Length:

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

4.3.5. *Geometric visibility*

Defined by angles α and β as specified in point 1.9:

α = 5° upwards and downwards,

β = 45° outwards and 5° inwards.

4.3.6. *Alignment*

The alignment of the front fog-lamps must not vary according to the angle of lock of the steering.

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

4.3.7. *May be 'grouped'*
with other front lamps.

4.3.8. *May not be 'combined'*
with other front lamps.

4.3.9. *May be 'reciprocally incorporated'*

4.3.9.1. with main-beam headlamps which do not swivel according to the angle of lock of the steering when there are four headlamps;

4.3.9.2. with the front position (side) lamps;

4.3.9.3. with the parking lamp

4.3.10. *Electrical connections*

It must be possible to switch the fog-lamp on and off independently of the main-beam or dipped-beam headlamps and vice versa.

4.3.11. *Circuit-closed tell-tale*

Optional.

4.4. Reversing lamps

4.4.1. *Presence*

Optional.

4.4.2. *Number*

One or two.

4.4.3. *Arrangement*

No individual specifications.

4.4.4. *Position*

4.4.4.1. Width:

No individual specifications.

4.4.4.2. Height:

Not less than 250 mm and not more than 1 200 mm above the ground.

4.4.3. Length.

At the back of the tractor.

4.4.5. *Geometric visibility*

Defined by angles α and β as specified in point 1.9:

α = 15° upwards and 5° downwards,

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

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

4.4.6. *Alignment*

Rearwards

4.4.7. *May be 'grouped'*

with any other rear lamp.

4.4.8. *May not be 'combined'*

with other lamps.

4.4.9. *May not be 'reciprocally incorporated'*

with other lamps.

4.4.10. *Electrical connections*

It can only light up if the reverse gear is engaged and if the device which controls the starting or stopping of the engine is in such a position that operation of the engine is possible.

It must not light up or remain lit up if either of the above conditions is not satisfied.

4.4.11. *Tell-tale*

Optional.

4.5. Direction-indicator lamp

4.5.1. *Presence* (see Appendix 3).

Mandatory. Types of indicators fall into categories (1, 2 and 5) the assembly of which on one tractor constitutes an arragement (A to D).

Arrangement A shall be allowed only on tractors whose overall length does not exceed 4·60 m and in the case of which the distance between the outer edges of the illuminating surfaces is not more than 1·60 m.

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

4.5.2. *Number*

The number of devices shall be such that they can emit signals which correspond to one of the arrangements referred to in point 4.5.3.

4.5.3. *Arrangement* (see Appendix 3).

A — Two front direction indicator lamps (category 1),
— Two rear direction indicator lamps (category 2).

These lamps may be independent, grouped or combined.

B — Two front direction indicator lamps (category 1).
— Two repeating side direction indicator lamps (category 5),
— Two rear direction indicator lamps (category 2).

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

C — Two front, direction indicator lamps (category 1),
— Two rear direction indicator lamps (category 2),
— Two repeating side indicator lamps (category 5).

D — Two front direction-indicator lamps (category 1).
— Two rear direction-indicator lamps (category 2).

4.5.4. *Position*

4.5.4.1. Width:

The edge of the illuminating surface furthest from the median longitudinal plane of the tractor must not be more than 400 mm from the extreme outer edge of the tractor.

The distance between the inner edges of the two illuminating surfaces shall be not less than 500 mm.

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

For front direction-indicator lamps the illuminating surface must be not less than 40 mm from the illuminating surface of the dipped-beam headlamps or front fog-lamps, if any. A smaller distance is permitted if the luminous intensity in the reference axis of the direction-indicator lamp is equal to at least 400 cd.

4.5.4.2. Height:

Above the ground:

— not less than 500 mm for direction-indicator lamps in category 5,

— not less than 400 mm for direction-indicator lamps in categories 1 and 2,

— not more than 1 900 mm for all categories.

If the structure of the tractor makes it impossible to keep to this maximum figure, the highest point on the illuminating surface may be at 2 300 mm for direction-indicator lamps in category 5, for those in categories 1 and 2 of arrangement A and for those in category 1 of arrangement B; it may be at 2 100 mm for those in categories 1 and 2 of the other arrangements.

4.5.4.3. Length:

The distance between the centre of reference of the illuminating surface of the side direction-indicator lamp (arrangements B and C) and the transverse plane which marks the forward boundary of the tractor's overall length shall not exceed 1 800 mm. If the structure of the tractor makes it impossible to comply with the minimum angles of visibility, this distance may be increased to 2 600 mm.

4.5.5. *Geometric visibility*

Horizontal angle (see Appendix 3).

Vertical angle

15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 10° in the case of side repeating direction-indicator lamps of arrangements B and C if their height is less than 1 500 mm. The same applies in the case of direction indicator lamps in category 1 of arrangements B and D.

4.5.6. *Alignment*

If individual specifications for installation are laid down by the manufacturer they must be observed.

4.5.7. *May be 'grouped'*

with one or more lamps, which may not be concealed.

4.5.8. *May not be 'combined'*

with another lamp, save in accordance with the arrangements referred to in point 4.5.3.

4.5.9. *May be 'reciprocally incorporated'*

with a parking lamp only, but solely in the case of direction-indicator lamps in category 5.

4.5.10. *Electrical connections*

Direction-indicator lamps shall switch on independently of the other lamps. All direction-indicator lamps on one side of a tractor shall be switched on and off by means of one control and must flash in phase.

4.5.11. *Operational tell-tale*

Mandatory for all direction indicator lamps not directly visible to the driver. It may be optical or auditory or both.

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

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

4.5.12. *Other requirements*

The light shall be a flashing light flashing 90 ± 30 times per minute.

Operation of the light-signal control shall be followed within not more than one second by the appearance of the light and within not more than one and one-half seconds by its first extinction.

If a tractor is authorized to draw a trailer, the control of the direction-indicator lamps on the tractor shall also operate the indicator lamps of the trailer.

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

4.6. **Hazard-warning signal**

4.6.1. *Presence*

Mandatory.

4.6.2.	*Number*	As specified in the corresponding headings of section 4.5.
4.6.3.	*Arrangement*	
4.6.4.	*Position*	
4.6.4.1.	Width	
4.6.4.2.	Height	
4.6.4.3.	Length	
4.6.5.	*Geometric visibility*	
4.6.6.	*Alignment*	
4.6.7.	*May/may not be 'grouped'*	
4.6.8.	*May/may not be 'combined'*	
4.6.9.	*May/may not be 'reciprocally incorporated'*	

4.6.10. *Electrical connections*

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

4.6.11. *Circuit-closed tell-tale*

Mandatory. Flashing warning light, which can operate in conjunction with the tell-tale(s) specified in point 4.5.11.

4.6.12. *Other requirements*

As specified in point 4.5.12. If a tractor is equipped to draw a trailer the hazard-warning signal control must be also capable of bringing the direction-indicator lamps on the trailer into action. The hazard-warning signal must be able to function even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

4.7. **Stop lamps**

4.7.1. *Presence*

Optional.

4.7.2. *Number*

Two

4.7.3. *Arrangement*

No individual specifications.

4.7.4. *Position*

4.7.4.1. Width:

Not less than 500 mm apart. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1 400 mm.

4.7.4.2. Height:

Above the ground: not less than 400 mm, not more than 1 900 mm or 2 100 mm if the shape of the bodywork makes it impossible to keep to 1 900 mm.

4.7.4.3. Length:

At rear of tractor.

4.7.5. *Geometric visibility*

Horizontal angle

45° outwards and inwards.

Vertical angle

15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 10° in the case of lamps less than 1 500 mm above the ground; to 5° in the case of lamps less than 750 mm above the ground.

4.7.6. *Alignment*

Towards the rear of the tractor.

4.7.7. *May be 'grouped'*

with one or more other rear lamps.

4.7.8. *May not be 'combined'*

with another lamp.

4.7.9. *May be 'reciprocally incorporated'*

with the rear position (side) lamp or the parking lamp.

4.7.10. *Electrical connections*

must light up when the service brake is applied.

4.7.11. *Operational tell-tale*

Optional. If it exists, it should be a non-flashing warning light which comes on in the event of the malfunctioning of the stop lamps.

4.7.12. *Other requirements*

The luminous intensity of the stop lamps must be markedly greater than that of the rear position (side) lamps.

4.8. Rear registration plate lamp

4.8.1. *Presence*

Mandatory.

4.8.2. *Number*

4.8.3. *Arrangement*

4.8.4. *Position*

4.8.4.1. Width

4.8.4.2. Height

4.8.4.3. Length

4.8.5. *Geometric visibility*

4.8.6. *Alignment*

(4.8.2. to 4.8.6.:) Such that the device is capable of illuminating the space for the registration plate.

4.8.7. *May be 'grouped'*

with one or more rear lamps.

4.8.8. *May be 'combined'*

with the rear position (side) lamps.

4.8.9. *May not be 'reciprocally incorporated'*

with another lamp.

4.8.10. *Electrical connections*

The device must light up only at the same time as the rear position (side) lamps.

4.8.11. *Circuit-closed tell-tale*

Optional. If it exists, its function should be performed by the tell-tale required for the front and rear position (side) lamps.

4.9. **Front position (side) lamps**

4.9.1. *Presence*

Mandatory.

4.9.2. *Number*

Two or four (see point 4.2.4.2.2).

4.9.3. *Arrangement*

No individual specifications

4.9.4. *Position*

4.9.4.1. Width:

The point on the illuminating surface which is farthest from the tractor's median longitudinal plane must not be more than 400 mm from the extreme outer edge of the tractor.

The clearance between the respective inner edges of the two illuminating surfaces must not be less than 500 mm.

4.9.4.2. Height:

Above the ground: not less than 400 mm, not more than 1 900 mm or not more then 2 100 mm if the shape of the bodywork makes it impossible to keep within the 1 900 prescribed above.

4.9.4.3. Length:

No specifications provided that the lamps are aligned forwards and the angles of geometrical visibility specified in point 4.9.5 are complied with.

4.9.5. *Geometric visibility*

Horizontal angle

For the two front position (side) lamps: 10° inwards and 80° outwards. However, the angle of 10° inward may be reduced to 5° if the shape of the bodywork makes it impossible to keep to 10°. For tractors with an overall width not exceeding 1 400 mm this angle may be reduced to 3° if the shape of the bodywork makes it impossible to keep to 10°.

Vertical angle

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

4.9.6. *Alignment*

Towards the front.

4.9.7. *May be 'grouped'*

with any other front lamp.

4.9.8. *May not be 'combined'*

with any other lamps.

4.9.9. *May be 'reciprocally incorporated'*

with any other front lamp.

4.9.10. *Electrical connections*

No individual specifications.

4.9.11. *Tell-tale*

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

4.10. **Rear position (side) lamps**

4.10.1. *Presence*

Mandatory.

4.10.2. *Number*

Two.

4.10.3. *Arrangement*

No individual specifications.

4.10.4. *Position*

4.10.4.1. Width:

The point on the illuminating surface which is farthest from the tractor's median longitudinal plane must not be more than 400 mm from the extreme outer edge of the tractor.

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

4.10.4.2. Height:

Above the ground: not less than 400 mm, not more than 1 900 mm, or not more than 2 100 mm if the shape of the bodywork makes it impossible to keep within 1 900 mm.

4.10.4.3. Length:

At rear of tractor.

4.10.5. *Geometric visibility*

Horizontal angle

For the two rear position (side) lamps:

— either 45° inwards and 80° outwards,

— or 80° inwards and 45° outwards.

Vertical angle

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

4.10.6. *Alignment*

Towards the rear.

4.10.7. *May be 'grouped'*

with any other rear lamp.

4.10.8. *May be 'combined'*

with the rear registration-plate lamp.

4.10.9. *May be 'reciprocally incorporated'*

with the stop lamp, the rear fog-lamp or the parking lamp.

4.10.10. *Electrical connections*

No individual specifications.

4.10.11. *Circuit-closed tell-tale*

Mandatory. It must be combined with that of the front position (side) lamps.

4.11. **Rear fog lamp**

4.11.1. *Presence*

Optional.

4.11.2. *Number*

One or two.

4.11.3. *Arrangement*

This must satisfy the conditions of geometric visibility.

4.11.4. *Position*

4.11.4.1. Width:

If there is only one rear fog lamp, it must be on the opposite side of the median longitudinal plane of the tractor to the direction of traffic prescribed in the country of registration.

In all cases the distance between the rear fog-lamp and the stop lamp must be greater than 100 mm.

4.11.4.2. Height:

Above the ground: not less than 400 mm, not more than 1 900 mm, or not more than 2 100 mm if the shape of the bodywork makes it impossible to keep within 1 900 mm.

4.11.4.3. Length:

At rear of tractor.

4.11.5. *Geometric visibility*

Horizontal angle

25° inwards and outwards.

Vertical angle

5° above and below the horizontal.

4.11.6. *Aligment*

Towards the rear.

4.11.7. *May be 'grouped'*

with any other rear lamps.

4.11.8. *May not be 'combined'*

with other lamps.

4.11.9. *May be 'reciprocally incorporated'*

with rear position (side) lamps or the parking lamp.

4.11.10. *Electrical connections*

Must be such that the rear fog lamp can light up only when the dipped-beam headlamps or the front fog-lamps are in use.

If there are front fog-lamps, it must be possible to extinguish the rear fog-lamp independently of the front fog-lamps.

4.11.11 *Circuit-closed tell tale*

Mandatory. An independent, fixed-intensity warning light.

4.12. *Parking lamp*

4.12.1. *Presence*

Optional.

4.12.2. *Number*

Dependent upon the arrangement.

4.12.3. *Arrangement*

— either two front lamps and two rear lamps,
— or one lamp on each side.

4.12.4. *Position*

4.12.4.1. Width:

The point on the illuminating surface which is farthest from the median longitudinal plane of the tractor must not be more than 400 mm from the extreme outer edge of the tractor. Furthermore, in the case of a pair of lamps, the lamps must be on the sides of the tractor.

4.12.4.2. Height:

Above the ground: not less than 400 mm, not more than 1 900 mm or not more than 2 100 mm if the shape of the bodywork makes it impossible to keep within 1 900 mm.

4.12.4.3. Length:

No individual specifications.

4.12.5. *Geometric visibility*

Horizontal angle

45° outwards, towards, the front and towards the rear.

Vertical angle

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

4.12.6. *Alignment*

Such that the lamps meet the conditions concerning visibility towards the front and towards the rear.

4.12.7. *May be 'grouped'*

with any other lamp.

4.12.8. *May not be 'combined'*

with other lamps.

4.12.9. *May be 'reciprocally incorporated'*

— at the front: with the position (side) lamps, the dipped-beam headlamps, the main-beam headlamps and the front fog-lamps,
— at the rear: with the position (side) lamps, the stop lamps and the rear fog-lamps.
— with the direction indicator lamps in category 5.

4.12.10. *Electrical connections*

The connections must allow the parking lamp(s) on the same side of the tractor to be lit independently of any other lamps.

4.12.11. *Tell-tale*

Optional. If there is one, it must not be possible to confuse it with the tell-tale for the position (side) lamps.

4.12.12. *Other requirements*

The function of this lamp may also be performed by simultaneously switching on the front and rear position (side) lamps on the same side of the tractor.

4.13. End-outline marker lamp

4.13.1. *Presence*

Optional on tractors exceeding 2·10 m in width.

Prohibited on all other tractors.

4.13.2. *Number*

Two visible from the front and two visible from the rear.

4.13.3. *Arrangement*

No individual specifications.

4.13.4. *Position*

4.13.4.1. Width:

As close as possible to the extreme outer edge of the tractor.

4.13.4.2. Height:

At the maximum height compatible with the requirements relating to the position as regards width and to the symmetry of the lamps.

4.13.4.3. Length:

No individual specifications.

4.13.5. *Geometric visibility*

Horizontal angle

80° outwards.

Vertical angle

5° above and 20° below the horizontal.

4.13.6. *Alignment*

Such that the lamps meet the visibility requirements towards the front and towards the rear.

4.13.7. *May not be 'grouped'*

4.13.8. *May not be 'combined'*

4.13.9. *May not be 'reciprocally incorporated'*

with other lamps, except for the case referred to in point 4.2.4.2.2.

4.13.10. *Electrical connections*

No individual specifications.

4.13.11. *Tell-tale*

Optional.

4.13.12. *Other requirements*

Subject to all the other conditions being met, the lamp visible from the front and the lamp visible from the rear, on the same side of the tractor, may be combined in one device.

The position of an end-outline marker lamp in relation to the corresponding position (side) lamp shall be such that the distance between the projections on a transverse vertical plane of the points nearest to the illuminating surfaces of the two lamps considered is not less than 200 mm.

4.14. Rear reflex reflector, non triangular

4.14.1. *Presence*

Mandatory.

4.14.2. *Number*

Two or four (see point 4.14.5.2.).

4.14.3. *Arrangement*

No individual specifications.

4.14.4. *Position*

4.14.4.1. Width:

The point on the illuminating surface which is farthest from the tractor's median longitudinal plane must be not more than 400 mm from the extreme outer edge of the tractor.

The distance between the interior edges of the reflex reflectors shall be 600 mm minimum. This distance may be reduced to 400 mm if the overall width of the tractor is less than 1 300 mm.

4.14.4.2. Height:

Above the ground: not less than 400 mm and not more than 900 mm. The upper limit may be increased to 1 200 mm if it is not possible to keep within the height of 900 mm without having to use fixing devices liable to be easily damaged or bent.

4.14.4.3. Length:

No individual specifications.

4.14.5. *Geometric visibility*

4.14.5.1. Horizontal angle

30° inwards and outwards.

Vertical angle

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

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

4.14.5.2.1 Two reflex reflectors must keep within the maximum height of 900 mm above the ground, observe a distance between the interior edges of at least 400 mm and have a vertical angle of visibility above the horizontal of 15°.

4.14.5.2.2. The other two shall keep within a maximum height of 2 100 mm above the ground and shall be bound by the requirements of points 4.14.4.1 and 4.14.5.1.

4.14.6. *Alignment*

Towards the rear.

4.14.7. *May be 'grouped'*

with any other lamp.

4.14.8. *Other requirements*

The illuminating surface of the reflex reflector may have parts in common with that of any other rear lamp.

4.15. Work lamp

4.15.1. *Presence*

Optional

4.15.2. *Number*

No individual specifications.

4.15.3. *Arrangement*

4.15.4. *Position*

4.15.4.1. Width

4.15.4.2. Height

4.15.4.3. Length

4.15.5. *Geometric visibility*

4.15.6. *Alignment*

No individual specifications.

4.15.7. *May not be 'grouped'*

4.15.8 *May not be 'combined'*

4.15.9. *May not be 'reciprocally incorporated'*

with another lamp.

4.15.10 *Electrical connections*

This lamp must be illuminated independently of all other lamps in view of the fact that it does not illuminate the road or act as a signalling device on the road.

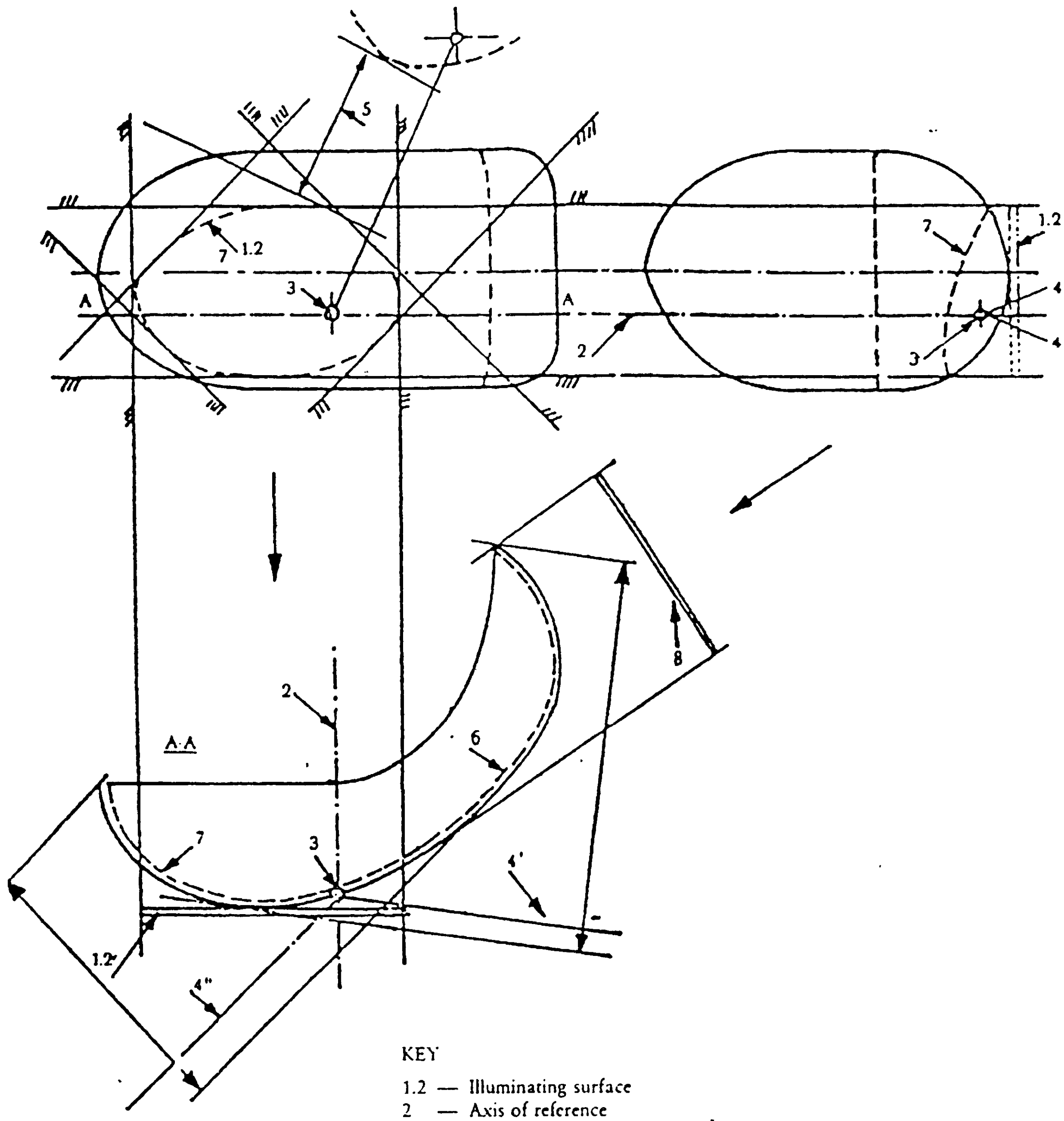
4.15.11. *Tell-tale*

Optional.

5. CONFORMITY OF PRODUCTION

5.1. Every series-produced tractor shall conform to the tractor type which received type-approval as regards the installation of lighting and light-signalling devices and their characteristics as specified by this Directive.

Appendix 1



KEY

1.2 — Illuminating surface
2 — Axis of reference
3 — Centre of reference
4 — Geometric visibility
5 — Distance between lamps
6 — Emission surface
7 — Operational surface
8 — Exterior light-emitting surface
↔ — Geometric visibility in directions 4' and 4"

78/933 /EEC

Appendix 2

The visibility test must be carried out at maximum track width.

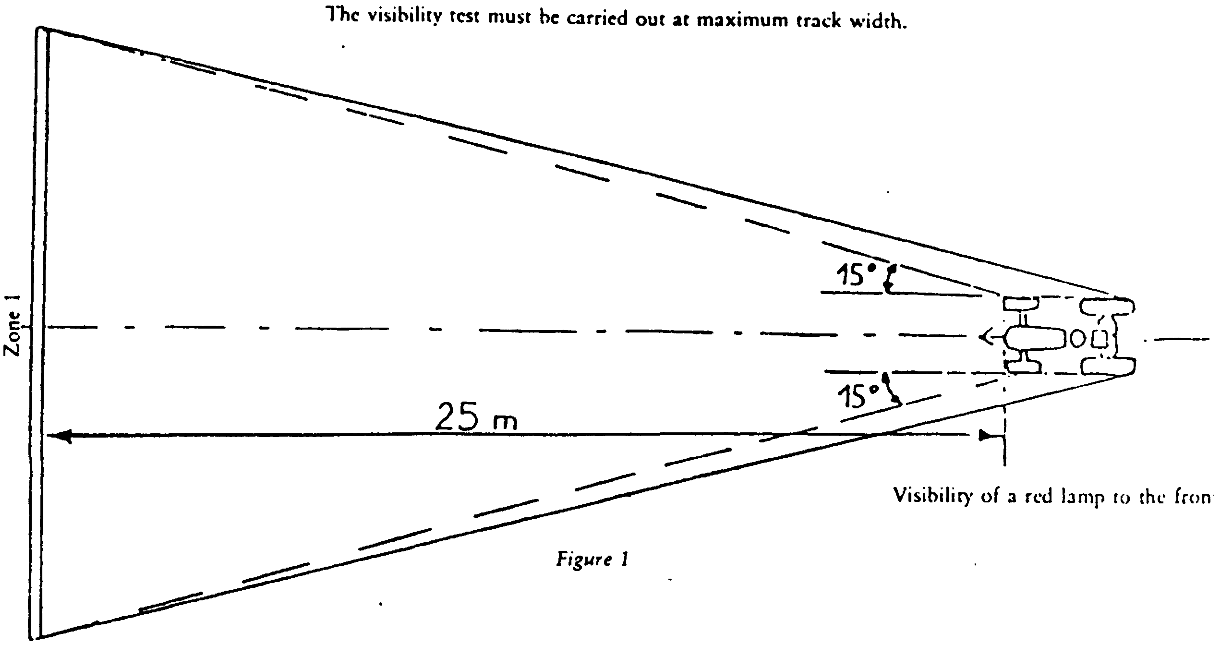


Figure 1

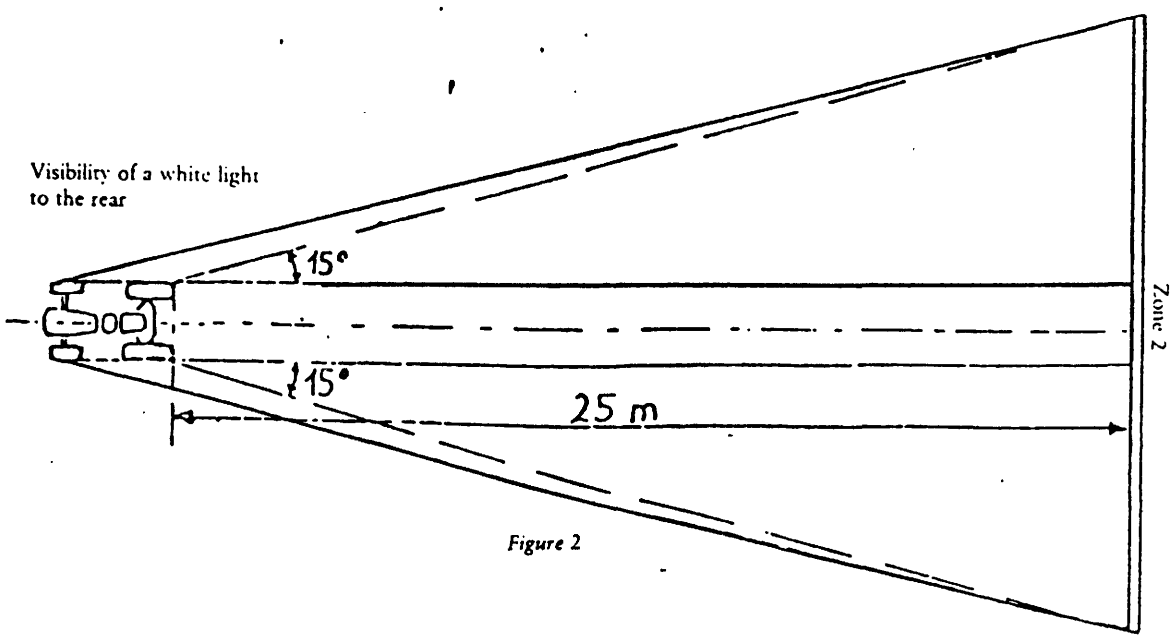
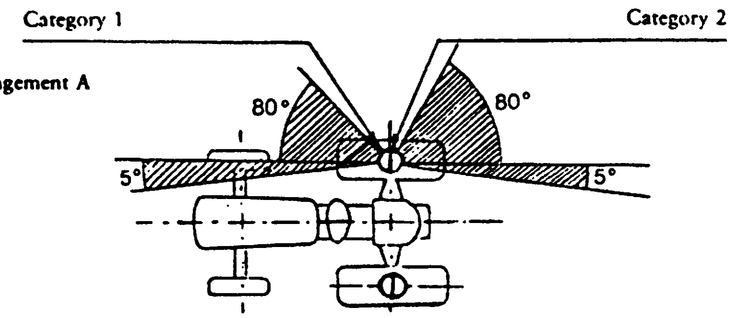


Figure 2

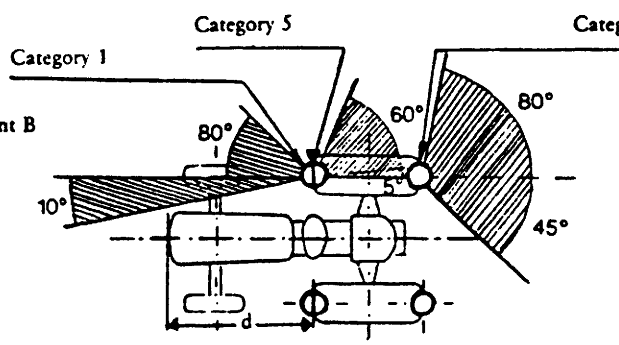
Appendix 3

DIRECTION-INDICATOR LAMP: GEOMETRICAL VISIBILITY

Arrangement A



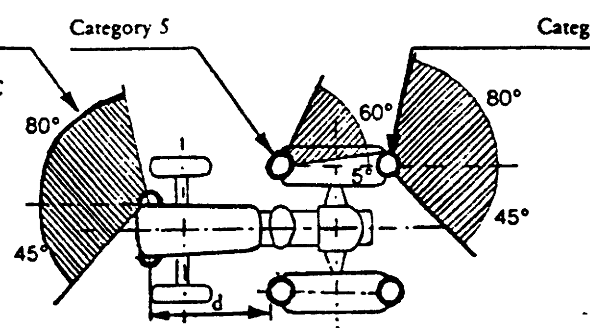
Arrangement B



The value 5° given for the dead angle of visibility to the rear of the repeating side indicator is an upper limit. This value may be increased to 10°, however, where it is impossible to adhere to the 5° limit.

d< 1 800 mm

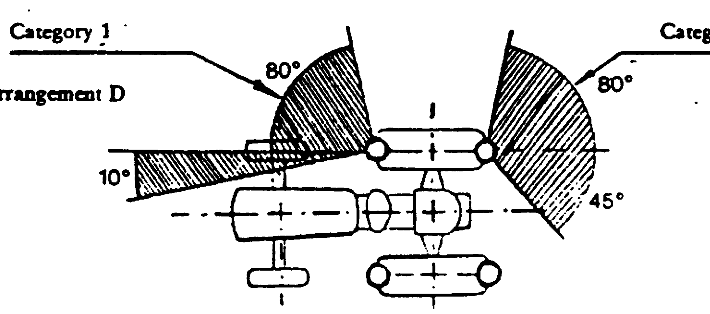
Arrangement C



The value 5° given for the dead angle of visibility to the rear of the repeating side indicator is an upper limit. This value may be increased to 10°, however, where it is impossible to adhere to the 5° limit.

d≤ 2 600 mm

Arrangement D



The value 10° given for the inward angle of visibility of the front indicator may be reduced to 3° for tractors with an overall width not exceeding 1 400 mm.

PART 2

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE INSTALLATION OF LIGHTING AND LIGHT-SIGNALLING DEVICES

(Article 4 (2))

EEC type-approval No ....

1. Make (trade name) ....

2. Vehicle type and commercial description classification ....

....

3. Manufacturer's name and address ....

....

4. If applicable, name and address of manufacturer's representative ....

....

5. Lighting equipment installed on the tractor submitted for approval ([1]) ....

....

5.1. Main-beam headlamps: yes/no ([2])

5.2. Dipped-beam headlamps: yes/no ([2])

5.3. Front fog-lamps: yes/no ([2])

5.4. Reserving lamps: yes/no ([2])

5.5. Front direction-indicator lamps: yes/no ([2])

5.6. Rear direction-indicator lamps: yes/no ([2])

5.7. Repeating side indicator lamps: yes/no ([2])

5.8. Hazard-warning device: yes/no ([2])

5.9. Stop lamps: yes/no ([2])

5.10 Rear registration-plate lamp: yes/no ([2])

5.11. Front position (side) lamps: yes/no ([2])

5.12. Rear position (side) lamps: yes/no ([2])

5.13. Rear fog-lamps: yes/no ([2])

5.14. Parking lamps: yes/no ([2])

5.15. End-outline marker lamps: yes/no ([2])

5.16. Rear reflex reflectors, non-triangular: yes/no ([2])

5.17. Work lamp: yes/no ([2])

([1]) Annex the lay-out drawings for the tractor, as mentioned in point 2.2.3 of Part 1 of this Annex on the approximation of the laws of the Member States relating to the installation of lighting and light-signalling devices on wheeled agricultural or forestry tractors with a maximum design speed of between 6 and 25 km/h.

([2]) Delete where inapplicable.

6. Equivalent lamps: yes/no (¹) (see 15) ....

....

7. Tractor submitted for approval on ....

8. Technical service conducting the EEC type-approval tests ....

....

9. Date of report issued by that service ....

10. Number of report issued by that service ....

11. EEC type-approval with regard to the lighting and light-signalling devices is granted/refused (¹)

12. Place ....

13. Date ....

14. Signature ....

15. The following document, bearing the type-approval mark indicated above, is annexed to this type-approval certificate:

...............list(s) of devices presented by the manufacturer for the lighting and light-signalling assembly; for each device the manufacturer's mark and the component type-approval mark are indicated.

This (these) list(s) include(s) a schedule of equivalent lamps (¹)

16. Remarks:

....

....

....

....

....

....

(¹) Delete where inapplicable.

ANNEX XVI

TYPE-APPROVAL OF LIGHTING DEVICES

79/532 /E

1. **Headlamps which function as main-beam and/or dipped-beam headlamps and incandescent electric filament lamps for such headlamps:**

   The EEC component type-approval mark is that laid down in Council Directive 76/761/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to motor-vehicle headlamps which function as main-beam and/or dipped-beam headlamps and to incandescent electric filament lamps for such headlamps (1).

   The provisions of Directive 76/761/EEC also apply to the component type-approval of special headlamps for agricultural or forestry tractors designed to provide both a main beam and a dipped beam of less than 160 mm, diameter D, with the following amendments:

   (a) the minimum illumination values fixed in section 6.3 of Annex I are reduced according to the ratio

   $$\cdot\left(\frac{D - 45}{160 - 45}\right)^2$$

   subject to the following absolute lower limits:

   — 3 lux, either at point 75 R or at point 75 L,

   — 5 lux, either at point 50 R or at point 50 L,

   — 1·5 lux, in Zone IV.

   Note: If the apparent surface of the reflector is not circular, the diameter is that of a circle with the same area as the apparent useful surface of the reflector.

   (b) the symbol M inside an inverted triangle is affixed on the headlamp instead of the symbol CR provided for in point 4.3.5 of Part 6.

   (c) Heading 1 of the component type-approval certificate (Annex II) reads 'headlamp for wheeled agricultural or forestry tractors'.

2. **End-outline-marker lamps, front position (side) lamps, rear position (side) lamps and stop lamps:**

   The EEC component type-approval mark is that laid down in Council Directive 76/758/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to end-outline marker lamps, front position (side) lamps, rear position (side) lamps and stop lamps for motor vehicles and their trailers (2).

3. Direction indicator lamps:

   The EEC component type-approval mark is that laid down in Council Directive 76/759/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to direction indicator lamps for motor vehicles and their trailers (3).

4. Reflex reflectors:

   The EEC component type-approval mark is that laid down in Council Directive 76/757/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to reflex reflectors for motor vehicles and their trailers (4).

5. Rear registration plate lamps:

   The EEC component type-approval mark is that laid down in Council Directive 76/760/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to rear registration plate lamps for motor vehicles and their trailers (5).

6. Front fog lamps:

   The EEC component type-approval mark is that laid down in Council Directive 76/762/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to front fog lamps for motor vehicles and filament lamps for such lamps (6).

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(1) OJ No L 262, 27. 9. 1976, p. 96.
(2) OJ No L 262, 27. 9. 1976, p. 54.
(3) OJ No L 262, 27. 9. 1976, p. 71.
(4) OJ No L 262, 27. 9. 1976, p. 32.
(5) OJ No L 262, 27. 9. 1976, p. 85.
(6) OJ No L 262, 27. 9. 1976, p. 122.

79/532/EEC

7. **Rear fog lamps:**

The EEC component type-approval mark is that laid down in Council Directive 77/538/EEC of 28 June 1977 on the approximation of the laws of the Member States relating to rear fog lamps for motor vehicles and their trailers (1).

8. **Reversing lamps:**

The EEC component type-approval mark is that laid down in Council Directive 77/539/EEC of 28 June 1977 on the approximation of the laws of the Member States relating to reversing lamps for motor vehicles and their trailers (2).

9. **Parking lamps:**

The EEC component type-approval mark is that laid down in Council Directive 77/540/EEC of 28 June 1977 on the approximation of the laws of the Member States relating to parking lamps for motor vehicles (3).

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(1) OJ No L 220, 29. 8. 1977, p. 60
(2) OJ No L 220, 29. 8. 1977, p. 72.
(3) OJ No L 220, 29. 8. 1977, p. 83.

ANNEX XVII

PART 1

COUPLING DEVICE

1. **Number**

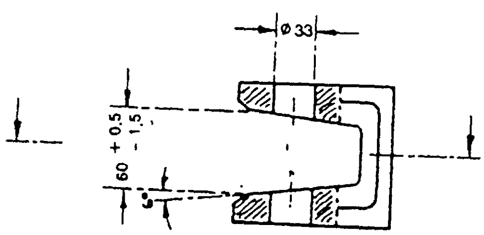
   Every tractor must have a special device to which it must be possible to attach a connection such as a tow-bar or a tow-rope for towing purposes.

2. **Position**

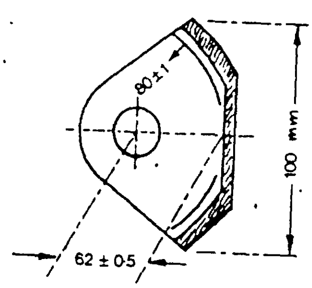
   The device must be fitted to the front of the tractor, which must be equipped with a coupling pin.

3. **Design**

   The device must be of the slotted-jaw type. The functional dimensions specified must be adhered to.



all dimensions in mm



The coupling pin must have a diameter of 30 + 1·5 mm and be fitted with a device preventing it from leaving its seating during use. The securing device must be non-detachable.

The tolerance of + 1·5 referred to above should not be regarded as a manufacturing tolerance but as a permissible variation in nominal dimensions for pins of different designs.

PART 2

REVERSE

All tractors must be equipped with a device for reversing which can be operated from the driving position.

79/622/EEC

ANNEX XVIII

STATIC TESTING OF PROTECTION STRUCTURES

LIST OF PARTS CONSTITUING THE ANNEX

Part 1:	Conditions for EEC component type-approval
Part 2:	Conditions for testing the strength of the protection structures and of their attachment to tractors
Part 3:	Test procedures
Part 4:	Figures
Part 5:	Test report model
Part 6:	Marks
Part 7:	Model of EEC component type-approval certificate
Part 8:	Conditions for EEC type-approval
Part 9:	Annex to the EEC type-approval certificate for a tractor with regard to the strength of the protection structures and of their attachment to the tractor (static tests).

PART 1

CONDITIONS FOR EEC COMPONENT TYPE-APPROVAL

1. DEFINITION

1.1. 'Roll-over protection structure' (safety cab or frame), hereinafter called 'protection structure', means the structure on a tractor the essential purpose of which is to avoid or limit risks to the driver resulting from roll-over of the tractor during normal use.

1.2. The structures mentioned in point 1.1 are characterized by the fact that during the tests prescribed in Parts 2 and 3 they ensure an unobstructed space inside them large enough to protect the driver.

2. GENERAL REQUIREMENTS

2.1. Every protection structure and its attachment to a tractor must be so designed and constructed as to fulfil the essential purpose laid down in section 1.

2.2. This condition is considered to be fulfilled if the requirements of Parts 2 and 3 are complied with.

3. APPLICATION FOR EEC COMPONENT TYPE-APPROVAL

3.1. The application for EEC component type-approval with regard to the strength of a protection structure and the strength of its attachment to a tractor shall be submitted by the tractor manufacturer or by the manufacturer of the protection structure or by his authorized representatives.

3.2. The application for EEC component type-approval shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

- general arrangement drawing either to a scale marked on the drawing or giving the main dimensions of the protection structure. This drawing must in particular show details of the mounting components,
- photographs from side and rear showing mounting details,
- brief description of the protection structure including type of construction, details of mounting on the tractor and, where necessary, details of cladding, means of access and escape, details of interior padding and features to prevent continuous rolling and details of heating and ventilation,
- details of materials used in structural parts including attaching brackets and fixing bolts (see Part 5).

3.3. A tractor representative of the tractor type for which the protection structure to be approved is intended shall be submitted to the technical service responsible for conducting the component type-approval tests. This tractor shall be fitted with the protection structure.

3.4. The holder of EEC component type-approval may request its extension to other tractor types. The competent authority which has granted the original EEC component type-approval shall grant the extension if the approved protection structure and the type(s) of tractor for which the extension is requested comply with the following conditions:

- the mass of the unballasted tractor, as defined in point 1.3 of Part 2, does not exceed by more than 5% the reference mass used in the test,
- the method of attachment and the tractor's components to which the attachments are made are identical,
- any components such as mudguards and bonnet cowls which may provide support for the protection structure are identical,

— the position and critical dimensions of the seat in the protection structure and the relative positions of the protection structure and the tractor shall be such that the zone of clearance would have remained within the protection of the deflected structure throughout all tests.

4. MARKINGS

4.1. Every protection structure conforming to the approved type shall bear the following markings:

4.1.1. the trade mark or name;

4.1.2. a component type-approval mark conforming to the model in Part 6 ;

4.1.3. serial number of the protection structure;

4.1.4. Make and type(s) of tractor(s) for which the protection structure is intended.

4.2. All these particulars must appear on a small plate.

4.3. These markings must be visible, legible and indelible.

PART 2

CONDITIONS FOR TESTING THE STRENGTH OF THE PROTECTION STRUCTURES AND OF THEIR ATTACHMENT TO TRACTORS

1. GENERAL REQUIREMENTS

1.1. Test purposes

Tests made using special rigs are intended to simulate such loads as are imposed on a protection structure, when the tractor overturns. These tests, described in Part 3., enable observations to be made on the strength of the protection structure and any brackets attaching it to the tractor and any parts of the tractor which transmit the test force.

1.2. Preparation for test

1.2.1. The protection structure must conform to the series production specifications. It shall be attached in accordance with the manufacturer's declared method of attachment to one of the tractors for which it is designed. A complete tractor is not required for the test; however, the protection structure and parts of the tractor on which it is attached for the tests shall represent an operating installation, hereinafter referred to as 'the assembly'.

1.2.2. The assembly shall be secured to the bedplate so that the members connecting the assembly and the bedplate do not deflect significantly in relation to the protection structure under loading. The method of attachment of the assembly to the bedplate must not of itself modify the strength of the assembly.

1.2.3. The assembly must be supported and secured or modified so that all the test energy is absorbed by the protection structure and its attachment to the rigid components of the tractor.

1.2.3.1. To comply with the requirements of point 1.2.3, the modification shall lock any tractor ride suspension system so as to ensure that it does not absorb any of the test energy.

1.2.4. For the tests the tractor must be fitted with all structural components of the series production which may influence the strength of the protection structure or which may be necessary for the strength test.

Components which may create a hazard in the zone of clearance must also be fitted so that they may be examined to see whether the requirements of section 4 have been fulfilled.

1.3. Tractor mass

The reference mass m_t, used in the formulae (see Part 3) to calculate the energies and the crushing force, shall be at least that defined in point 2.4 of Part 1 of Annex I (i.e. excluding optional accessories but including coolant, oils, fuel, tools and driver) plus the protection structure and less 75 kg.

Not included are optional front or rear weights, tyre ballast, mounted implements, mounted equipment or any specialized components.

2. APPARATUS AND EQUIPMENT

2.1. Horizontal loading tests (side and longitudinal)

2.1.1. Material, equipment and tie-down means adequate to ensure that the assembly is firmly fixed to the bedplate, independently of tyres if present.

2.1.2. Means of applying a horizontal force on the protection structure by a stiff beam as shown in Figures 1 and 2 of Part 4.

2.1.2.1. The stiff beam shall have a vertical face dimension of 150 mm.

2.1.2.2. Provision must be made so that the load can be uniformly distributed normal to the direction of loading and along a beam having a length of one of the exact multiples of 50 between 250 and 700 mm.

2.1.2.3. The edges of the beam in contact with the protection structure shall be curved with a maximum radius of 50 mm.

2.1.2.4. Universal joints — or the equivalent — shall be incorporated to ensure that the loading device does not constrain the structure in rotation or translation in any direction other than the direction of loading.

2.1.2.5. Where the horizontal length of the protection structure to which the load is to be applied does not constitute a straight line normal to the direction of application of the load, the space shall be packed so as to distribute the load over this length.

2.1.3. Equipment for measuring as far as is technically possible the energy absorbed by the protection structure and the rigid parts of the tractor to which it is attached, for example by measuring the force applied along its direction of application and the corresponding deflection relative to a point on the tractor chassis.

2.1.4. Means for proving that the zone of clearance has not been entered during the test. A rig according to figures 6a, 6b and 6c of Part 4 can be used.

2.2. Crushing tests (rear and front)

2.2.1. Material, equipment and tie-down means adequate to ensure that the tractor is firmly fixed to the bedplate, independently of tyres.

2.2.2. Means for applying a vertical force on the protection structure, such as shown in figure 3 of Part 4, including a stiff crushing beam with a width of 250 mm.

2.2.3. Equipment for measuring the total vertical force applied.

2.2.4. Means for proving that the zone of clearance has not been entered during the test. A rig according to figures 6a, 6b and 6c of Part 4 can be used.

2.3. Measurement tolerances

2.3.1. Dimensions: ± 3 mm.

2.3.2. Deflection: ± 3 mm.

2.3.3. Tractor mass: ± 20 kg.

2.3.4. Loads and forces: ± 2%.

2.3.5. Direction of loading: deviation from horizontal and vertical directions specified in Annex III:

— at start of test, under zero load: ± 2°,

— during test, under load: 10° above and 20° below the horizontal. These variations should be kept to a minimum.

3. TESTS

3.1. General requirements

3.1.1. *Sequence of tests*

3.1.1.1. The sequence of tests shall be as follows:

3.1.1.1.1. Longitudinal loading (Part 3, point 1.2)

For tractors with at least 50% of the mass as defined in point 1.3 on the rear wheels the longitudinal loading shall be applied from the rear (case 1). For other tractors the longitudinal loading shall be applied from the front (case 2).

79/622 /EEC

3.1.1.1.2. First crushing test

The first crushing test shall be applied at the same end of the protection structure as the longitudinal loading, i. e.:

— at the rear in case 1 (Part 3, point 1.5),

— at the front in case 2 (Part 3, point 1.6),

3.1.1.1.3. Loading from the side (Part 3, point 1.3)

3.1.1.1.4. Second crushing test

The second crushing test shall be applied at the opposite end of the protection structure to the longitudinal loading, i.e.:

— at the front in case 1 (Part 3, point 1.6),

— at the rear in case 2 (Part 3, point 1.5)

3.1.1.1.5. Second longitudinal loading (Part 3, point 1.7)

A second longitudinal loading shall be applied to tractors fitted with a protection structure designed to be tilted when the direction of application of the longitudinal loading (see point 3.1.1.1.1) would not have tilted the protection structure.

3.1.1.2. If, during the test, any part of the restraining equipment breaks or moves, the test shall be re-started.

3.1.1.3. No repairs or adjustments to the tractor or protection structure may be carried out during the tests.

3.1.2. *Wheel track width*

The wheels shall be removed or set at a track width setting which ensures that no interference can occur with the protection structure during the tests.

3.1.3. *Removal of non-hazard creating components*

All components of the tractor and protection structure which, as complete units, constitute protection for the driver — including weather protection — shall be supplied complete on a tractor for inspection.

The protection structure to be tested need not be fitted with front, side or rear windows of safety glass or similar material and any detachable panels, fittings and accessories which have no function of structural strength and which cannot create a hazard in the event of overturning.

3.1.4. *Instrumentation*

The protection structure shall be instrumented with the necessary equipment to obtain the data required to draw the force-deflection diagram (see figure 4 of Part 4). Total and permanent protection structure deflection shall be measured and noted for each stage of the test (see figure 5 of Part 4).

3.1.5. *Direction of loading*

In the case of a tractor whose seat is not on the median plane of the tractor and/or non-symmetrical strength of the structure, the side loading will be on the side most likely to lead to infringement of the zone of clearance during the tests (see also Part 3, point 1.3).

4. ACCEPTANCE CONDITIONS

4.1. A protection structure submitted for EEC component type-approval shall be considered as having satisfied the strength requirements if after the tests it fulfils the following conditions:

4.1.1. No part of the zone of clearance as described in point 3.2 of Part 3 has been entered by, or has been outside the protection of, the protection structure during the tests specified in points 1.2, 1.3, 1.5, 1.6 and, where appropriate, 1.7 of Part 3.
If an overload test has been carried out, the force applied when the specified energy is absorbed shall be greater than 0·8 of the maximum force occuring during both the main test and the overload test concerned (see figures 4b and 4c of Part 4). 82/953 /EEC

4.1.2. During the tests the protection structure must not impose any constraint on the seat structure. 79/622/EEC

4.1.3. At the point when the required energy level is attained in each of the specified horizontal loading tests, the force shall exceed 0·8 F_{max}. 82/953 /EEC

4.2. In addition there shall be no other feature presenting a particular hazard to the driver e.g. insufficient padding inside the roof or anywhere else where the driver's head may strike.

79/622 /EEC

5. TEST REPORT

5.1. The test report shall be attached to the EEC component type-approval certificate referred to in Part 7 . The presentation of the report shall be as shown in Part 5. It shall include:

5.1.1. A general description of the protection structure's shape and construction (see Part 5 for the obligatory dimensions), including the provisions for normal entry, exit and escape; the provisions for heating and ventilation system, and other accessories where these are available and where they could affect the zone of clearance or might create a hazard.

5.1.2. Details of any special features such as devices to prevent the continuous rolling of the tractor.

5.1.3. A brief description of any interior padding.

5.1.4. A statement of the type of windscreen and glazing fitted and of any EEC or other approval marking incorporated.

5.2. If EEC component type-approval is being extended for other tractor types, the report must include the exact reference of the report of the original EEC component type-approval as well as precise indications regarding the requirements laid down in point 3.4 of Part 1.

5.3. The report must identify clearly the tractor type (make, type and commercial description, etc.) used for testing and the types for which the protection structure is intended.

6. SYMBOLS

82/953 /EEC

m_t = reference tractor mass (kg), as defined in point 1.3.

D = deflection (mm) of structure at the point of and in line with the load application.

'D' – deflection (mm) of structure for the calculated energy required.'

F = static load force (N) (newtons).

F_{max} = maximum static load force occurring during loading, (N) with the exception of the overload.

'F' – force for the calculated energy required.'

'F-D – force/deflection curve.'

E_{is} = energy input to be absorbed during side loading (J) (joules).

E_{il1} = energy input to be absorbed during longitudinal loading (J).

'E_{il2} – energy input to be absorbed during application of the second longitudinal load (J).'

F_r = applied force at rear in the crushing test (N).

F_f = applied force at front in the crushing test (N).

PART 3

TEST PROCEDURE

79/622 /EEC

1. HORIZONTAL LOADING AND CRUSHING TESTS

1.1. General provisions for horizontal loading tests

1.1.1. The loads applied to the protection structure shall be distributed by means of a stiff beam, complying with the specifications laid down in point 2.1.2 of Part 2 located normal to the direction of load application; the stiff beam may be equipped with a means of preventing its being displaced sideways. The rate of deflection under loading shall not be greater than 5 mm/s. As the load is applied, F and D shall be recorded simultaneously at deflection increments of 15 mm or less, to ensure accuracy. Once the initial application has commenced, the load shall not be reduced until the test has been completed; but it is permitted to cease increasing the load if desired, e.g. to record measurements.

1.1.2. If the structural member to which the load is to be applied is curved, the specifications laid down in point 2.1.2.5 of Part 2 must be complied with. The application of a load must, however, comply with the requirements of point 1.1.1 above and point 2.1.2 of Part 2.

1.1.3. If no structural cross member exists at the point of application, a substitute test beam which does not add strength to the structure may be utilized for the test procedure.

1.1.4. The structure shall be inspected visually when the load is removed after each loading test has been completed. If cracks or tears have occurred during loading, the overload test specified in point 1.4 below shall be carried out before proceeding to the next loading in the sequence given in point 3.1.1.1 of Part 2.

82/953 /EEC

'1.2. Longitudinal loading (see Figure 2 of Part 4)

Load application shall be horizontal and parallel to the vertical median plane of the tractor.

For tractors with at least 50 % of their mass, as defined in point 1.3 of Part 2, on the rear wheels, the longitudinal rear load and the lateral load shall be applied on different sides of the median longitudinal plane of the protection structure. For tractors with at least 50 % of their mass on the front wheels, the longitudinal front load shall be on the same side of the median longitudinal plane of the protection structure as the lateral load.

It shall be applied to the uppermost transverse structural member of the protection structure (i.e. the part which would be likely to strike the ground first in an overturning incident).

The point of application of the load shall be located one-sixth of the width of the top of the protection structure inwards from the outside corner. The width of the protection structure shall be taken as the distance between two lines parallel to the vertical median plane of the tractor touching the outside extremities of the protection structure in the horizontal plane touching the top of the uppermost transverse structural members.

The length of the beam shall be not less than one-third of the width of the protection structure (as previously described) and not more than 49 mm greater than this minimum.

The longitudinal loading is applied from the rear or front, as defined in point 3.1.1.1 of Part 2.

The test shall be stopped whenever:

(a) the strain energy absorbed by the protection structure is equal to or greater than the required energy input E_{il1} (where $E_{il1} = 1 \cdot 4\ m_t$);

(b) the structure infringes the zone of clearance or leaves the zone of clearance unprotected.'

79/622 /EEC

1.3. Loading from the side (see Figure 1 of Part 4)

The loading shall be applied horizontally at 90° to the vertical median plane of the tractor. It shall be applied to the upper extremity of the protection structure at a point 300 mm forward of the seat reference point with the seat in its rearmost position as defined in point 2.3.1 below. If the protection structure has any projection on the side which would be

79/622 /EEC

certain to contact the ground first during a sideways overturn, the loading shall be applied at that point.

The beam shall be as long as practicable, but no more than 700 mm in length.

Stop the test whenever:

(a) the strain energy absorbed by the protection structure is equal to or greater than the required energy input E_{is} (where $E_{is} = 1{\cdot}75\ m_t$); or

(b) the structure infringes the zone of clearance or leaves the zone of clearance unprotected.

1.4. Overload test (see Figs. 4a, 4b and 4c in Part 4) 88/413 /EEC

1.4.1. The overload test must be carried out if the force decreases by more than 3 % during the last 5 % of the deflection achieved, where the energy required is absorbed by the structure (see Fig. 4b)'.

1.4.2. The overload test involves the gradual increase of the horizontal load by increments of 5 % of the initial energy requirement up to a maximum of 20 % of energy added (see figure 4c). 82/953 /EEC

1.4.2.1. The overload test is satisfactory if, after each increase by 5, 10 or 15 % in the energy required, the force decreases by less than 3 % for a 5 % increment and remains more than $0{\cdot}8\ F_{max}$.

1.4.2.2. The overload test is satisfactory if, after the structure has absorbed 20 % of the added energy, the force exceeds $0{\cdot}8\ F_{max}$.

1.4.2.3. Additional cracks or tears and/or entry into or lack of protection of the zone of clearance due to elastic deformation are permitted during the overload test. However, after the removal of the load, the structure shall not enter the zone of clearance, which shall be completely protected.'

1.5. Crushing at the rear

The beam shall be positioned over the rear uppermost structural members and the resultant of crushing forces shall be located in the vertical longitudinal reference plane. A force $F_r = 20\ m_t$ shall be applied. 79/622 /EEC

Where the rear part of the protection structure roof will not sustain the full crushing force, the force shall be applied until the roof is deflected to coincide with the plane joining the upper part of the protection structure with that part of the rear of the tractor capable of supporting the vehicle's mass when overturned. The force shall then be removed, and the tractor or loading force repositioned so that the beam is over that point of the protection structure which would then support the tractor when completely overturned. The force F_r shall then be applied.

The force F_r shall be applied for a minimum of five seconds following the cessation of the visually detectable deflection.

Stop the test if the structure infringes the zone of clearance or leaves the zone of clearance unprotected.

1.6. Crushing at the front

The beam shall be positioned across the front uppermost structural members and the resultant of crushing forces shall be located in the vertical longitudinal reference plane. A force $F_f = 20\ m_t$ shall be applied.

Where the front part of the protection structure roof will not sustain the full crushing force, the force shall be applied until the roof is deflected to coincide with the plane joining the upper part of the protection structure with that part of the front of the tractor capable of supporting the vehicle's mass when overturned. The force shall then be removed, and the tractor or loading force repositioned so that the beam is over that point of the protection structure which would then support the tractor when completely overturned. The force F_f shall then be applied.

The force F_f shall be applied for a minimum of five seconds following the cessation of the visually detectable deflection.

Stop the test if the structure infriges the zone of clearance or leaves the zone of clearance unprotected.

1.7. **Second longitudinal loading**

Load application shall be horizontal parallel to the vertical median plane of the tractor.

The second longitudinal loading is applied from the rear or front as defined in point 3.1.1.1 of Part 2.

It shall be applied in the opposite direction to and at the corner furthest from the longitudinal loading in point 1.2.

It shall be applied to the uppermost transverse structural member of the protection structure (i.e. that part which would be likely to strike the ground in an overturning incident).

The point of application of the load shall be located one sixth of the width of the top of the protection structure inwards from the outside corner. The width of the protection structure shall be taken as the distance between two lines parallel to the vertical median plane of the tractor touching the outside extremities of the protection structure in the horizontal plane touching the top of the uppermost transverse structural members.

The length of the beam shall be not less than one third of the width of the protection structure (as previously described) and not more than 49 mm more than this minimum.

Stop the test whenever:

(a) the strain energy absorbed by the structure is equal to or greater than the required energy input E_{il_2} (where $E_{il_2} = 0{\cdot}35\ m_t$); or

(b) the structure infringes the zone of clearance or leaves the zone of clearance unprotected.

2. ZONE OF CLEARANCE

2.1. The zone of clearance is illustrated in figure 6 of Part 4 and is defined in relation to a vertical reference plane generally longitudinal to the tractor and passing through a seat reference point, described in point 2.3, and the centre of the steering wheel. The reference plane shall be assumed to move horizontally with the seat and steering wheel during application of the load but to remain perpendicular to the floor of the tractor or of the protection structure if this is resiliently mounted.

Where the steering wheel is adjustable, its position should be that for normal seated driving.

2.2. The boundaries of the zone shall be taken as:

2.2.1. vertical planes 250 mm on either side of the reference plane extending upwards from the seat reference point for 300 mm;

2.2.2. parallel planes extending from the upper edge of plane 2.2.1 to a maximum height of 900 mm above the seat reference point and inclined in such a way that the upper edge of the plane on the side from which the side loading is applied is at least 100 mm from the reference plane;

2.2.3. a horizontal plane 900 mm above the seat reference point;

2.2.4. an inclined plane perpendicular to the reference plane and including a point 900 mm directly above the seat reference point and the rearmost point of the seat backrest;

2.2.5. a surface, if necessary curved, with a series of straight lines perpendicular to the reference plane extending downwards from the rearmost point of the seat in contact with the seat backrest throughout its length;

2.2.6. a curvilinear surface, perpendicular to the reference plane, with a radius of 120 mm tangential to planes 2.2.3 and 2.2.4; 79/622/EEC

2.2.7. a curvilinear surface, perpendicular to the reference plane, having a radius of 900 mm extending forward for 400 mm from and tangential to plane 2.2.3 at a point 150 mm forward of the seat reference point;

2.2.8. an inclined plane perpendicular to the reference plane, joining surface 2.2.7 at its forward edge and passing 40 mm from the steering wheel. In the case of a high steering wheel position this plane is replaced by a tangent plane to the surface 2.2.7;

2.2.9. a vertical plane, perpendicular to the reference plane, 40 mm forward of the steering wheel;

2.2.10. a horizontal plane through the seat reference point.

2.3. **Seat location and seat reference point**

2.3.1. For the purpose of defining the zone of clearance in point 2.1 the seat shall be at the rearmost point of any horizontal adjustment range. It shall be set at the highest point of the vertical adjustment range where this is independent of adjustment of its horizontal position.

The reference point shall be established using the apparatus illustrated in figures 7 and 8 of Part 4 to simulate loading by a human occupant. The apparatus shall consist of a seat pan board and backrest boards. The lower backrest board shall be jointed in the region of the ischium humps (A) and loin (B), the joint (B) being adjustable in height.

2.3.2. The reference point is defined as the point in the median longitudinal plane of the seat where the tangential plane of the lower backrest and a horizontal plane intersect. This horizontal plane cuts the lower surface of the seat pan board 150 mm in front of the abovementioned tangent.

2.3.3. Where a seat incorporates a free sprung suspension travel, whether or not this can be adjusted for the weight of the driver, the seat shall be set at the mid-point of this travel.

The apparatus shall be positioned on the seat. It shall then be loaded with a force of 550 N at a point 50 mm in front of joint (A), and the two parts of the backrest board shall be lightly pressed tangentially against the backrest.

2.3.4. If it is not possible to determine definite tangents to each area of the backrest (below and above lumbar region) the following should be done:

2.3.4.1. where no definite tangent to the lower area is possible, the lower part of the backrest board is pressed against the backrest vertically;

2.3.4.2. where no definite tangent to the upper area is possible, the joint (B) is fixed at a height which is 230 mm above the seat reference point, if the lower part of the backrest board is vertical. Then the two parts of the backrest board are lightly pressed against the backrest.

3. CONTROLS AND MEASUREMENTS TO BE MADE

3.1 Zone of clearance 82/953/EEC

During each test the protection structure shall be examined to see whether any part of the protection structure has entered a zone of clearance round the driving seat as defined in point 2.1. In addition, the protection structure shall be examined to determine whether any part of the zone of clearance is outside the protection of the protection structure. For this purpose, it shall be considered to be outside the protection of the protection structure if any part of it would have come into contact with flat ground if the tractor had overturned towards the direction from which the loading was applied. For this purpose, the tyre and track setting shall be assumed to be the smallest specified by the manufacturer.

3.2 Final permanent deflection

After the tests, the final permanent deflection of the protection structure shall be recorded. For this purpose, before the start of the test, the position of the main protection structure members in relation to the seat reference point shall be recorded.

PART 4

'FIGURES

Figure 1 : Point of application of lateral load
Figure 2 : Point of application of longitudinal rear load
Figure 3 : Example of an arrangement for crushing test
Figure 4a : Force/deflection curve — overload test not necessary
Figure 4b : Force/deflection curve — overload test necessary
Figure 4c : Force/deflection curve — overload test to be continued
Figure 5 : Illustration of the terms permanent, elastic and total deflection
Figure 6a : Side view of zone of clearance
Figure 6b : Front/rear view of zone of clearance
Figure 6c : Isometric view
Figure 7 : Apparatus for determination of seat reference point
Figure 8 : Method of determining seat reference point'

82/953 /EEC

79/622 /EEC

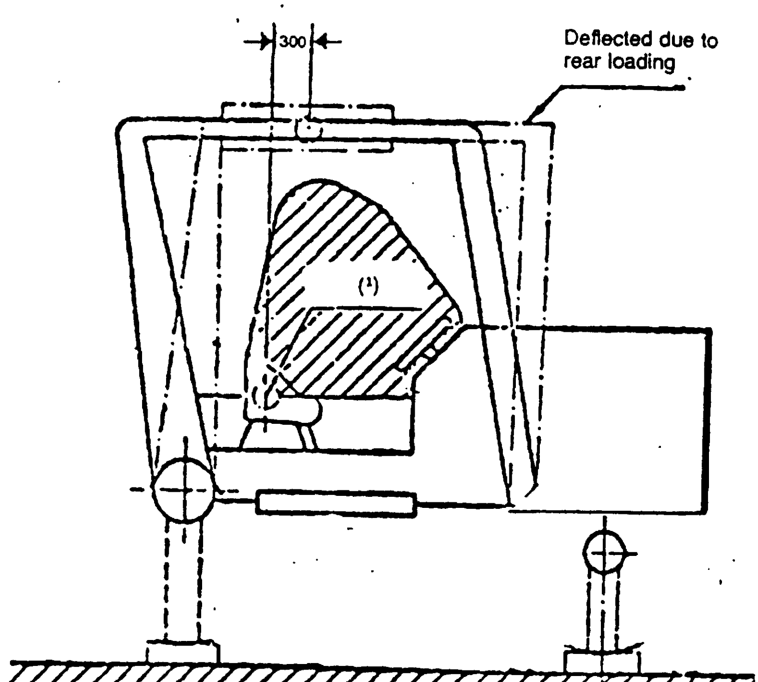


Figure 1
Point of application of lateral loading

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(¹) Seat reference point.

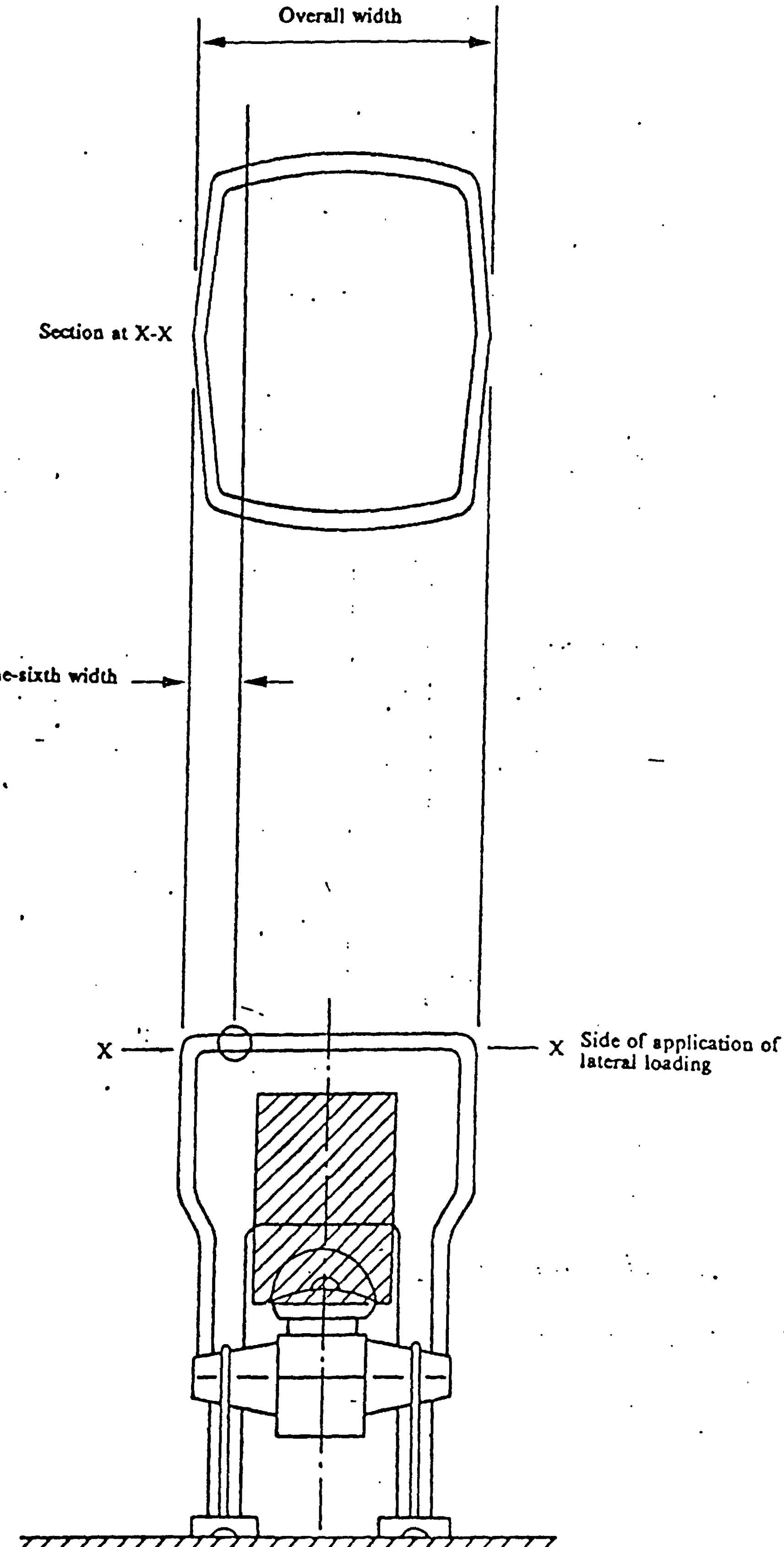

Figure 2

Point of application of rear longitudinal loading (when at least 50 % of the tractor mass rests on the rear wheels)

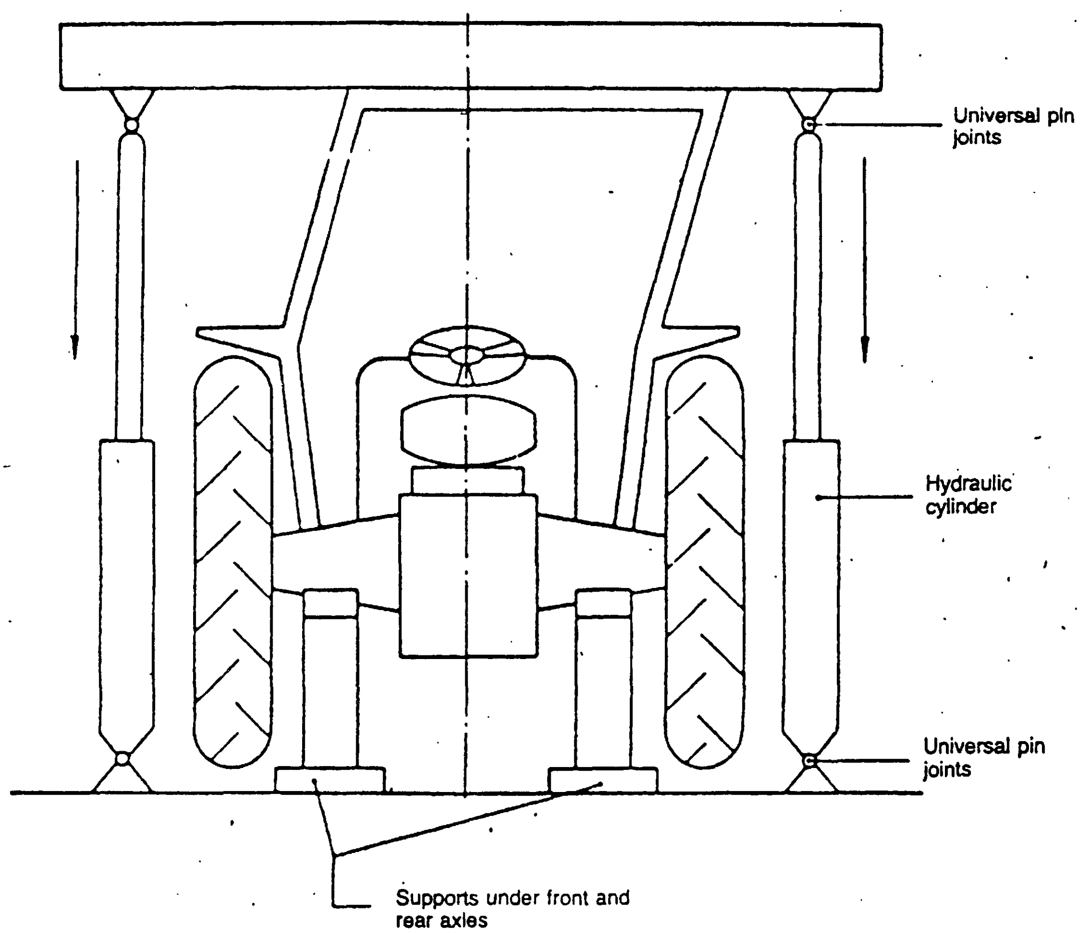

Figure 3

Example of an arrangement for crushing test

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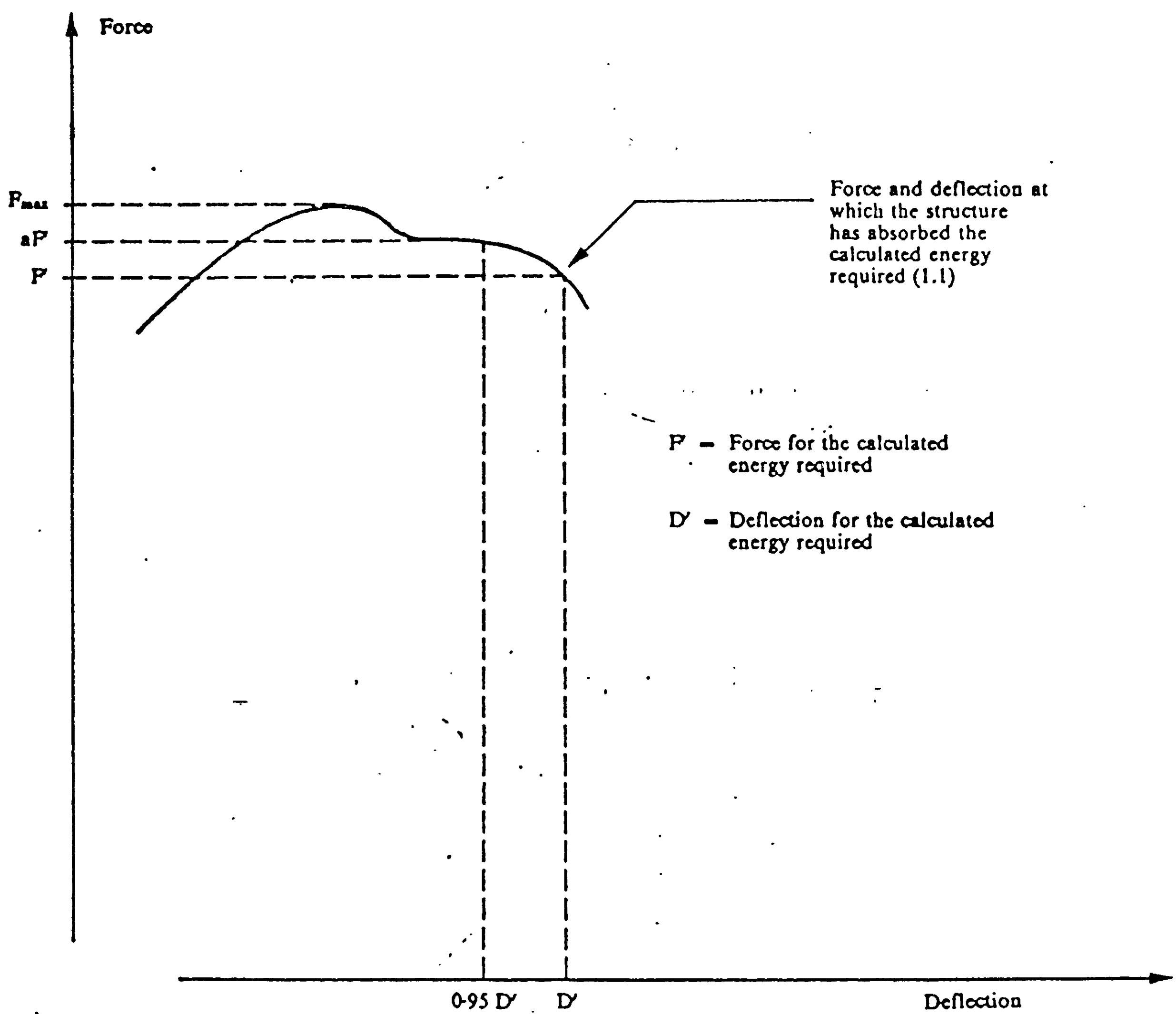

1. Point of reference aF' = 0·95 D'.

1.1. The overload test is not necessary since aF' < 1·03 F'.

Figure 4a

Force/deflection curve — overload test not necessary

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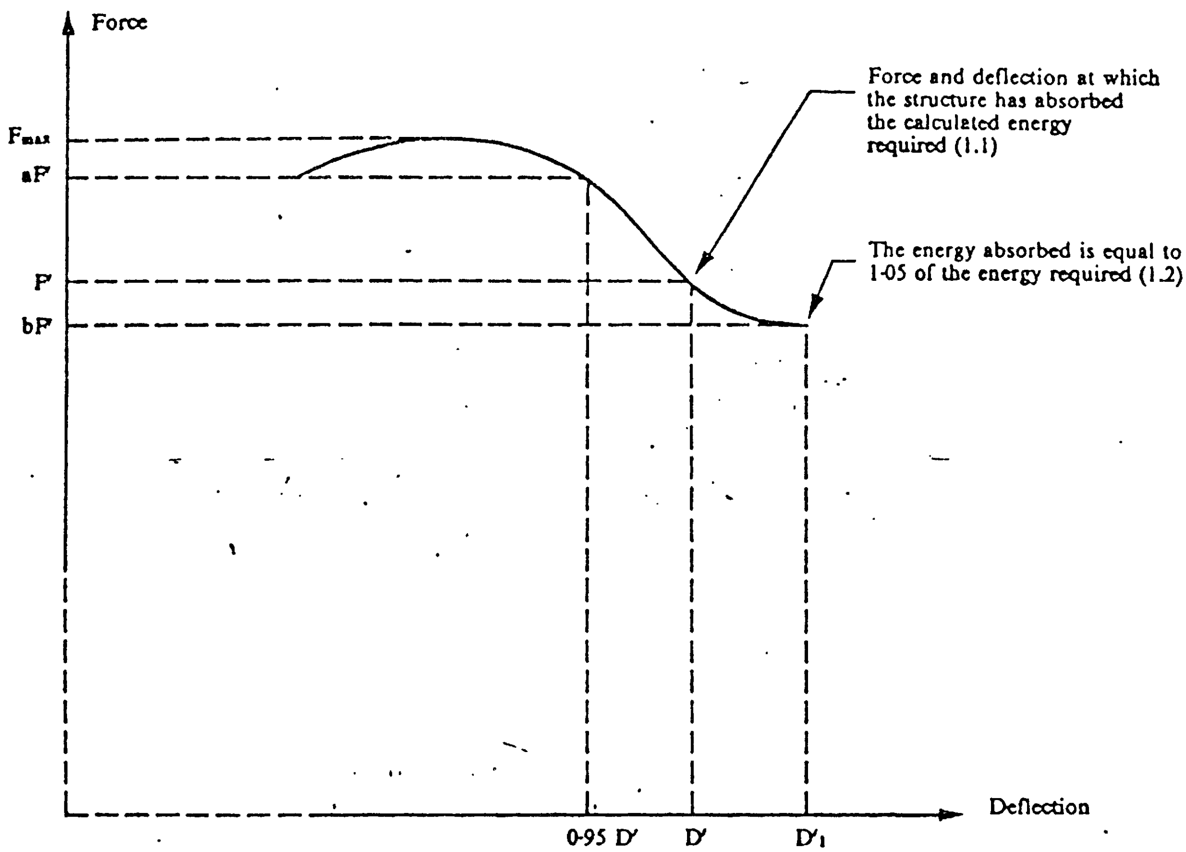


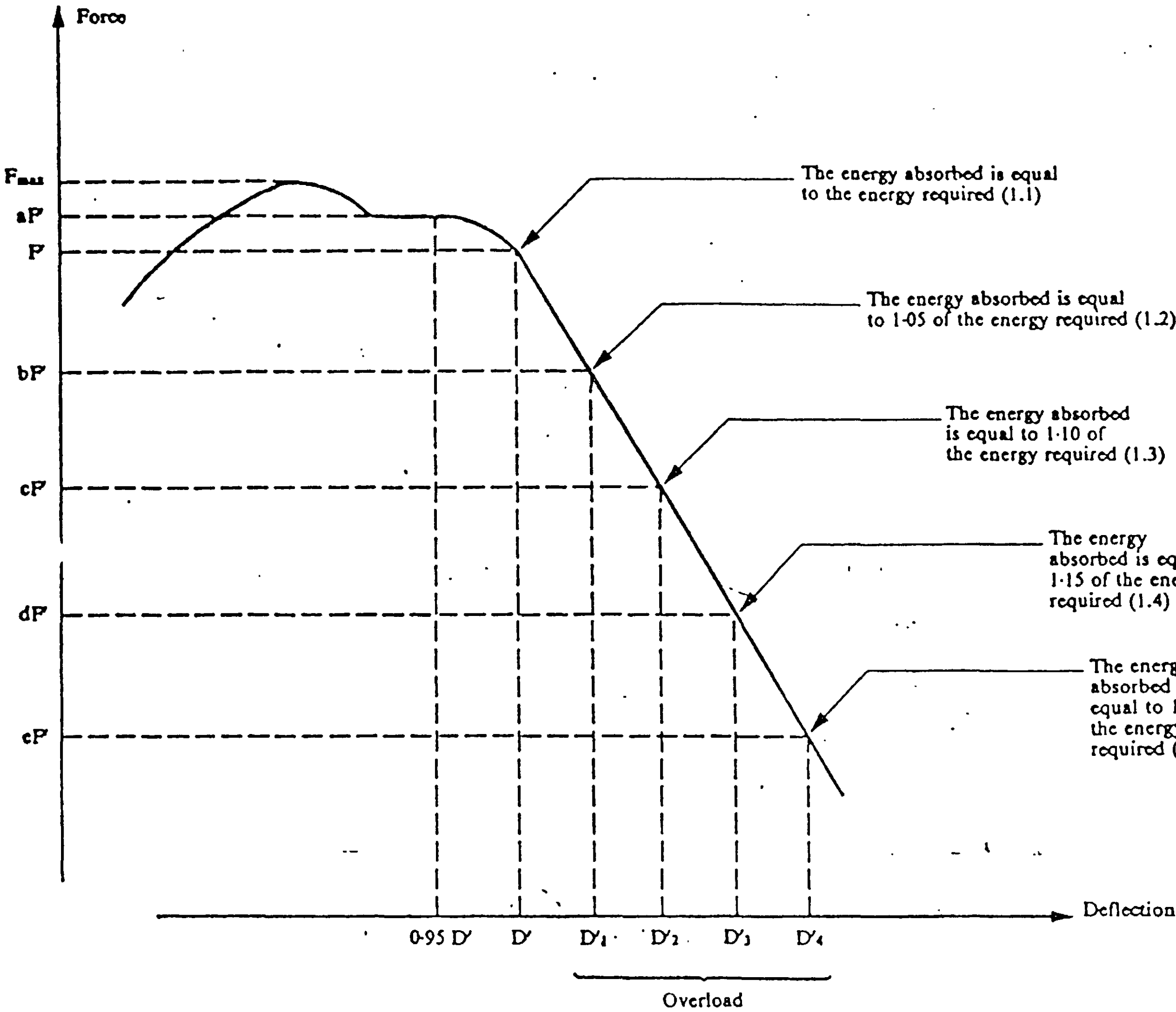
1. Reference point aF' = 0·95 D'.

1.1. The overload test is necessary since aF' > 1·03 F'.

1.2. The overload test is satisfactory since bF' > 0·97 F' and bF' > 0·8 F_{max}.

Figure 4b

Force/deflection curve — overload test necessary



1. Reference point aF' = 0·95 D'.

1.1. The overload test is necessary since aF' > 1·03 F'.

1.2. Since bF' < 0·97 aF' the overload test must be continued.

1.3. Since cF' < 0·97 bF' the overload test must be continued.

1.4. Since dF' < 0·97 cF' the overload test must be continued.

1.5. The overload test is satisfactory since eF' > 0·8 F_{max}.

NB: If at any time F drops below 0·8 F_{max}, the structure is rejected.

Figure 4c

Force/deflection curve — overload test to be continued

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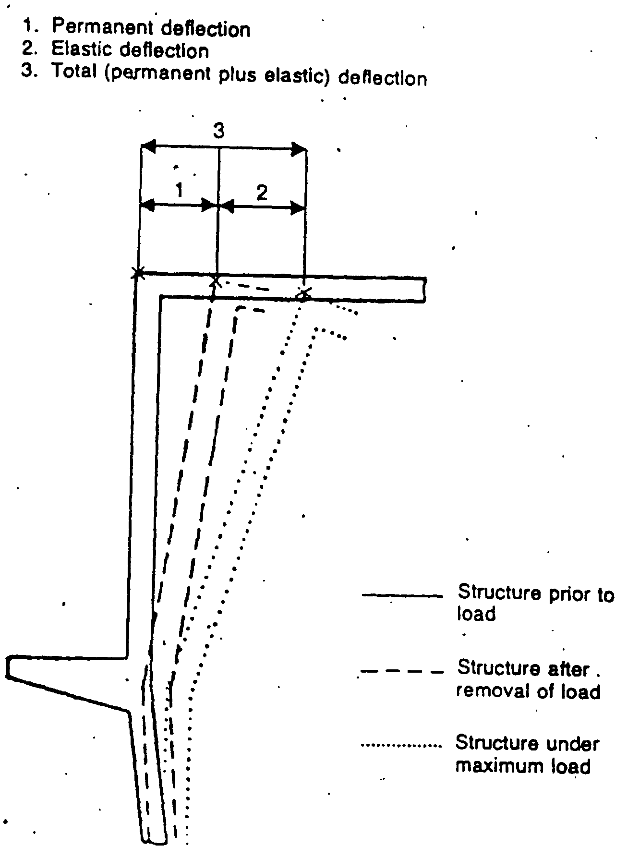


Figure 5

Illustration of the terms permanent, elastic and total deflection

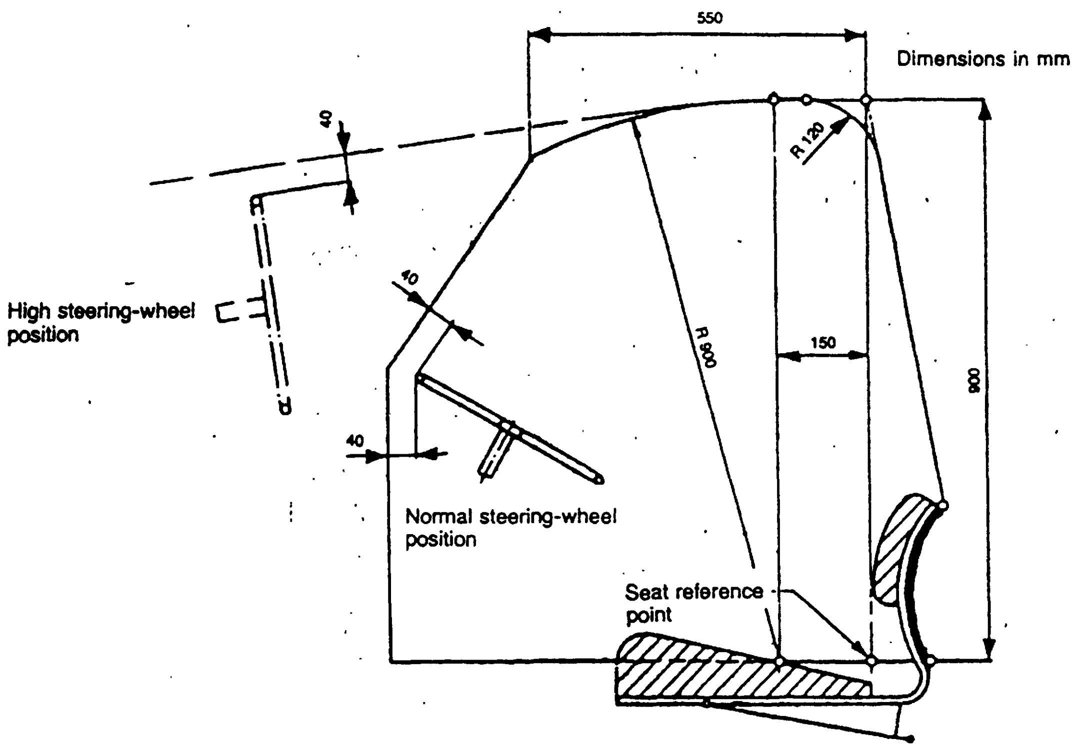


Figure 6a

Side view of zone of clearancel

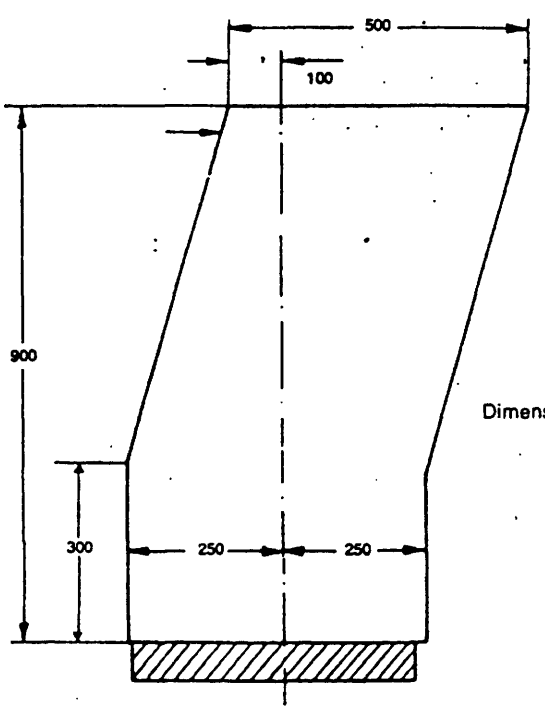


Figure 6b

Front/rear view of zone of clearance

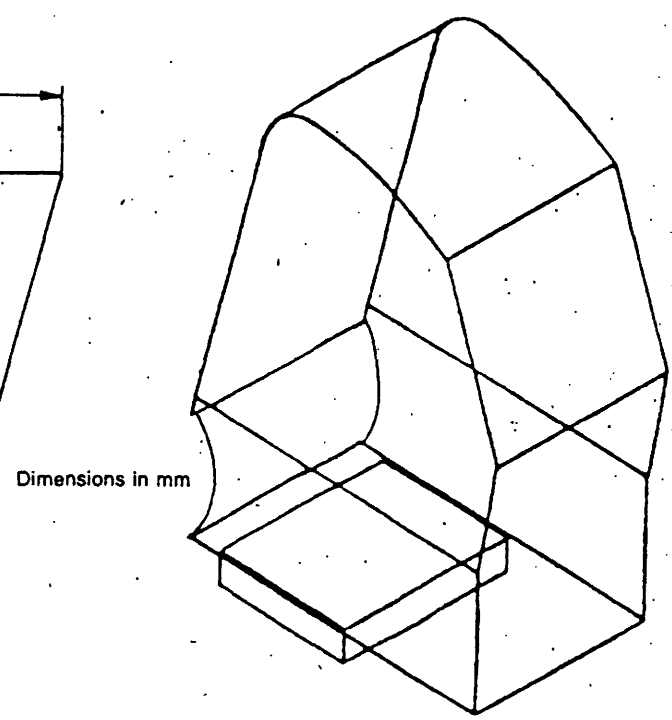


Figure 6c

Isometric view

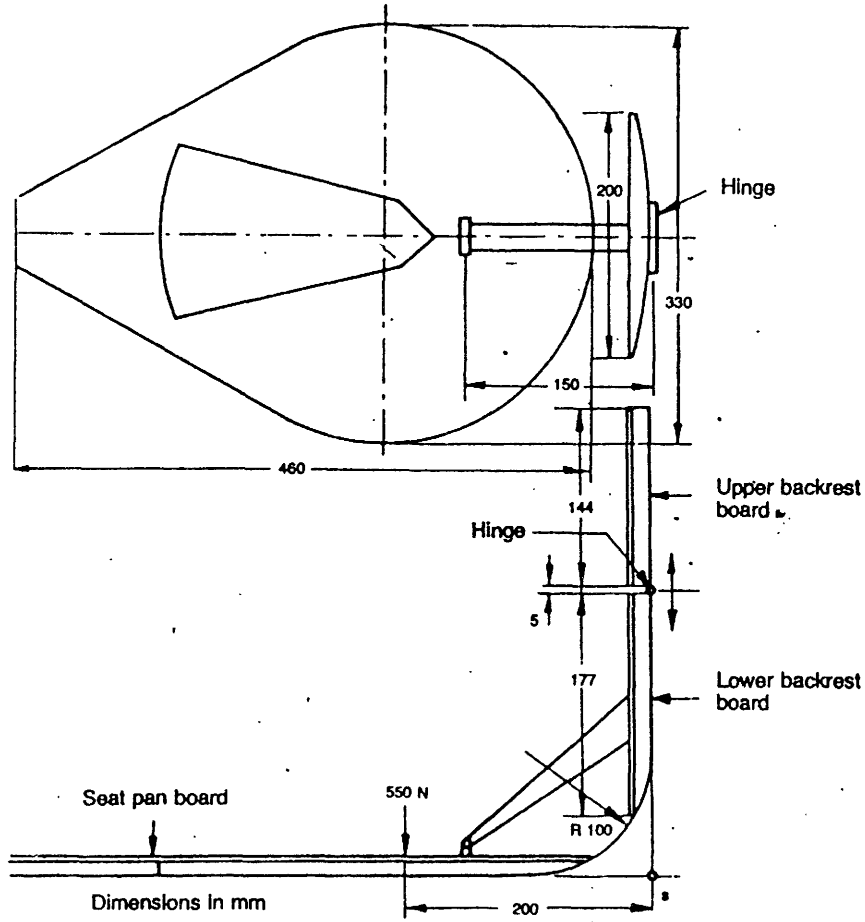


Figure 7

Apparatus for determination of seat reference point

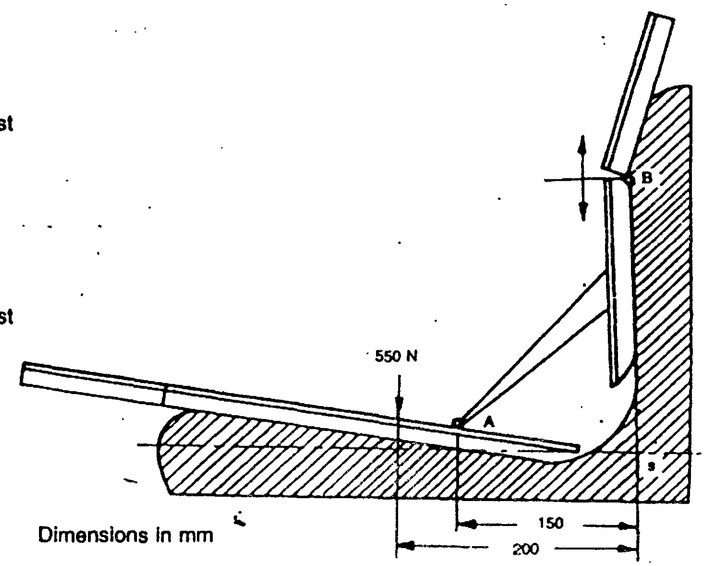


Figure 8

Method of determining seat reference point

PART 5

MODEL

REPORT RELATING TO THE EEC COMPONENT TYPE-APPROVAL TEST OF A PROTECTION STRUCTURE (SAFETY FRAME OR CAB) WITH REGARD TO ITS STRENGTH AS WELL AS TO THE STRENGTH OF ITS ATTACHMENT TO THE TRACTOR

(Static testing)

Protection structure	
Make	
Type	
Tractor make	
Tractor type	

Identification of test station

EEC component type-approval No ....

1. Trade mark or name of protection structure ....

....

2. Name and address of manufacturer of protection structure and/or tractor ....

....

3. If applicable, name and address of protection structure and/or tractor manufacturer's authorized representative ....

....

4. Specifications of tractor on which the tests are carried out

4.1. Trade mark or name ....

4.2. Type and commercial description ....

4.3. Serial number ....

4.4. Mass of unballasted tractor with protection structure fitted, without driver .... kg

Tyre sizes: front ....

rear ....

5. Extension(s) of EEC component type-approval for other tractor types [1]

5.1. Trade mark or name ....

[1] These details to be repeated for each extension.

5.2. Type and commercial description ....

5.3. Mass of unballasted tractor, with protection structure fitted, without driver .... kg

Tyre sizes: front ....

rear ....

6. Specifications of protection structure

6.1. General arrangement drawing of both the protection structure and its attachment to the tractor

6.2. Photographs from side and rear showing mounting details

6.3. Brief description of protection structure including type of construction, details of mounting on the tractor, details of cladding, means of access and escape, details of interior padding, features to prevent continuous rolling and details of heating and ventilation

6.4. Dimensions

6.4.1. Height of roof members above the seat reference point .... mm

6.4.2. Height of roof members above the tractor foot platform .... mm

6.4.3. Interior width of the protection structure at 900 mm above the seat reference point .... mm

6.4.4. Interior width of the protection structure at a point above the seat at the height of the centre of the steering wheel .... mm

6.4.5. Distance from the centre of the steering wheel to the right-hand side of the protection structure .... mm

6.4.6. Distance from the centre of the steering wheel to the left-hand side of the protection structure .... mm

6.4.7. Minimum distance from the steering wheel rim to the protection structure .... mm

6.4.8. Width of the doorways:

at the top .... mm

in the middle .... mm

at the bottom .... mm

6.4.9. Height of the doorways:

above foot platform .... mm

above highest mounting step .... mm

above lowest mounting step .... mm

6.4.10. Overall height of the tractor with the protection structure fitted .... mm

6.4.11 Overall width of the protection structure (excluding the wings) · mm

6.4.12. Horizontal distance to the rear of the protection structure from the seat reference point at a height of 900 mm .... mm

6.5. Details and quality of materials used, standards used ....

....

Main frame .... (material and dimensions)

Mountings .... (material and dimensions)

Cladding .... (material and dimensions)

Roof .... (material and dimensions)

Interior padding .... (material and dimensions)

Assembly and mounting bolts .... (grade and dimensions)

Type of windscreen and glazing and details of marking ....

....

7. Test results

7.1. Loading and crushing tests

Loading tests were made to the left/right hand (1) rear and to the right/left hand (1) front and right/left hand side (1)

7.2. The reference mass used for calculating energy input and crushing forces was .... kg

7.3. The requirements concerning cracks or tears and the protection of the zone of clearance were fulfilled

7.4. Loading energies:

rear/front (1) .... kJ

side .... kJ

Crushing force .... kN

A second longitudinal loading test was made to the right/left hand front/rear (1) .... kJ

7.5. Final permanent deflection measured after the tests:

rear: forwards/backwards (1)

left hand .... mm

right hand .... mm

front: forwards/backwards (1)

left hand .... mm

right hand .... mm

side sideways:

front .... mm

rear .... mm

(1) Delete where inapplicable.

top downwards/upwards (1) :

front .... mm

rear .... mm

79/622 /EEC

8. Report number ....

9. Report date ....

10. Signature ....

---

(1) Delete where inapplicable.

PART 6

MARKS

79/622 /EEC

The EEC component type-approval mark shall consist of a rectangle surrounding the lowercase letter 'e' followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval:

- 1 for Germany,
- 2 for France,
- 3 for Italy,
- 4 for the Netherlands,
- 6 for Belgium,
- 9 for Spain
- 11 for the United Kingdom,
- 13 for Luxembourg,
- 18 for Denmark,
- EL for Greece
- IRL for Ireland.
- 21 for Portugal

87/354/EEC

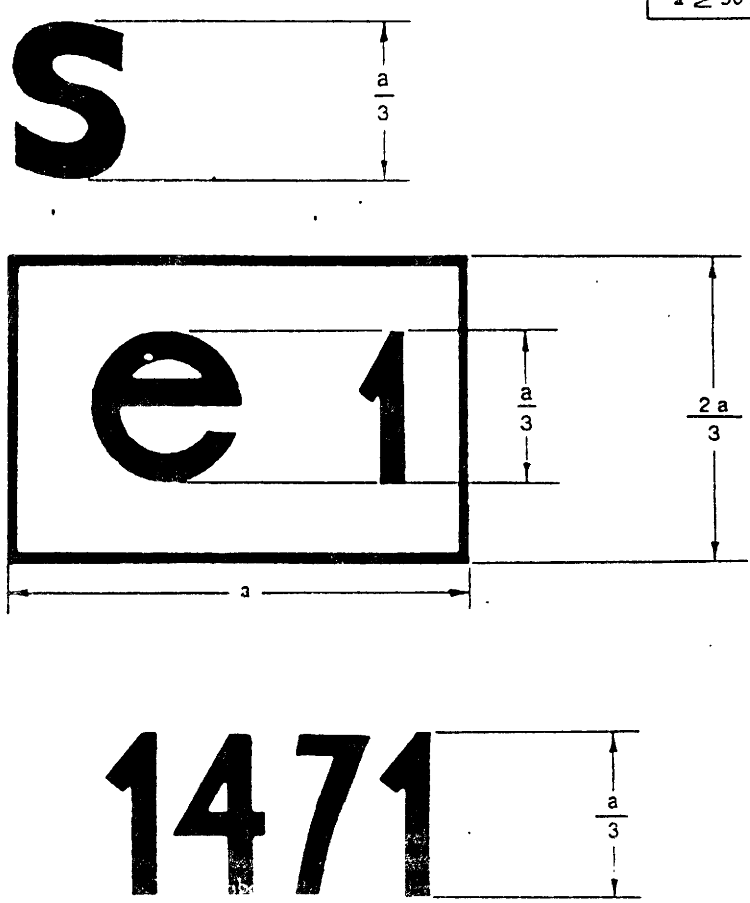
OJ 302/85

It must also include in the vicinity of the rectangle the EEC component type-approval number which corresponds to the number of the EEC component type-approval certificate issued with regard to the strength of the type of protection structure and its attachment to the tractor.

Example of an EEC component type-approval mark

The EEC component type-approval mark shall be supplemented by an additional symbol 'S'

a ≥ 30 mm



The protection structure bearing the EEC component type-approval mark shown above is a structure for which EEC component type-approval was granted in Germany (e 1) under the number 1471.

PART 7

MODEL

EEC COMPONENT TYPE-APPROVAL CERTIFICATE

Name of competent authority

Notification concerning the granting, refusal, withdrawal or extension of EEC component type-approval with regard to the strength of a protection structure (safety cab or frame) and to the strength of its attachment to the tractor

(Static testing)

EEC component type-approval No ....

.... extension [1]

1. Trade name or mark of protection structure ....

   ....

2. Name and address of manufacturer of protection structure ....

   ....

3. If applicable, name and address of authorized representative of manufacturer of protection structure ....

4. Trade mark or name, type and commercial description of tractor for which protection structure is intended ....

   ....

5. Extension of EEC component type-approval for the following tractor type(s) ....

   ....

5.1. The mass of the unballasted tractor, as defined in point 1.3 of Part 2, exceeds/does not exceed [2] the reference mass used for the test by more than 5 %.

5.2. The method of attachment and points of attachment are/are not [2] identical.

5.3. All the components likely to serve as supports for the protection structure are/are not [2] identical.

5.4. The requirements of the fourth indent of point 3.4 of Part 1 are/are not [2] fulfilled

6. Submitted for EEC component type-approval on ....

7. Test station ....

   ....

8. Date and number of the report of the test station ....

9. Date of granting/refusal/withdrawal of EEC component type-approval [2] ....

10. Date of granting/refusal/withdrawal of the extension of EEC component type-approval [2] ....

    ....

11. Place ....

12. Date ....

13. The following documents, bearing the component type-approval number shown above, are annexed to this certificate (e.g. report of the test station) ....

14. Remarks, if any ....

15. Signature ....

---

[1] If applicable, state whether this is the first, second, etc. extension of the original EEC component type-approval.
[2] Delete where inapplicable.

PART 8

CONDITIONS FOR EEC TYPE-APPROVAL

1. The application for EEC type-approval of a tractor, with regard to the strength of a protection structure and the strength of its attachment to the tractor, shall be submitted by the tractor manufacturer or by his authorized representative.

2. A tractor representative of the tractor type to be approved, on which a protection structure and its attachment, duly approved, are mounted, shall be submitted to the technical services responsible for conducting the type-approval tests.

3. The technical service responsible for conducting the type-approval tests shall check whether the approved type of protection structure is intended to be mounted on the type of tractor for which the type-approval is requested. In particular, it shall ascertain that the attachment of the protection structure corresponds to that which was tested when the EEC component type-approval was granted.

4. The holder of the EEC type-approval may ask for its extension for other types of protection structures.

5. The competent authorities shall grant such extension on the following conditions:

5.1. the new type of protection structure and its tractor attachment have received EEC component type-approval;

5.2. it is designed to be mounted on the type of tractor for which the extension of the EEC type-approval is requested;

5.3. the attachment of the protection structure to the tractor corresponds to that which was tested when EEC component type-approval was granted.

6. A certificate, of which a model is shown in Part 9, shall be annexed to the EEC type-approval certificate for each type-approval or type-approval extension which has been granted or refused.

7. If the application for EEC type-approval for a type of tractor is introduced at the same time as the request for EEC component type-approval for a type of protection structure intended to be mounted on the type of tractor for which EEC type-approval is requested, the checks laid down in 2 and 3 will not be made

PART 9

MODEL

79/622 /EEC

Name of competent authority

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE STRENGTH OF PROTECTION STRUCTURES (SAFETY CAB OR FRAME) AND THE STRENGTH OF THEIR ATTACHMENT TO THE TRACTOR

(Static testing)

(Article 4 (2)

EEC type-approval No ....

.... extension [1]

1. Trade name or mark of tractor ....

2. Tractor type ....

3. Name and address of tractor manufacturer ....

....

4. If applicable, name and address of manufacturer's authorized representative ....

....

5. Trade name or mark of protection structure ....

....

6. Extension of EEC type-approval for the following type(s) of protection structure ....

7. Tractor submitted for EEC type-approval on ....

8. Technical service responsible for EEC type-approval conformity control ....

....

9. Date of report issued by that service ....

10. Number of report issued by that service ....

11. EEC type-approval with regard to the strength of the protection structures and the strength of their attachment to the tractor has been granted/refused [2]

12. The extension of the EEC type-approval with regard to the strength of the protection structures and the strength of their attachment to the tractor has been granted/refused [2]

13. Place ....

14. Date ....

15. Signature ....

---

[1] If applicable, state whether this is the first, second, etc. extension of the original EEC type-approval.
[2] Delete where inapplicable.

ANNEX XIX

OPERATING SPACE

PART – 1

80/720 /EEC

I. **Operating space**

1.1. 'Operating space' means the minimum volume of space between any fixed parts of the structure which is available to the driver of the tractor to enable him to operate the tractor from his seat in any way required with complete safety.

'Seat reference point' means the reference point determined by the method described in Appendix 1.

'Reference plane' means the plane parallel to the median longitudinal plane of the tractor passing through the seat reference point.

1.2. The width of the operating space must be at least 900 mm, from 400 to 900 mm above the reference point and over a length of 450 mm forward of this point (see Figures 2 and 3).

1.3. Vehicle parts and accessories must not hamper the driver when driving the tractor.

1.4. For all positions of the steering column and the steering wheel, with the exception of those intended solely for entry and exit, the clearance between the base of the steering wheel and the fixed parts of the tractor must be at least 50 mm; in all other directions this clearance must be at least 80 mm from the rim of the steering wheel, as measured from outside the area occupied by the steering wheel (see Figure 2). 88/414 /EEC

80/720 /EEC

1.5. The rear wall of the cab from 300 to 900 mm above the seat reference point must be a minimum of 150 mm behind a vertical plane which is perpendicular to the reference plane and passes through the reference point (see Figures 2 and 3).

This wall must have a width of at least 300 mm on either side of the seat reference plane (see Figure 3).

1.6. The manual controls must be located in relation to one another and to the other parts of the tractor so that no danger of injury to the operator's hands arises from their operation.

Where the force required to operate a control exceeds 150 N, a clearance of 50 mm will be considered adequate and where the force is between 80 N and 150 N, a clearance of 25 mm will suffice. Any clearance will be accepted in relation to controls where the operating force required is less than 80 N (see Figure 3).

Alternative locations for the controls which achieve equally satisfactory safety standards are acceptable.

1.7. No point on the rigid roof must be less than 1 050 mm from the seat reference point in a section situated forward of a vertical plane passing through the reference point and perpendicular to the reference plane (see Figure 2). 88/414/EEC

The padding may extend downwards to 1 000 mm above the seat reference point. 88/414 /EEC

1.8. The radius of curvature of the surface between the rear panel of the cab and the roof of the cab may extend up to a maximum of 150 mm.

80/720 /EEC

II. **Access to the driving position (means of entry and exit)**

II.1. It must be possible to use the means of entry and exit without danger. Wheel hubs, hub caps or wheel rims are not acceptable as steps or rungs.

II.2. The points of access to the driving position and to the passenger seat must be free of any parts liable to cause injury. Where an obstruction such as a clutch pedal is present, a step or footrest must be provided to ensure safe access to the driving position.

II.3. Steps, integral foot recesses and rungs must have the following dimensions:

depth clearance: 150 mm minimum,

width clearance: 250 mm minimum,

WIDTH CLEARANCE / 250 mm minimum.

(Values lower than this minimum width are authorized only where justified as being necessary on technical grounds. Where this is the case, the aim must be to achieve the greatest possible width clearance. It must not, however, be less than 150 mm.) 80/720, /EEC

height clearance: 120 mm minimum,

distance between
surface of two steps: 300 mm maximum (see Figure 4).

II.4. The upper step or rung must be easily identifiable and accessible for a person leaving the vehicle. The vertical distance between successive steps or rungs must as far as possible be equal.

II.5. Appropriate handholds must be provided for all the means of entry and exit.

II.6 The lowest foothold must not be more than 550 mm above the ground when the tractor is fitted with the largest tyre size recommended by the manufacturer (see Figure 4). Steps or rungs must be designed and constructed in such a way that feet will not slip on them

III. **Doors, windows and emergency exits**

III.1. The devices operating the doors and windows must be designed and installed in such a way that they neither constitute a danger to the driver nor impede him while driving.

III.2. The opening angle of the door must permit entry and exit without danger.

III.3. Ventilation windows, if any, must be easily adjustable. 88/414/EEC

III.4. Cabs normally have a door on each side. 80/720/EEC

III.5. Two-door cabs must have one extra exit constituting an emergency exit.

Single-door cabs must have two extra exits constituting emergency exits.

Each of the three exits must be on a different cab wall (the term 'wall' may include the roof). Windscreens and side, rear and roof windows may be regarded as emergency exits if provision is made to open or to move them quickly from inside the cab. 88/414/EEC

The surrounds of emergency exits must present no danger on exit.

Emergency exits must have the minimum dimensions required to circumscribe an ellipse with a minor axis of 440 mm and a major axis of 640 mm. 80/720/EEC

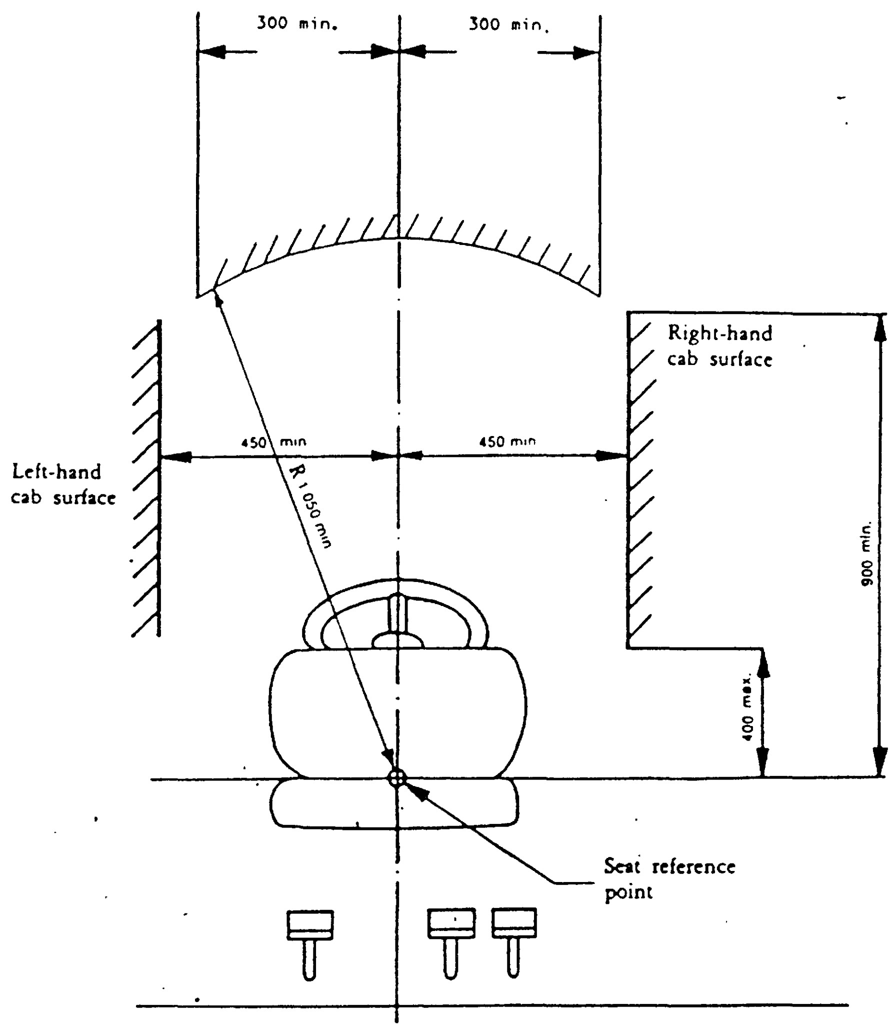


Figure 1

(Dimensions in millimetres)

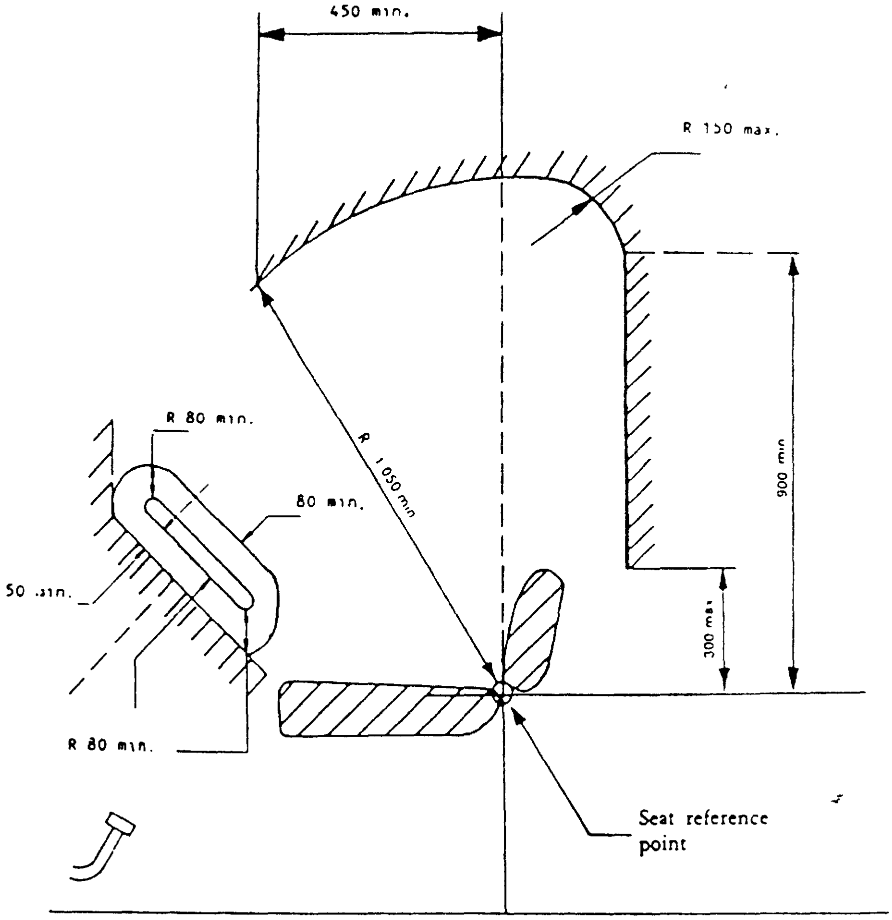


Figure 2
(Dimensions in millimetres)

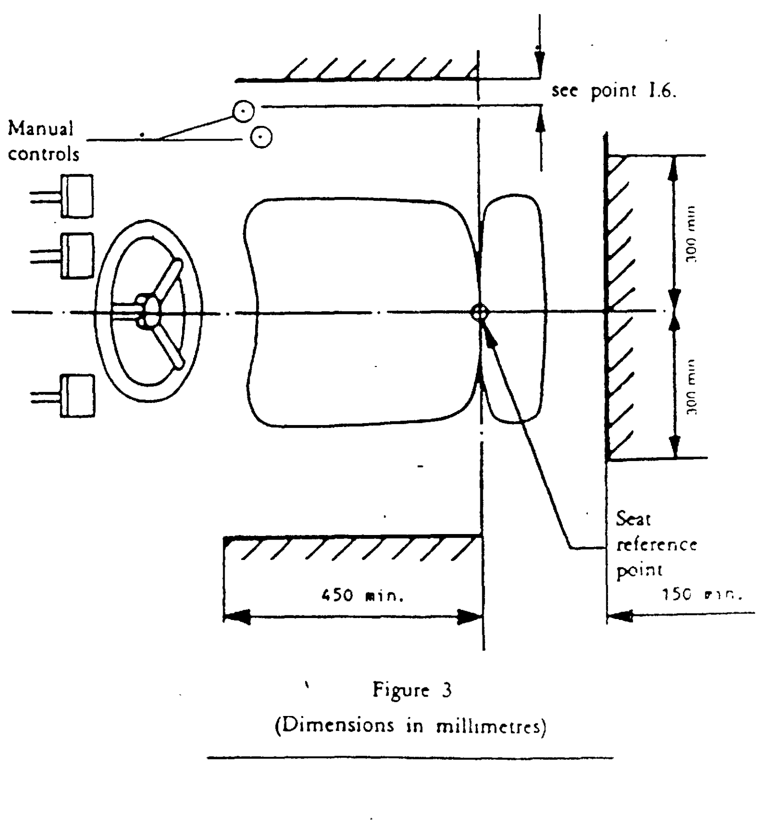


Figure 3
(Dimensions in millimetres)

(Dimensions in mm)

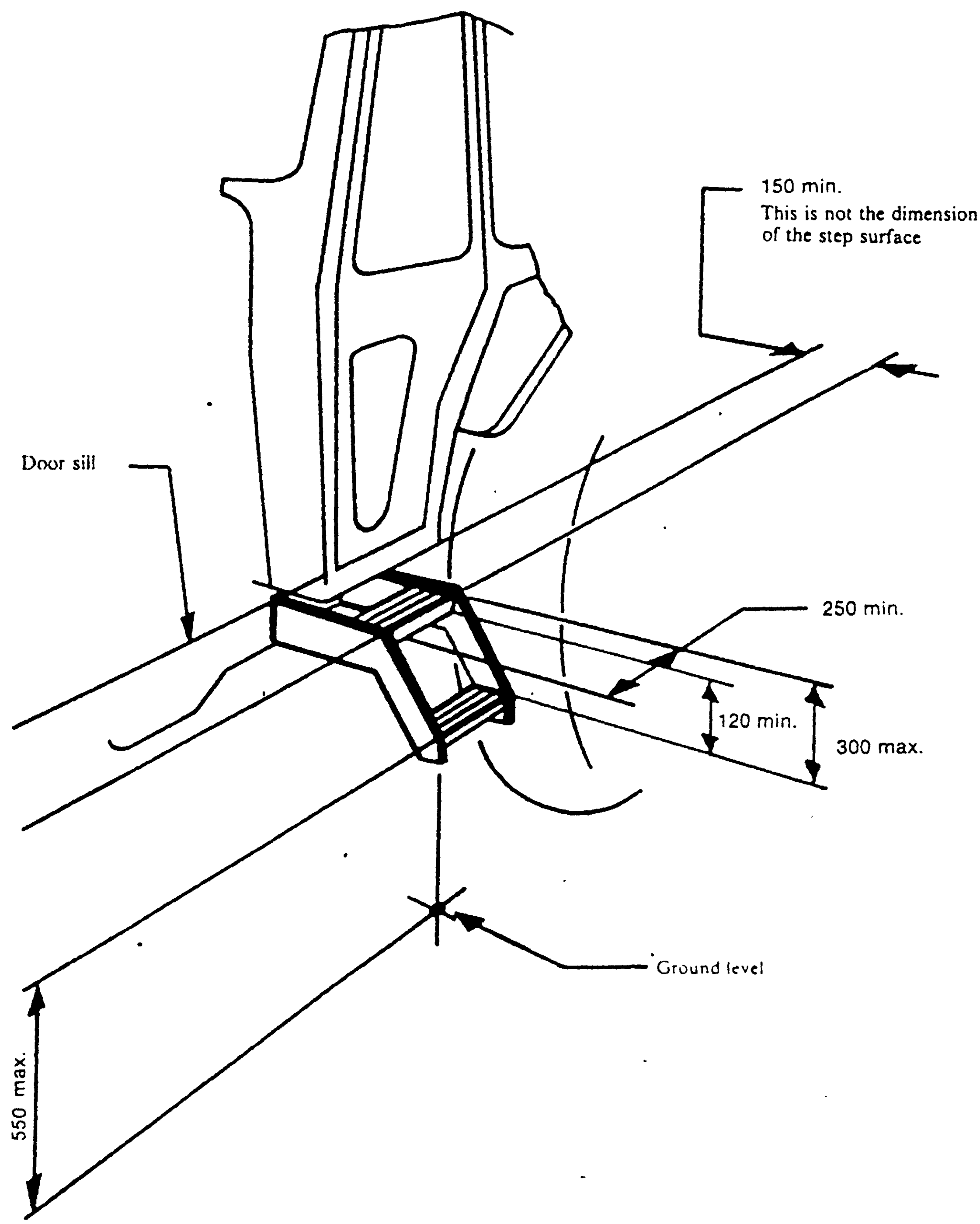


Figure 4

Appendix I

METHOD OF DETERMINING THE SEAT REFERENCE POINT (S)

1. **Definition of the reference point (S)**

'Seat reference point' (S) means the point of intersection in the median longitudinal plane of the seat between the tangential plane at the base of the padded backrest and a horizontal plane. This horizontal plane intersects the lower surface of the seat 150 mm in front of the seat reference point (S).

2. **Positioning of the seat**

The seat must be set in the rearmost longitudinal position and at the mid-point of the height adjustment range. Seats having a suspension system, whether or not adjustable according to the driver's weight, must be set at the mid-point of the suspension travel.

3. **Device for determining the seat reference point (S)**

The device illustrated in Figure 1 consists of a seat pan board and backrest boards. The lower backrest board must be hinged in the region of the ischium humps (A) and the loin (B), the hinge (B) being adjustable in height.

4. **Method of determining the seat reference point (S)**

The seat reference point (S) must be obtained by using the device illustrated in Figures 1 and 2, which simulates loading by a human occupant. The device must be positioned on the seat. It must then be loaded with a force of 550 N at a point 50 mm in front of hinge (A) and two parts of the backrest lightly pressed tangentially against the padded backrest.

If it is not possible to determine definite tangents to each area of the padded backrest (below and above the lumbar region) the following procedure must be adopted:

(a) where there is no possibility of defining the tangent to the lowest possible area, the lower part of the backrest board in a vertical position must be lightly pressed against the padded backrest;

(b) where there is no possibility of defining the tangent to the highest possible area, if the lower part of the backrest board is vertical, the hinge (B) must be fixed at a height of 230 mm above the seat reference point (S). The two parts of the backrest board in a vertical position must then be lightly pressed tangentially against the padded backrest.

Figure 1

Device for determining the seat reference point (S)

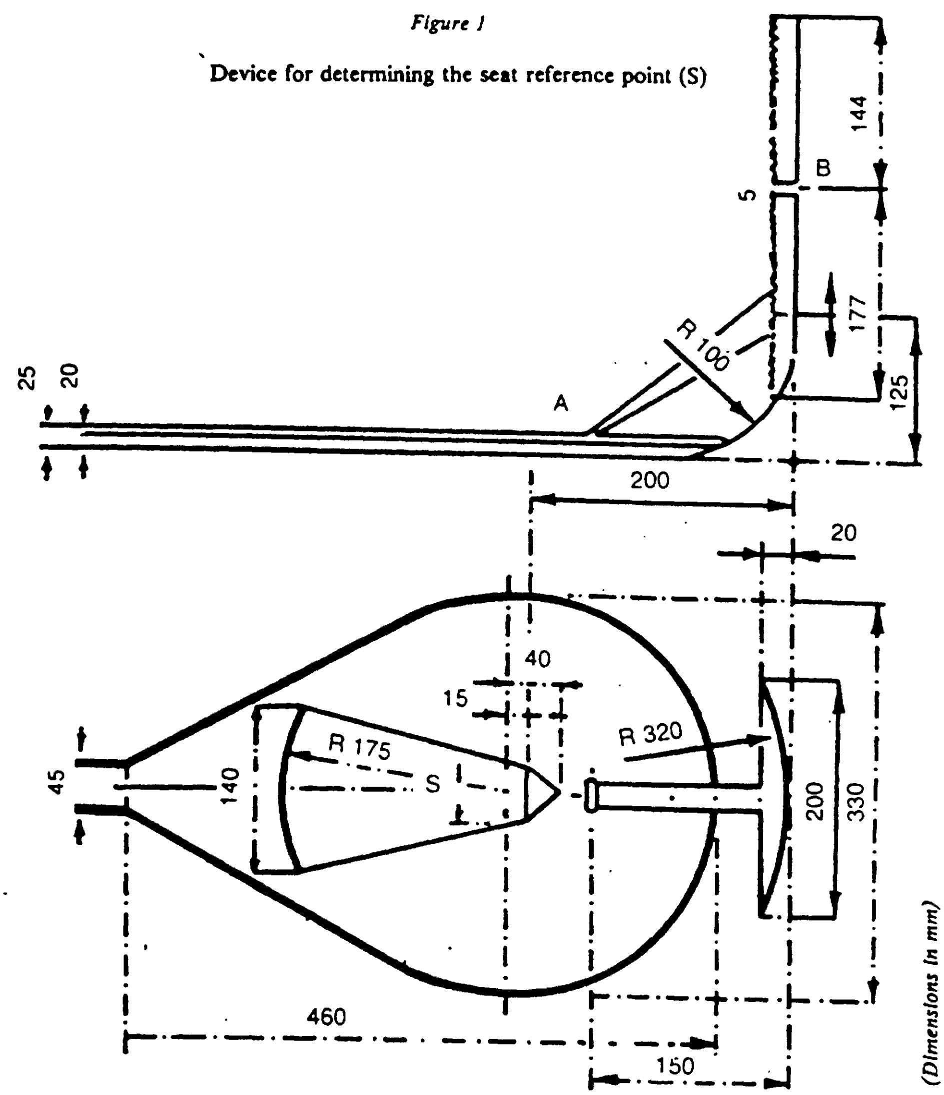
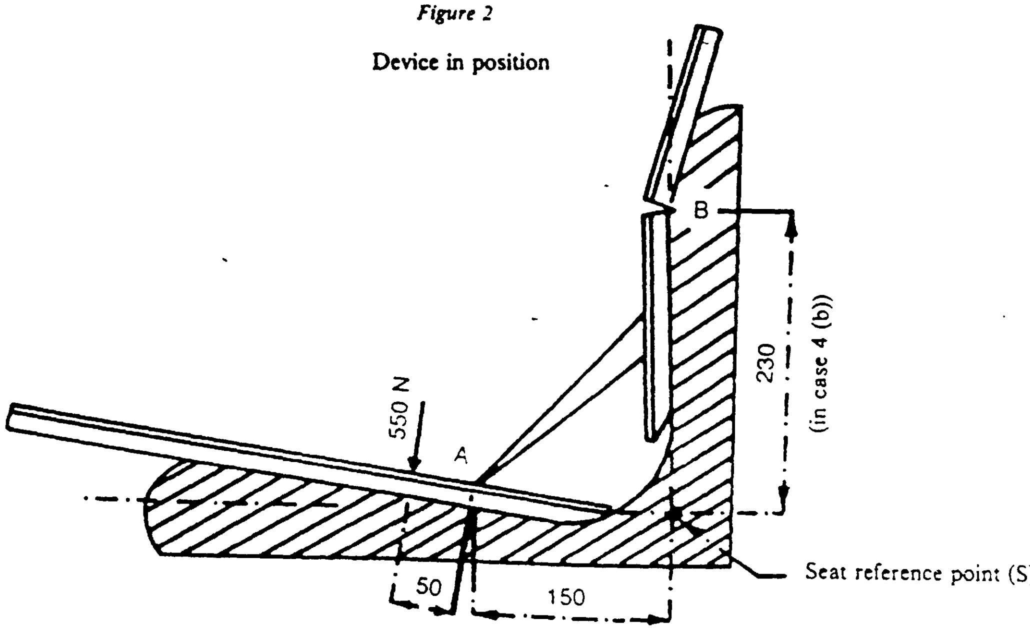


Figure 2

Device in position



80/720/ EEC

PART 2

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE OPERATING SPACE, ACCESS TO THE DRIVING POSITION (MEANS OF ENTRY AND EXIT) AND DOORS AND WINDOWS

(Article 4 (2)

EEC type-approval No ....

1. Component(s) or characteristic(s)

   — operating space,
   — access to the driving position (means of entry and exit),
   — doors and windows

2. Make of tractor or business name of manufacturer ....

3. Type and commercial description of tractor ....

4. Manufacturer's name and address ....

5. If applicable, name and address of manufacturer's authorized representative ....

   ....

6. Description of component(s) and/or characteristic(s) mentioned under 1 above ....

   ....

7. Date of submission of tractor for EEC type-approval ....

8. Technical service conducting the type-approval tests ....

9. Date of report issued by that service ....

10. Number of report issued by that service ....

11. EEC-type approval for the operating space, access to the driving position (means of entry and exit) and the doors and windows is granted/refused (1).

12. Place ....

13. Date ....

14. Signature ....

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

    dimensional drawing,

    exploded view or photograph of the cab and/or means of entry and exit.

    The data must be supplied to the competent authorities of the other Member States if they so request.

16. Remarks ....

---

(1) Delete where inapplicable.

Annex XX

REAR-MOUNTED ROLL-OVER PROTECTION DEVICES

86/298/EEC

LIST OF PARTS COMPRISING THE ANNEX

Part 1	Conditions for EEC component type-approval
Part 2	Conditions for testing the strength of the protection structures and of their attachment to tractors
Part 3	Test procedures A. Dynamic testing B. Static testing
Part 4	Figures
Part 5	Model report relating to the EEC component type-approval tests of a protection structure with regard to its strength as well as to the strength of its attachment to the tractor
Part 6	Marks
Part 7	Model EEC component type-approval certificate.
Part 8	Conditions for EEC type-approval
Part 9	Annex to the EEC type-approval certificate for a tractor type with regard to the strength of the protection structures and the strength of their attachment to the tractor

PART 1

CONDITIONS FOR EEC COMPONENT TYPE-APPROVAL

1. DEFINITION

1.1. 'Roll-over protection structure for the driver', hereinafter called 'protection structure', means the structure on a tractor the essential purpose of which is to avoid or limit risks to the driver resulting from roll-over of the tractor during normal use.

1.2. The structures mentioned in point 1.1 are characterized by the fact that, during the tests prescribed in Parts 2 and 3, they ensure sufficient unobstructed space to protect the driver.

2. GENERAL REQUIREMENTS

2.1. Every protection structure and its attachment to a tractor must be so designed and constructed as to fulfil the essential purpose laid down in point 1.1 above.

2.2. This condition is considered to be fulfilled when the requirements of Parts 2 and 3 are complied with.

3. APPLICATION FOR EEC COMPONENT TYPE-APPROVAL

3.1. The application for EEC component type-approval with regard to the strength of a protection structure and the strength of its attachment to a tractor shall be submitted by the tractor manufacturer or by the manufacturer of the protecion structure or by their authorized representatives.

3.2. The application for EEC component type-approval shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

- general arrangement drawing either to a scale marked on the drawing or giving the main dimensions of the protection structure. This drawing must, in particular, show details of the mounting components,
- photographs from side and rear showing mounting details,
- brief description of the protection structure including type of construction, details of mounting on the tractor and, where necessary, details of cladding, means of access and escape, details of interior padding and features to prevent continuous rolling and details of heating and ventilation,
- details of materials used in structural parts including attaching brackets and fixing bolts (see Part 5).

3.3. A tractor representative of the tractor type for which the protection structure to be approved is intended shall be submitted to the technical service responsible for conducting the component type-approval tests. This tractor shall be fitted with the protection structure.

3.4 The holder of EEC component type-approval may request its extension to other tractor types. The competent authority which has granted the original EEC component type-approval shall grant the extension if the approved protection structure and the type(s) of tractor for which the extension is requested comply with the following conditions:

- the mass of the unballasted tractor, as defined in point 1.4 of Part 2, does not exceed by more than 5 % the reference mass used in the tests,
- the wheelbase or the moment of inertia in relation to the rear-wheel axle is not more than the reference wheelbase or moment of inertia,
- the method of attachment and the points of attachment to the tractor are identical,
- any components, such as mudguards and bonnet which may provide support for the protection structure have indentical strength and are identically situated with respect to the protection structure,
- the critical dimensions and the position of the seat and steering wheel relative to the protection structure, and the position relative to the protection structure of the points deemed rigid and taken

into account for the purpose of verifying that the zone of clearance is protected, are such that the zone of clearance continues to be protected by the structure after the latter has undergone the deformation resulting from the various tests.

4. MARKINGS

4.1. Every protection structure conforming to the approved type shall bear the following markings:

4.1.1. The trade mark or name.

4.1.2. A component type-approval mark conforming to the model in Part 6 .

4.1.3. Serial number of the protection structure.

4.1.4. Make and type(s) of tractor(s) for which the protection structure is intended.

4.2. All these particulars must appear on a small plate.

4.3. These markings must be visible, legible and indelible.

PART 2

CONDITIONS FOR TESTING THE STRENGTH OF PROTECTION STRUCTURES AND THEIR ATTACHMENT TO TRACTORS

1. GENERAL REQUIREMENTS

1.1. Test purposes

Tests made using special rigs are intended to simulate such loads as are imposed on a protection structure, when the tractor overturns. These tests, described in Part 3, enable observations to be made on the strength of the protection structure and any brackets attaching it to the tractor and any parts of the tractor which transmit the test force.

1.2. Test methods

Tests may be performed in accordance with the dynamic procedure (see Part 2 A and A) or the static procedure (see Part 2 B and 3 B) at the manufacturer's choice.

The two methods are equivalent.

1.3. General rules governing preparation for tests

1.3.1. The protection structure must conform to the series production specifications. It shall be attached in accordance with the manufacturer's recommended method to one of the tractors for which it is designed.

A complete tractor is not required for the strength test in static testing; however, the protection structure and parts of the tractor to which it is attached shall represent an operating installation, hereinafter referred to as 'the assembly'.

1.3.2. For the strength test the tractor must be fitted with all series production components which may affect the strength of the protection structure or which may be necessary for the strength test.

Components which may create a hazard in the zone of clearance must also be fitted so that they may be examined to see whether the requirements of parts 3.1 and 3.2 have been fulfilled.

All components of the tractor or the protection structure including weather protection must be supplied or defined in drawings.

1.3.3. For the strength tests, all detachable windows, doors, panels and non-structural fittings must be removed so that they may not contribute to the strengthening of the protection structure.

1.3.4. *Track width*

The track width shall be adjusted such that the protection structure will, as far as possible, not be supported by the tyres during the strength tests. If these tests are conducted in accordance with the static procedure, the wheels may be removed.

1.4. Tractor reference mass

The reference mass 'm_t', used in the formulae (see Parts 3 A and 3 B) to calculate the height of fall of the pendulum block, the loading energies and the crushing forces, shall be at least that defined in Item 2.4 of Annex I (i.e. excluding 'optional' accessories but including coolant, oils, fuel, tools and driver) plus the protection structure and less 75 kilograms. Not included are 'optional' front or rear weights, tyre ballast, mounted implements, mounted equipment or any specialized component.

2. TESTS

2.1. Sequence of tests

The sequence of tests, without prejudice to the additional dynamic and static tests (Part 3 A and Part 3 B), is as follows:

2.1.1. Impact (dynamic tests) or loading (static tests) at the rear of the structure (see Item 1.1 of Parts 3 A and 3 B)

2.1.2. Rear crushing (dynamic or static tests) (see Item 1.4 of Parts 3 A and 3 B)

2.1.3. Impact (dynamic tests) or loading (static tests) at the front of the structure (see Item 1.2 of Parts 3 A and 3 B)

2.1.4. Impact (dynamic tests) or loading (static tests) to the side of the structure (see point 1.3 of Parts 3 A and 3 B) 86/298/EEC

2.1.5. Crushing at the front of the structure (dynamic or static tests) (see point 1.5 of Parts 3 A and 3 B)

2.2. General requirements

2.2.1. If, during the test, any part of the restraining equipment breaks or moves, the test shall be restarted.

2.2.2. No repairs or adjustments to the tractor or to the protection structure may be carried out during the tests.

2.2.3. The tractor gear-box shall be in neutral and the brakes off during the tests.

2.2.4. If the tractor is fitted with a suspension system between the tractor body and the wheels, it shall be blocked during the tests.

2.2.5. The side chosen for application of the first impact on the rear of the structure (in the case of dynamic tests) or the first load on the rear of the structure (in the case of static tests) shall be that which, in the opinion of the testing authorities will result in the application of the series of impacts or loads under the most unfavourable conditions for the structure. The lateral impact or load and the rear impact or load shall be on different sides of the longitudinal median plane of the protection structure. The front impact or load shall be on the same side of the longitudinal médian plane of the protection structure as the lateral impact or load.

2.3. Measurement tolerances

2.3.1. Linear dimensions: ± 3 mm.

Except for: — tyre deflection: ± 1 mm,

— structure deflection during horizontal loading: ± 1 mm,

— each of the two measurements for the height of fall of the pendulum block: ± 1 mm.

2.3.2. Masses: ± 1 %.

2.3.3. Forces: ± 2 %.

2.3.4. Angles: ± 2°.

3 ACCEPTANCE CONDITIONS

3.1. A protection structure submitted for EEC component type-approval shall be considered as having satisfied the strength requirements if it fulfils the following conditions:

'3.1.1. After each partial test in the dynamic test procedure, it shall be free from tears or cracks as described in point 3.1 of Part 3 (A). 89/682/EEC

If, during the dynamic test, significant tears or cracks appear, an additional impact test or crushing test as defined in point 1.6 of Part 3 (A) must be performed immediately after the test which caused these tears or cracks to appear.';

3.1.2. During static testing, at the point when the energy required is attained in each horizontal load test prescribed or in the overload test (see Figures 10a, 10b and 10c of Part 4 the force must be greater than 0,8 F_{max}.

3.1.3 If, during a static test, cracks or tears appear as a result of the application of the crushing force, an additional crushing test, as defined in point 1.7 of Part 3 B, may be carried out immediately after the crushing test which caused the cracks or tears to appear.

3.1.4. Additional cracks or tears and/or entry into or lack of protection of the zone of clearance are permitted during the overload test. 86/298/EEC

3.1.5. During the tests, other than the overload test, no part of the protection structure shall enter the zone of clearance as defined in point 2 of Parts 3 A and 3 B.

3.1.6. During the tests, other than the overload test, no part of the zone of clearance shall be outside the protection of the structure, in accordance with point 3.2.2 of Parts 3 A and 3 B.

3.1.7. During the tests the protection structure must not impose any constraints on the seat structure.

3.1.8. The elastic deflection, measured in accordance with point 3.3 of Parts 3 A and 3 B, shall be less less than 250 mm.

3.2. There shall be no accessories presenting a hazard for the driver. There shall be no projecting part or accessory which is liable to injure the driver should the tractor overturn, or any part or accessory which is liable to trap him — for example by the leg or the foot — as a result of the deflections of the structure.

4. TEST REPORT

4.1. The test report shall be attached to the EEC component type-approval certificate referred to in Part 7 . The presentation of the report shall be as shown in Part 5. The report shall include:

4.1.1 A general description of the protection structure's shape and construction (through drawings 1/20 scale for general drawings and 1/25 for attachment details) including materials and fastenings, external dimensions of the tractor with protection structure fitted, main interior dimensions and details of provisions for normal entry and exit and for escape, where they exist, and, where appropriate, details of the heating and ventilation system.

4.1.2. Details of any special features such as devices to prevent the continuous rolling of the tractor.

4.1.3. A brief description of any interior padding.

4.1.4. A statement of the type of windscreen and glazing fitted.

4.2. The report must clearly identify the tractor (make, type, trade name, etc.) used for testing and the other tractors for which the protection structure is intented.

4.3. If EEC component type-approval is being extended to other types of tractor, the report must include the exact reference of the report of the original EEC component type-approval as well as precise indications regarding the requirements laid down in point 3.4 of Part 1.

A. APPARATUS AND EQUIPMENT FOR DYNAMIC TESTS

1. PENDULUM BLOCK

1.1. A pendulum block shall be suspended by two chains or wire ropes from pivot points not less than 6 meters above the ground. Means shall be provided for adjusting independently the suspended height of the block and the angle between the block and the supporting chains or wire ropes.

1.2. The mass shall be 2 000 ± 20 kilograms excluding the mass of the chains or wire ropes which themselves shall not exceed 100 kilograms. The length of the sides of the impact face shall be 680 ± 20 mm (see Part 4 , Figure 4). The block shall be filled in such a way that the position of its centre of gravity is constant and coincides with the geometrical centre of the parallelepiped.

1.3. The parallelepiped shall be connected to the system which pulls it backwards by an instantaneous release mechanism which is so designed and located as to enable the pendulum block to be released without causing any significant oscillation of the parallelepiped.

2. PENDULUM SUPPORTS

The pendulum pivot points shall be rigidly fixed so that their displacement in any direction does not exceed 1 % of the height of fall.

3. LASHINGS

3.1. The tractor shall be anchored to the ground by means of restraining and tensioning devices with rails rigidly attached to a non-yielding base. The rails shall be an appropriate width apart to enable the tractor to be lashed in accordance with Part 4, Figures 5, 6 and 7. During each test, the wheels of the tractor and the axle stands used shall rest on the non-yielding base.

3.2. The tractor shall be lashed to the rails by means of wire rope with round strand, fibre core, construction 6 × 19 in accordance with ISO 2408 and a nominal diameter of 13 mm. The metal strands shall have an ultimate tensile strength of 1 770 MPa.

3.3. The central pivot of an articulated tractor shall be supported and lashed down as appropriate for all tests. For the lateral impact test, the pivot shall also be propped from the side opposite the impact. The front and rear wheels need not be in line if this makes it more convenient to attach appropriate wire ropes.

4. WHEEL PROP AND BEAM

4.1. A softwood beam 150 mm square shall be used as a prop for the wheels during the lateral impact tests (see Part 4, Figures 5, 6 and 7).

4.2. During the lateral impact tests, a softwood beam shall be clamped to the floor to brace the rim of the wheel opposite the side of impact as shown in Part 4, Figure 7.

5. PROPS AND LASHINGS FOR ARTICULATED TRACTORS

5.1. Additional props and lashings shall be used for articulated tractors.

Their purpose is to ensure that the section of the tractor on which the protection structure is fitted is a rigid as that of a rigid tractor.

5.2. Additional specific details are given in Part 3 A for the impact and crushing tests.

6. TYRE PRESSURE AND DEFLECTION

6.1. The tractor tyres shall not be liquid-ballasted and shall be inflated to the pressures prescribed by the tractor manufacturer for field work.

6.2. The lashings shall be tensioned in each particular case such that the tyres undergo a deflection equal to 12 % of the tyre wall height (distance between the ground and the lowest point of the rim) before tensioning.

7. CRUSHING RIG

A rig as shown in Part 4, Figure 8, shall be capable of exerting a downward force on a protection structure through a rigid beam approximately 250 mm wide connected to the load-applying mechanism by means of universal joints. Suitable axle stands shall be provided so that the tractor tyres do not bear the crushing force.

8. MEASURING APPARATUS

8.1. A device such as that illustrated in Part 4, Figure 9, for measuring the elastic deflection (the difference between the maximum momentary deflection and the permanent deflection).

8.2. A device for checking that the protection structure has not entered the zone of clearance and that the latter has remained within the structure's protection during the test (see point 3.2.2 of Part 3 A).

B. APPARATUS AND EQUIPMENT FOR STATIC TESTS

1. STATIC TESTING RIG

1.1. This rig shall enable horizontal thrusts or loading to be applied to the structure.

1.2. Provision must be made so that the load can be uniformly distributed normal to the direction of loading and along a beam having a length of one of the exact multiples of 50, between 250 and 700 mm.

The stiff beam shall have a vertical face dimension of 150 mm. 86/298/EEC

The edges of the beam in contact with the protection structure shall be curved, with a maximum radius of 50 mm.

1.3. The pad shall be capable of being adjusted to any angle in relation to the direction of the force, in order to be able to follow the angular variations of the structure's load-bearing surface as the structure deflects.

1.4. Direction of the force (deviation from horizontal and vertical)

— at start of test, under zero load: ± 2°,

— during test, under load: 10° above and 20° below the horizontal. These variations must be kept to a minimum.

1.5. The deflection rate shall be slow (less than 5 mm/s) so that the load may at all moments be considered as 'static'.

2. APPARATUS FOR MEASURING THE ENERGY ABSORBED BY THE STRUCTURE

2.1. The 'force versus deflection' curve shall be plotted in order to determine the energy absorbed by the structure. There is no need to measure the force and deflection at the point where the load is applied to the structure; however, 'force' and 'deflection' shall be measured simultaneously and co-linearly.

2.2. The point of origin of deflection measurements shall be selected such that only the energy absorbed by the structure and/or the deflection of certain parts of the tractor is taken into account. The energy absorbed by the deflection and/or the slipping of the anchoring shall be ignored.

3. MEANS OF ANCHORING THE TRACTOR TO THE GROUND

3.1. The tractor shall be anchored to the ground by means of restraining and tensioning devices with rails rigidly attached to a non-yielding base. The rails shall be an appropriate width apart to enable the tractor to be lashed. During each test, the wheels and the axle stands used shall rest on the base.

3.2. The tractor shall be anchored to the rails by any suitable means (plates, wedges, wire ropes, jacks, etc.) such that it cannot move during the tests. This requirement shall be checked while the loads are being applied, by means of the usual devices for measuring length. If the tractor moves, the entire test shall be repeated, unless the system for measuring the deflections used in plotting the 'force versus deflection' curve is connected to the tractor.

4. CRUSHING RIG

A rig as shown in Figure 8 of Part 4 shall be capable of exerting a downward force on a protection structure through a rigid beam approximately 250 mm wide connected to the load-applying mechanism by means of universal joints. Suitable axle stands shall be provided so that the tractor tyres do not bear the crushing force.

5. OTHER MEASURING APPARATUS

5.1. A device such as that illustrated in Figure 9 of Part 4 for measuring the elastic deflection (the difference between the maximum momentary deflection and the permanent deflection).

5.2. A device for checking that the protection structure has not entered the zone of clearance and that the latter has remained within the structure's protection during the test (see point 3.2.2 of Part 3 B).

C. SYMBOLS

m_t (kg) = tractor reference mass, as defined in point 1.4 of Part 2.

H (mm) = falling height of the pendulum block.

H' (mm)	=	falling height of the pendulum block for additional test.
L (mm)	=	tractor reference wheelbase.
I (kgm^2)	=	tractor reference moment of inertia in relation to the centre line of the rear wheels, notwithstanding the mass of these wheels.
D (mm)	=	deflection of the structure at the point of impact (dynamic tests) or at the point of and in line with the load application (static tests).
D' (mm)	=	deflection of the structure for the calculated energy required.
F (N)	=	statio load force.
F_{max} (N)	=	maximum static load force occurring during loading, with the exception of the overload.
F' (N)	=	force for calculated energy required.
F-D	=	force/deflection diagram.
E_{is} (J)	=	energy to be absorbed during the side loading.
E_{il} (J)	=	energy to be absorbed during longitudinal loading.
F_v (N)	=	vertical crushing force.

PART 3

TEST PROCEDURE

A. Dynamic tests

1. IMPACT AND CRUSHING TESTS

1.1. **Impact at the rear**

1.1.1. The tractor shall be so placed in relation to the pendulum block that the block will strike the protection structure when the impact face of the block and the supporting chains or wire ropes are at an angle with the vertical plane equal to $m_t/100$ with a 20° maximum, unless, during deflection, the protection structure at the point of contact forms a greater angle to the vertical. In this case the impact face of the block shall be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at the angle defined above.

The suspended height of the block shall be adjusted, and necessary steps taken so as to prevent the block from turning about the point of contact.

The point of impact shall be that part of the protection structure likely to hit the ground first in a rearward overturning accident, normally the upper edge. The position of the centre of gravity of the block shall be one-sixth of the width of the top of the protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the protection structure.

If the structure is curved or protruding at this point, wedges enabling the impact to be applied thereon will have to be added, without thereby reinforcing the structure.

1.1.2. The tractor shall be lashed to the ground by means of four wire ropes, one at each end of both axles, arranged as indicated in Figure 5 of Part 4 . The front and rear lashing points shall be located at a distance such that the wire ropes make an angle of less than 30° with the ground. The rear lashings shall in addition be so arranged that the point of convergence of the two wire ropes is located in the vertical plane in which the centre of gravity of the block travels.

The wire ropes must be tensioned such that the tyres undergo the deflections given in point 6.2 of Part 2 A.

With the wire ropes tensioned, the wedging beam shall be placed in front of and tight against the rear wheels and then fixed to the ground.

1.1.3. If the tractor is of the articulated type, the point of articulation shall, in addition, be supported by a wooden block at least 100 mm square and firmly lashed to the ground.

1.1.4. The pendulum block shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by one of the following two formulae:

$$H = 2{,}165 \times 10^{-8} m_t L^2 \text{ or } H = 5{,}73 \times 10^{-2} I.$$

The block must then be released so as to strike the protection structure.

1.2. **Impact at the front**

1.2.1. The tractor shall be so placed in relation to the pendulum block that the block will strike the protection structure when the impact face of the block and the supporting chains or wire ropes are at an angle with the vertical plane, equal to $m_t/100$ with a 20° maximum, unless, during deflection, the protection structure at the point of contact forms a greater angle to the vertical. In this case the impact face of the block shall be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at the angle defined above.

The suspended height of the pendulum block shall be adjusted and necessary steps taken so as to prevent the block from turning about the point of contact.

The point of impact shall be that part of the protection structure likely to hit the ground first if the tractor overturns sideways while travelling forward, normally the upper edge. The position of the centre of gravity of the block shall be one-sixth of the width of the top of the protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the protection structure.

If the structure is curved or protruding at this point, wedges enabling the impact to be applied thereon will have to be added, without thereby reinforcing the structure.

1.2.2. The tractor shall be lashed to the ground by means of four wire ropes, one at each end of both axles, arranged as indicated in Figure 6 of Part 4. The front and rear lashing points shall be located at a distance such that the wire ropes make an angle of less than 30° with the ground. The rear lashings shall, in addition, be so arranged that the point of convergence of the two wire ropes is located in the vertical plane in which the centre of gravity of the pendulum block travels.

The wire ropes must be tensioned such that the tyres undergo the deflections given in point 6.2 of Part 2 A.

With the wire ropes tensioned, the wedging beam shall be placed firmly behind the rear wheels and then fixed to the ground.

1.2.3. If the tractor is of the articulated type, the point of articulation shall in addition be supported by a wooden block at least 100 mm square and firmly lashed to the ground.

1.2.4. The pendulum block shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by one of the following two formulae, to be chosen according to the reference mass of the tractors subjected to the tests:

$H = 25 + 0,07\ m_t$ for tractors with a reference mass of less than 2 000 kilograms,

$H = 125 + 0,02\ m_t$ for tractors with a reference mass of more than 2 000 kilograms.

The pendulum block must then be released so as to strike the protection structure.

1.3. Impact from the side

1.3.1. The tractor shall be so placed in relation to the pendulum block that the block will strike the protection structure when the impact face of the weight and the supporting chains or wire ropes are vertical unless, during deflection, the protection structure at the point of contact forms an angle to the vertical. In this case the impact face of the block shall be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining vertical on impact.

The suspended height of the block shall be adjusted and necessary steps taken so as to prevent the block from turning about the point of contact.

The point of impact shall be that part of the protection structure likely to hit the ground first in a sideways overturning accident, normally the upper edge. Unless it is certain that another part of this edge would hit the ground first, the point of impact shall be in the plane at right angles to the median plane and passing 200 mm in front of the seat reference point, the seat being set at the mid position of the longitudinal seat adjustment.

1.3.2. The tractor wheels on the side which is to receive the impact shall be lashed to the ground by means of wire ropes passing over the corresponding ends of the front and rear axles. The wire ropes shall be tensioned to produce the tyre deflection values given in point 6.2 of Part 2 A on the side which is to receive the impact.

With the wire ropes tensioned, the wedging beam shall be placed on the ground, pushed tight against the tyres on the side opposite that which is to receive the impact and then fixed to the ground. It may be necessary to use two beams or wedges if the outer sides of the front and rear tyres are not in the same vertical plane.

The prop shall then be placed as indicated in Figure 7 of Part 4 against the rim of the wheel opposite to the impact, pushed firmly against the rim and then fixed at its base.

The length of the rop shall be chosen such that it makes an angle of 30 ± 3° with the ground when in position against the rim. In addition, its length must, if possible, be between 20 and 25 times greater than its thickness and its width between two and three times greater than its thickness. The props shall be shaped at both ends as shown in the details of Figure 7 of Part 4.

1.3.3. If the tractor is of the articulated type, the point of articulation shall, in addition, be supported by a wooden block at least 100 mm square and laterally supported by a device similar to that provided for in point 1.3.2 against the rear wheel. The point of articulation shall then be lashed firmly to the ground.

1.3.4. The pendulum block shall be pulled back so that the height of its centre of gravity above that at the point of impact is given by one of the following two formulae, to be chosen according to the reference mass of the tractors subjected to the tests: 86/298/ EEC

$H = 25 + 0{,}20\ m_t$ for tractors with a reference mass of less than 2 000 kilograms,

$H = 125 + 0{,}15\ m_t$ for tractors with a reference mass of more than 2 000 kilograms.

The pendulum block must then be released so as to strike the protection structure.

1.4. **Crushing at the rear**

The beam shall be positioned over the rear uppermost structural member(s) and the resultant of the crushing forces shall be located in the tractor's median plane.

A force, $F_v = 20\ m_t$ shall be applied.

Where the rear part of the protection structure roof will not sustain the full crushing force, the force shall be applied until the roof is deflected to coincide with the plane joining the upper part of the protection structure with that part of the rear of the tractor capable of supporting the vehicle's mass when overturned.

The force shall then be removed, and the tractor or loading force repositioned so that the beam is over that point of the protection structure which would then support the tractor when completely overturned.

The force F_v shall then be applied.

It shall be applied for a minimum of five seconds following the cessation of any visually detectable deflection.

1.5. Crushing at the front

The beam shall be positioned over the front uppermost structural member(s) and the resultant of the crushing forces shall be located in the tractor's median plane.

A force, $F_v = 20\ m_t$ shall be applied.

Where the front part of the protection structure roof will not sustain the full crushing force, the force shall be applied until the roof is deflected to coincide with the plane joining the upper part of the protection structure with that part of the front of the tractor capable of supporting the vehicle's mass when overturned.

The force shall then be removed, and the tractor or loading force repositioned so that the beam is over that point of the protection structure which would then support the tractor when completely overturned.

The force F_v shall then be applied.

It shall be applied for a minimum of five seconds following the cessation of any visually detectable deflection.

1.6. Additional tests

1.6.1. If cracks or tears which cannot be considered negligible appear during an impact test, a second, similar test, but with a height of fall of: 89/682 /EEC

$$H' = \frac{H}{10} \times \frac{12 + 4a}{1 + 2a}$$

shall be performed immediately after the impact test causing these tears or cracks to appear, "a" being the ratio of the permanent deformation to the elastic deformation ($a = D_p/D_e$) as measured at the point of impact.

The additional permanent deformation due to the second impact must not exceed 30 % of the permanent deformation due to the first impact.

In order to be able to carry out the additional test, it is necessary to measure the elastic deformation during all of the impact tests.

1.6.2. If, during a crushing test, significant tears or cracks appear, a second, similar crushing test, but with a force equal to 1,2 F_v, shall be performed immediately after the crushing test which caused these tears and cracks to appear.

2. ZONE OF CLEARANCE

2.1. The zone of clearance is shown in Figures 1, 2a, 2b, 2c, 2d and 2e of Part 4. 86/298 /EEC

The zone is defined on the basis of a 'vertical reference plane', generally longitudinal to the tractor and passing through the seat reference point and the centre of the steering wheel. This plane must be able to move horizontally with the seat and the steering wheel during the impact but to remain perpendicular to the floor of the tractor or of the protection structure if this is resiliently mounted.

2.2. The zone is bounded by the following planes, the tractor being on a horizontal surface and, where the steering wheel is adjustable, its position adjusted for normal seated driving.

2.2.1. A horizontal plane — $A_1B_1B_2A_2$ — 900 mm above the seat reference point.

2.2.2. An inclined plane — $H_1H_2G_2G_1$ — perpendicular to the vertical reference plane and including a point 900 mm directly above the seat reference point and the rearmost point of the seat backrest.

2.2.3. A cylindrical surface — $A_1A_2H_2H_1$ — which is perpendicular to the reference plane, has a radius of 120 mm and is tangential to the planes defined above in point 2.2.1 and 2.2.2.

2.2.4. A cylindrical surface — $B_1C_1C_2B_2$ — perpendicular to the reference plane, having a radius of 900 mm and extending forward by 400 mm the plane defined in point 2.2.1, to which it is tangential, following a horizontal line 150 mm forward of the seat reference point.

2.2.5. A inclined plane — $C_1D_1D_2C_2$ — perpendicular to the reference plane, extending the surface defined in point 2.2.4 and passing through a point 40 mm from the outer edge of the steering wheel.

2.2.6. A vertical plan — $D_1K_1E_1E_2K_2D_2$ — perpendicular to the reference plane and passing 40 mm in front of the other edge of the steering wheel.

2.2.7. A horizontal plane — $E_1F_1P_1N_1N_2P_2F_2E_2$ — passing through the seat reference point.

2.2.8. A curvilinear surface — $G_1L_1M_1N_1N_1M_2L_2G_2$ — perpendicular to the reference plaen and in contact with the back of the seat backrest.

2.2.9. Two vertical planes — $K_1I_1F_1E_1$ and $K_2I_2F_2E_2$ — parallel to the reference plane, 250 mm either side of this plane, and bounded towards the top 300 mm above the horizontal plane passing through the seat reference point.

2.2.10. Two inclined and parallel planes — $A_1B_1C_1D_1K_1I_1L_1G_1H_1$ and $A_2B_2C_2D_2K_2I_2L_2G_2H_2$ — starting from the upper edge of the planes defined in point 2.2.9 above and joining the horizontal plane defined in point 2.2.1 least 100 mm from the reference plane on the side where the impact is applied.

2.2.11. Two vertical planes — $Q_1P_1N_1M_1$ and $Q_2P_2N_2M_2$ — parallel to the reference plane, 200 mm either side of this plane, and bounded towards the top 300 mm above the horizontal plane passing through the seat reference point.

2.2.12. Two portions — $I_1Q_1P_1F_1$ and $I_2Q_2P_2F_2$ — of a vertical plane, perpendicular to the reference plane and passing 350 mm in front of the seat reference point.

2.2.13. Two portions — $I_1Q_1M_1L_1$ — and $I_2Q_2M_2L_2$ — of the horizontal plane passing 300 mm above the seat reference point.

2.3. Seat location and seat reference point

2.3.1 *Seat reference point*

2.3.1.1. The refernce point shall be established using the apparatus illustrated in Figures 3 and 3b of Part 4. The apparatus shall consist of a seat pan board and backrest boards. The lower backrest board shall be jointed in the region of the ischium humps (A) and loin (B), the joint (B) being adjustable in height.

2.3.1.2. The reference point is defined as the point in the median longitudinal plane of the seat where the tangential plane of the lower backrest and a horizontal plane intersect. This horizontal plane cuts the lower surface of the seat pan board 150 mm in front of the abovementioned tangent.

2.3.1.3. The apparatus shall be positioned on the seat. It shall then be loaded with a force of 550 N at a point 50 mm in front of joint (A), and the two parts of the backrest board shall be lightly pressed tangentially against the backrest.

2.3.1.4. If it is not possible to determine definite tangents to each area of the backrest (above and below the lumbar region) the following must be done:

2.3.1.4.1. Where no definite tangent to the lower area is possible the lower part of the backrest board is pressed against the backrest vertically.

2.3.1.4.2. Where no definite tangent to the upper area is possible the joint (B) is fixed at a height of 230 mm above the lower surface of the seat pan board, the backrest board being perpendicular to the latter. Then the two parts of the backrest board are lightly pressed against the backrest.

2.3.2. *Seat position and adjustment for determining the location of the seat reference point*

2.3.2.1. Where the seat position is adjustable, the seat must be adjusted to its rear uppermost position.

2.3.2.2. Where the inclination of the backrest and seat pan is adjustable, these must be adjusted so that the reference point is in its rear uppermost position.

2.3.2.3. Where the seat is equipped with suspension, the latter must be blocked at mid-travel, unless this is contrary to the instructions clearly laid down by the seat manufacturer.

3. MEASUREMENTS TO BE MADE

3.1. Fractures and cracks

After each test all structural members, joints and fastening systems shall be visually examined for fractures or cracks, any small cracks in unimportant parts being ignored.

Any tears caused by the edges of the pendulum weight shall be ignored.

3.2. Zone of clearance

3.2.1. During each test an examination shall be made to see whether any part of the protection structure has entered the zone of clearance round the driver's seat as defined in point 2.

3.2.2. In addition, an examination shall be made to determine whether any part of the zone of clearance is outside the protection of the protection structure. For this purpose it shall be considered to be outside the protection of the roll-over protection structure if any part of it would have come into contact with flat ground if the tractor had overturned towards the direction from which the impact came. For this purpose the front and rear tyre and track setting shall be assumed to be the smallest specified by the manufacturer.

3.3. Elastic deflection (on side impact)

The elastic deflection shall be measured 900 mm above the seat reference point, in the vertical plane passing through the point of impact. For this measurement, apparatus as shown in Figure 9 of Part 4 shall be used.

3.4. Permanent deflection

After the final crushing test, the permanent deflection of the protection structure shall be recorded. For this purpose, before the start of the test, the position of the main protection structure members in relation to the seat reference point shall be recorded.

B. Static tests

1. LOADING AND CRUSHING TESTS

1.1. **Loading at the rear**

1.1.1. The load shall be applied horizontally, in a vertical plane parallel to the tractor's median plane.

The load application point shall be that part of the protection structure likely to hit the ground first in a rearward overturning accident, normally the upper edge. The vertical plane in which the load is applied shall be located at a distance of one-third of the external width of the upper part of the structure from the median plane.

If the structure is curved or protruding at this point, wedges enabling the load to be applied thereon will have to be added, without thereby reinforcing the structure.

1.1.2. The assembly defined in point 1.3.1 of Part 2 shall be lashed to the ground as described in point 3 of Part 2 B.

1.1.3. The energy absorbed by the protection structure during the test shall be at least

$$E_{il} = 2{,}165 \times 10^{-7}\ m_t\ L^2 \text{ or } E_{il} = 0{,}574 \times I.$$

1.2. Loading at the front

1.2.1. The load shall be applied horizontally in a vertical plane parallel to the tractor's median plane.

The point of application shall be that part of the protection structure likely to hit the ground first if the tractor overturns sideways while travelling forward, i.e. normally the upper egde. The point of application of the load shall be one-sixth of the width of the top of the protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the protection structure.

If the structure is curved or protruding at this point, wedges enabling the load to be applied thereon will have to be added, without thereby reinforcing the structure.

1.2.2. The assembly defined in point 1.3.1 of Part 2 shall be anchored to the ground as described in point 3 of Part 2 B.

1.2.3. The energy absorbed by the protection structure during the test shall be at least

$$E_{il} = 500 + 0{,}5\ m_t$$

1.3. Loading from the side

1.3.1. The side loading shall be applied horizontally, in a vertical plane perpendicular to the tractor's median plane and passing 200 mm in front of the seat reference point, the seat being at the mid position of the longitudinal seat adjustment.

The load application point shall be that part of the protection structure likely to hit the ground first in a sideways overturning accident, normally the upper edge.

1.3.2. The assembly defined in point 1.3.1 of Part 2 shall be lashed to the ground as described in point 3 of Part 2 B.

1.3.3. The energy absorbed by the protection structure during the test shall be at least

$$E_{is} = 1{,}75\ m_t$$

1.4. **Crushing at the rear**

All provisions are identical to those given in point 1.4 of Part 3 A.

1.5. **Crushing at the front**

All provisions are identical to those given in point 1.5 of Part 3 A.

1.6. Overload test

1.6.1. An overload test shall be carried out where the force decreases by more than 3 % during the last 5 % of the deflection reached when the energy required is absorbed by the structure (see Figure 10b of Part 4).

1.6.2. The overload test involves the gradual increase of the horizontal load by increments of 5 % of the initial energy requirement up to a maximum of 20 % of energy added (see Figure 10c of Part 4.)

1.6.2.1. The overload test is satisfactory if, after each increase by 5 %, 10 % or 15 % in the energy required, the force decreases by less than 3 % for a 5 % increment and remains more than 0,8 F_{max}.

1.6.2.2. The overload test is satisfactory if, after the structure has absorbed 20 % of the added energy, the force exceeds 0,8 F_{max}.

1.6.2.3. Additional cracks or tears and/or entry into or lack of protection of the zone of clearance due to elastic deflection are permitted during the overload test. However, after the removal of the load, the structure shall not enter the zone of clearance, which shall be completely protected.

1.7. **Crushing test**

If cracks or tears which cannot be considered as negligible appear during a crushing test, a second, similar crushing, but with a force of 1,2 F_v, shall be applied immediately after the crushing which caused the cracks or tears to appear.

2. ZONE OF CLEARANCE

The zone of clearance is identical to that described in point 2 of Part 3 A above, except that the word 'impact' is to be replaced by 'load' in the last line of point 2.2.10.

3. MEASUREMENTS TO BE MADE

3.1. **Fractures and cracks**

After each test all structural members, joints and attachment systems shall be visually examined for fractures or cracks, any small cracks in unimportant parts being ignored.

3.2. **Zone of clearance**

3.2.1. During each test an examination shall be made to see whether any part of the protection structure has entered the zone of clearance as defined in point 2 above.

3.2.2. In addition, an examination shall be made to determine whether any part of the zone of clearance is outside the protection of the protection structure. For this purpose it shall be considered to be outside the protection of the protection structure if any part of it would have come into contact with flat ground if the tractor had overturned towards the direction from which the impact came. For this purpose the front and rear tyres and track setting shall be assumed to be the smallest specified by the manufacturer.

3.3. **Elastic deflection (under side loading)**

The elastic deflection shall be measured 900 mm above the reference point, in the vertical plane in which the load is applied. For this measurement, any apparatus similar to that illustrated in Figure 9 of Part 4, may be used.

3.4. **Permanent deflection**

After the tests, the permanent deflection of the protection structure shall be recorded. For this purpose, before the start of the tests, the position of the main protection structure members in relation to the seat reference point shall be recorded.

PART 4

FIGURES

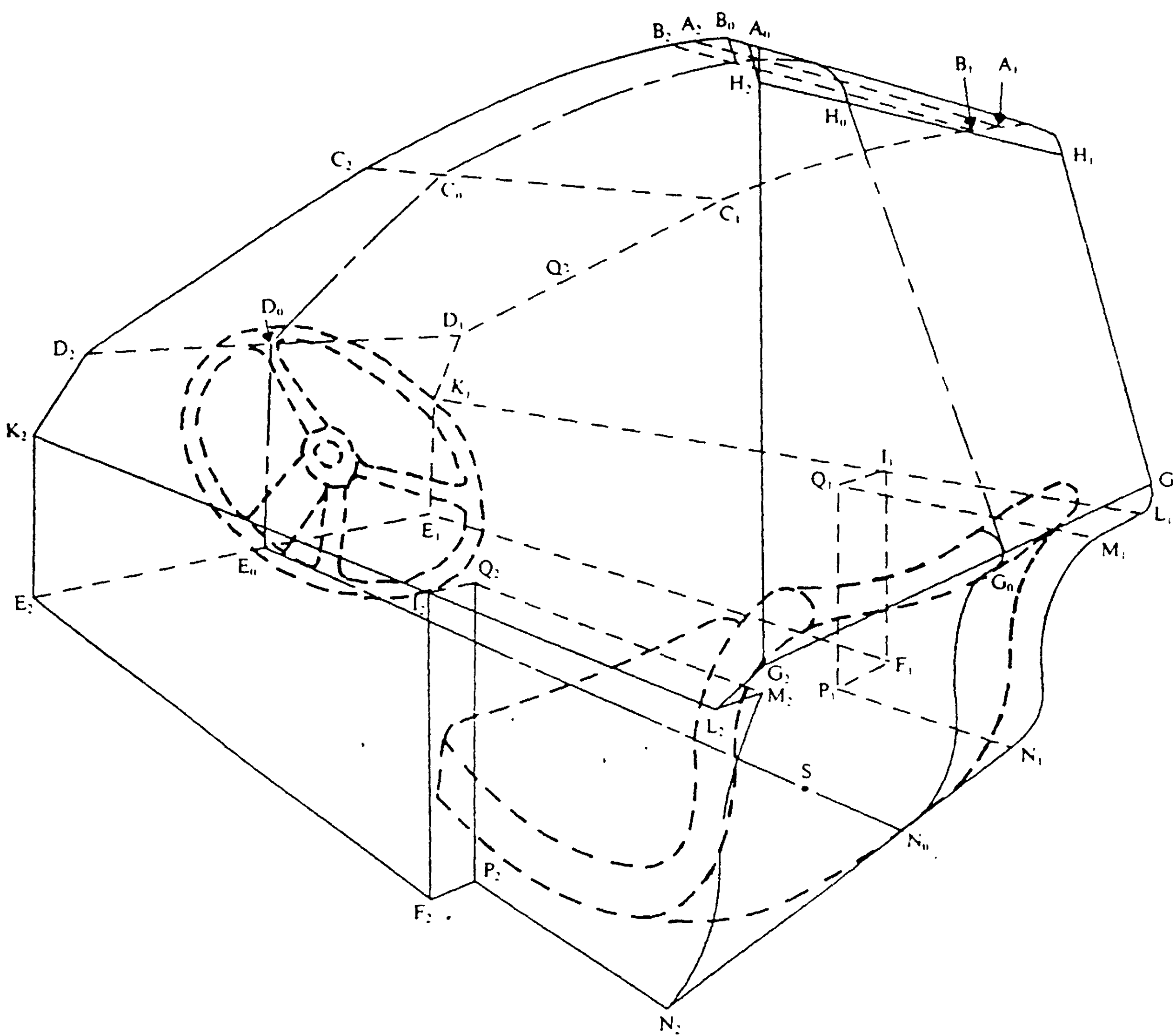


Figure 1

Zone of clearance — ³/₄ rear perspective view

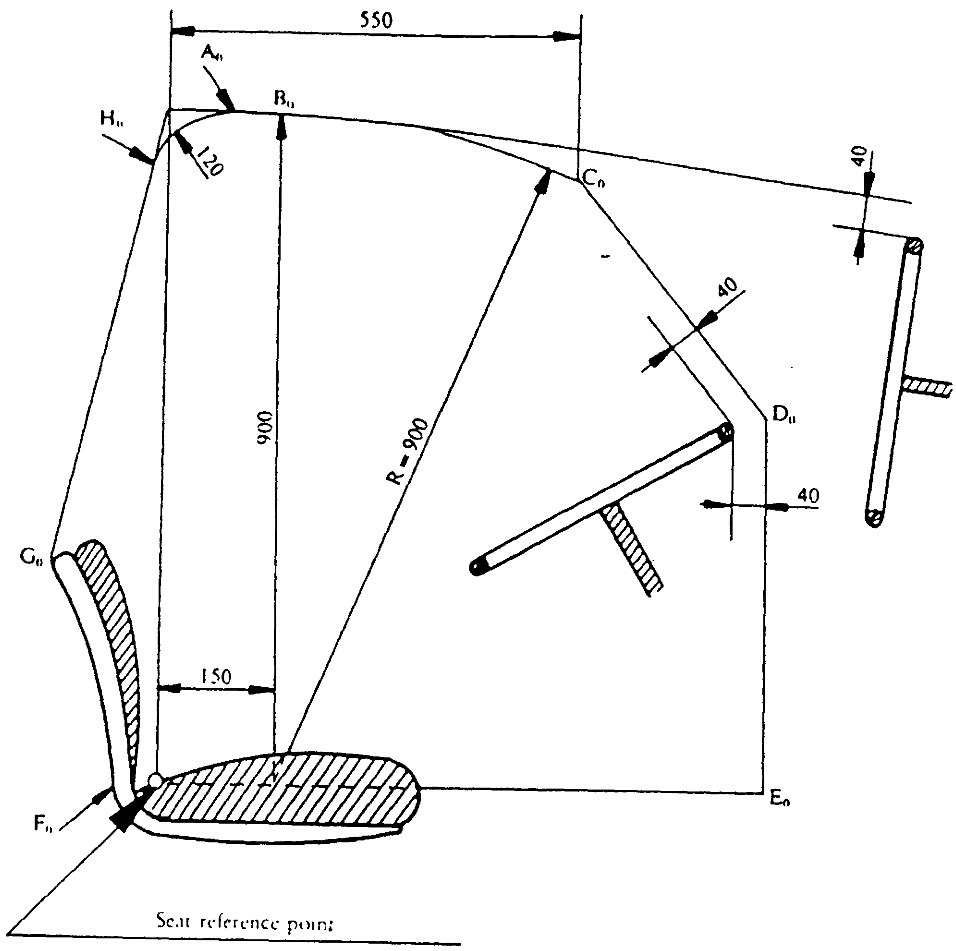


Figure 2a

Zone of clearance — Cross-section through the reference plane

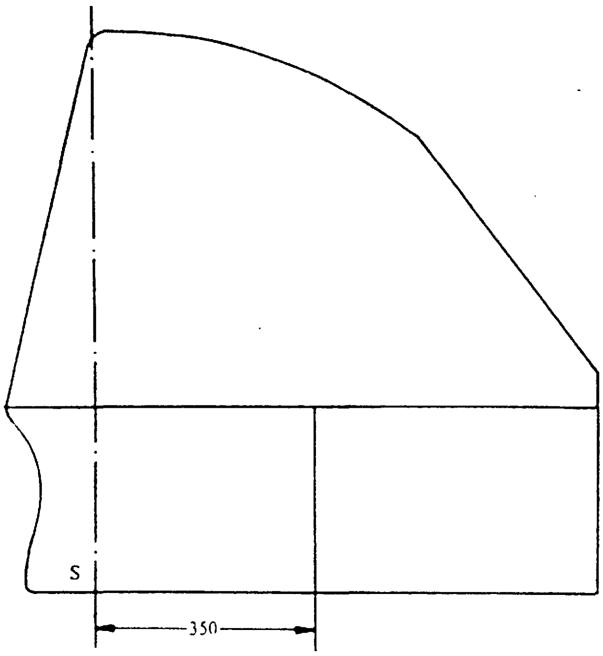


Figure 2b

Zone of clearance — Side view

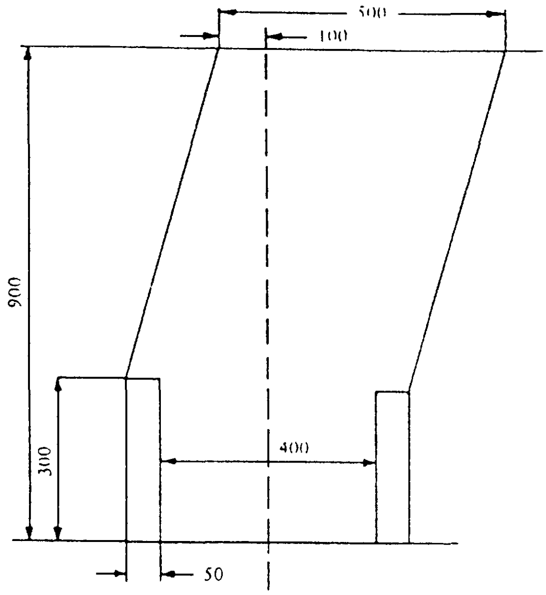


Figure 2c

Zone of clearance — Rear view

ZONE OF CLEARANCE

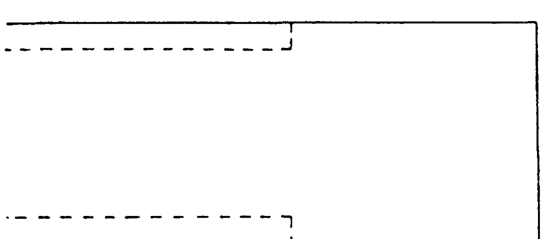


Figure 2d

Zone of clearance — Top view

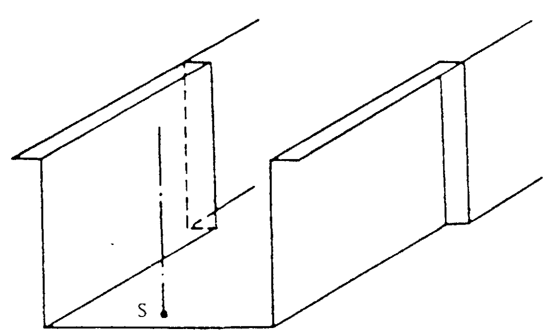


Figure 2e

Lower part of the zone of clearance — ¾ rear view

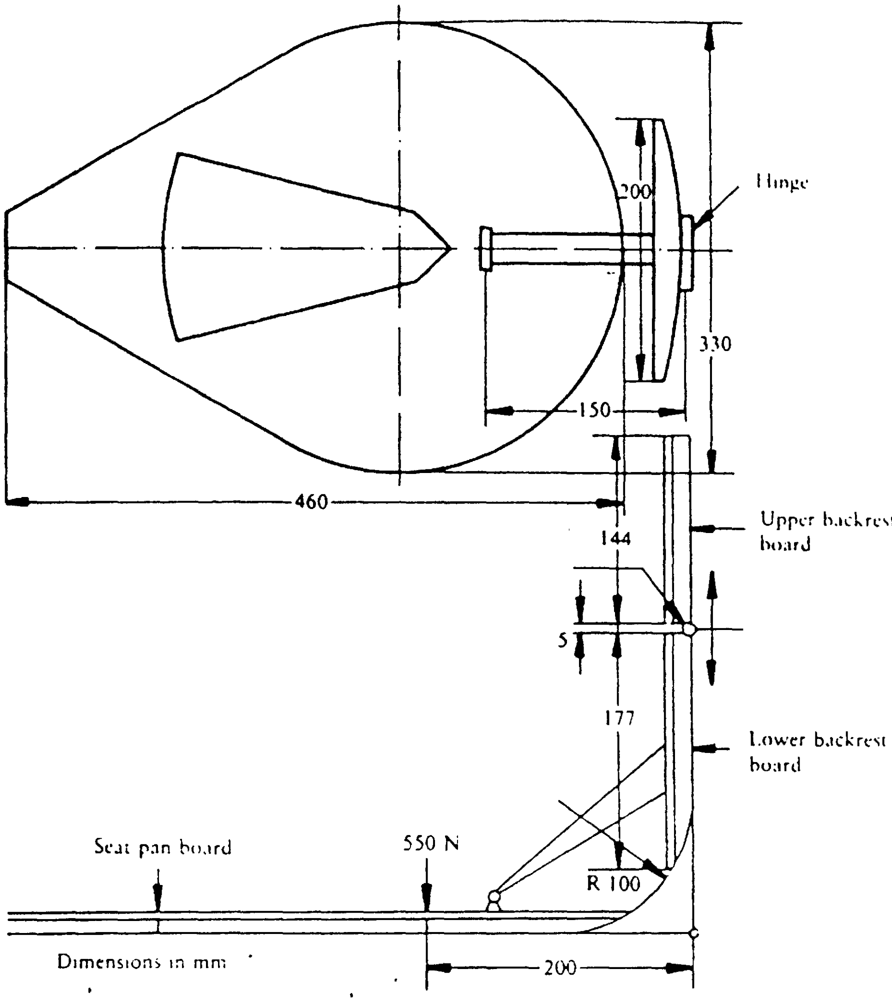


Figure 3a

Apparatus for determination of seat reference point

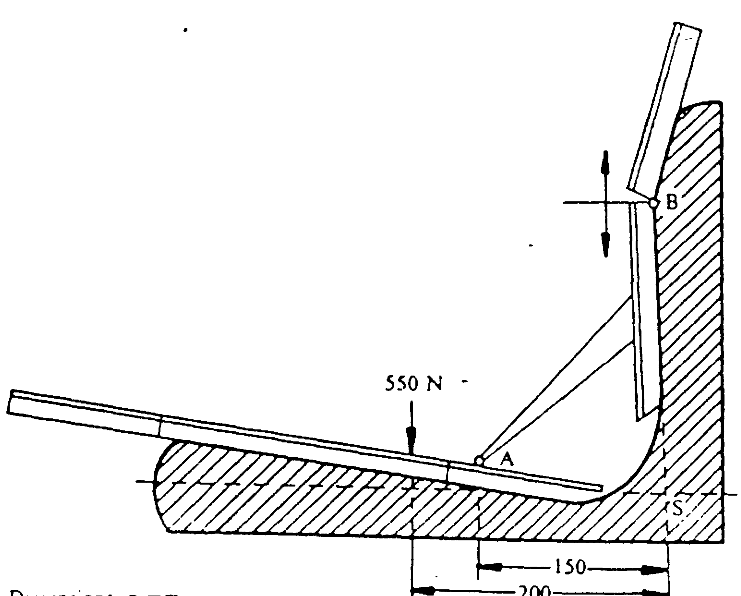


Figure 3b

Method of determining seat reference point

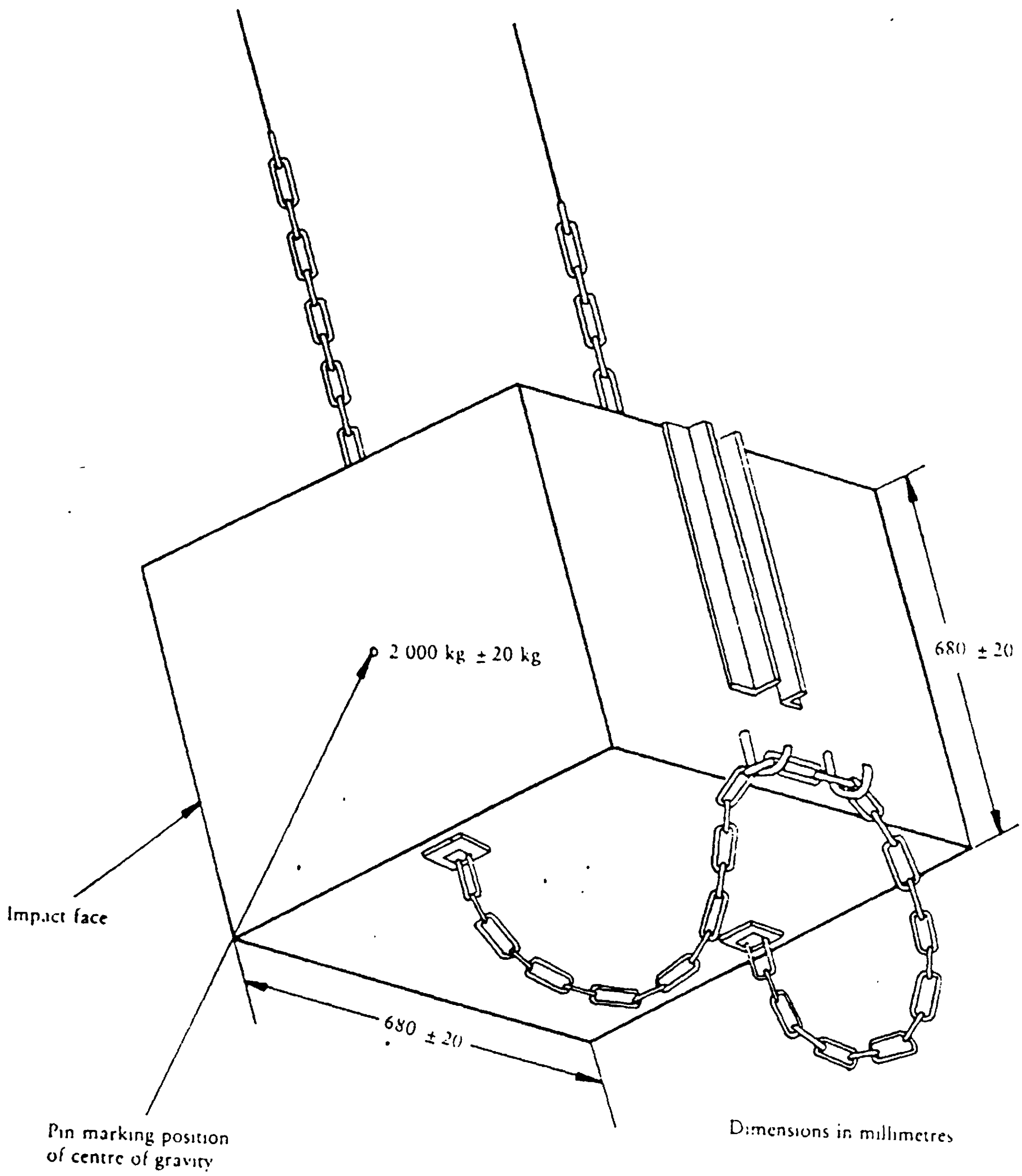


Figure 4

Pendulum block and its suspending chains or wire ropes

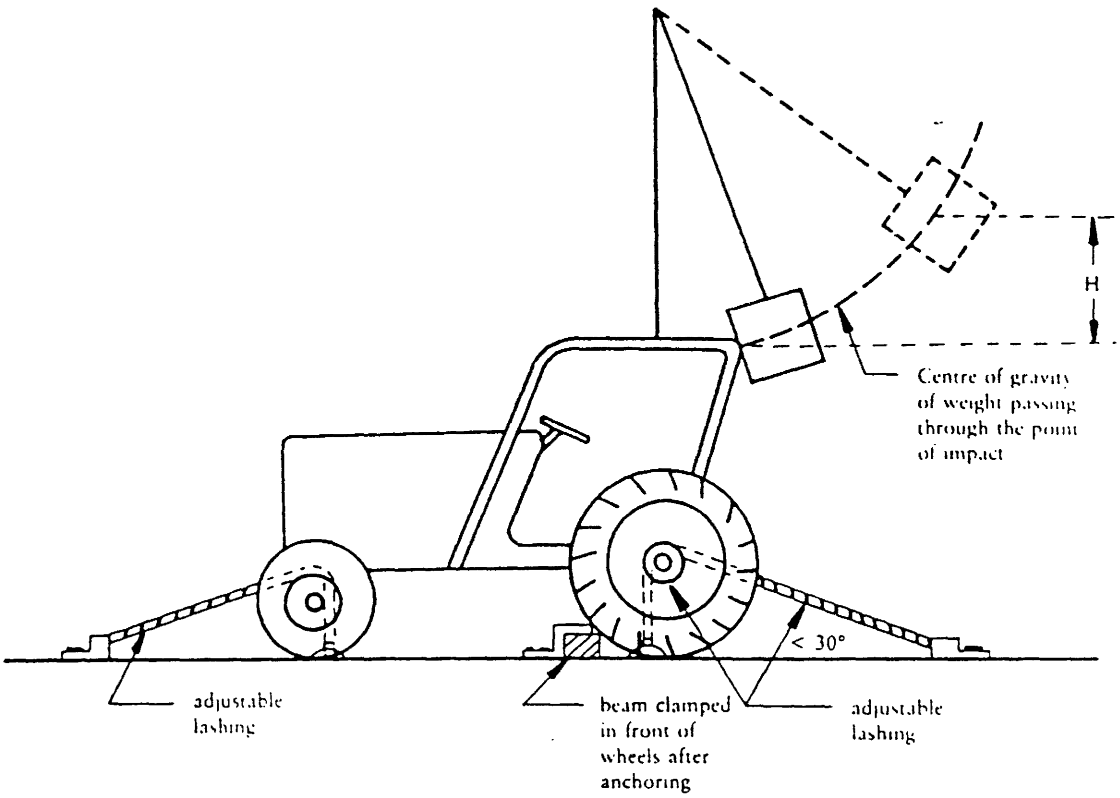


Figure 5

Impact at the rear

Note:

The configuration of the protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

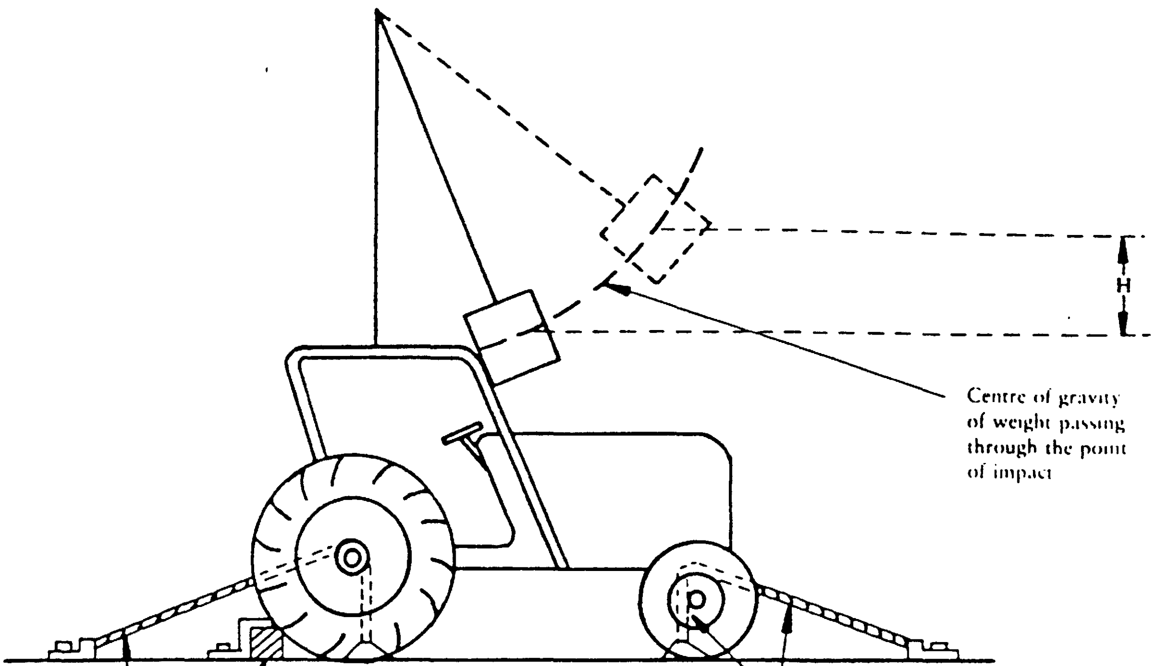


Figure 6

Impact at the front

Note:

The configuration of the protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

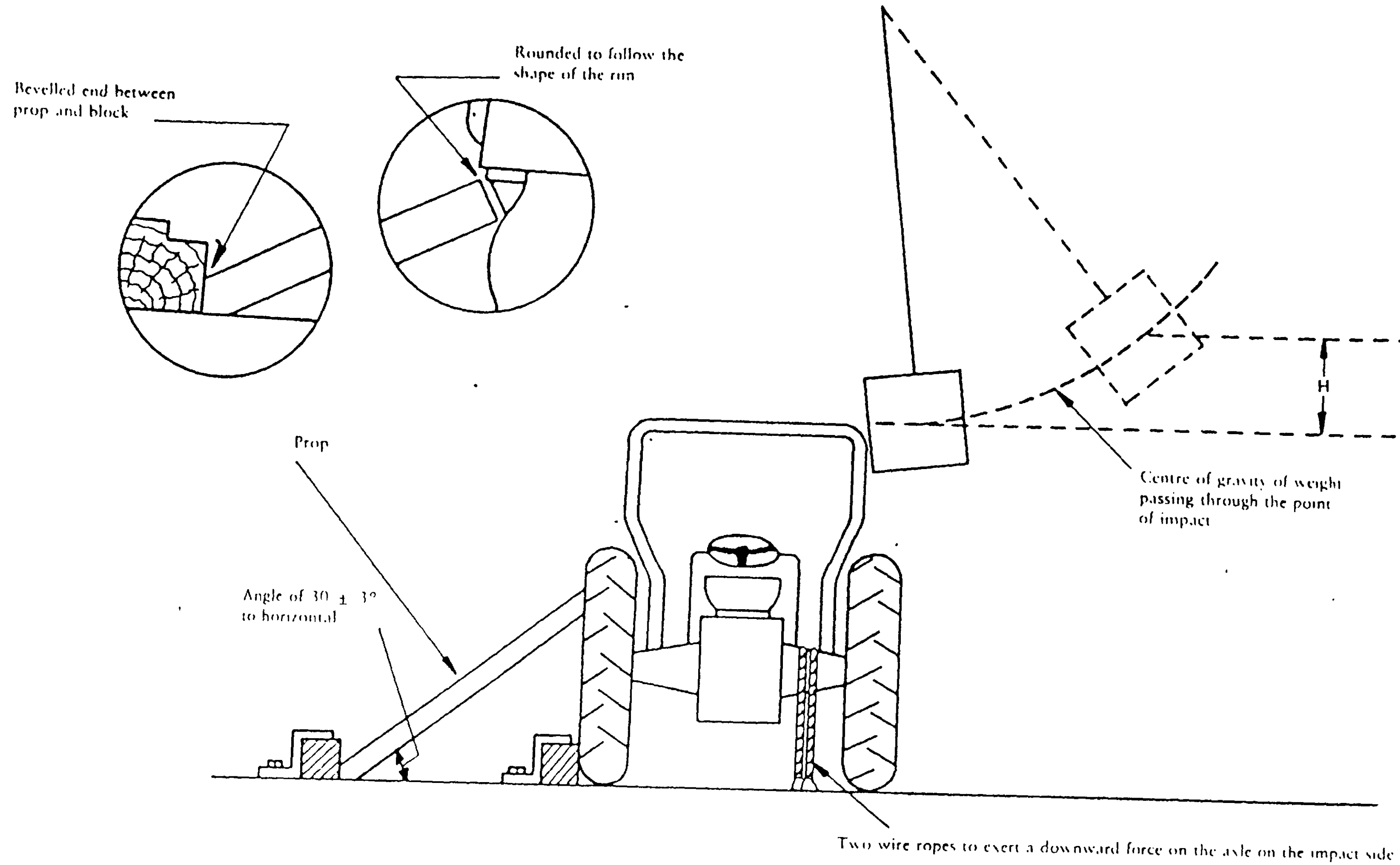


Figure 7

Impact from side

Note.

The configuration of the protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

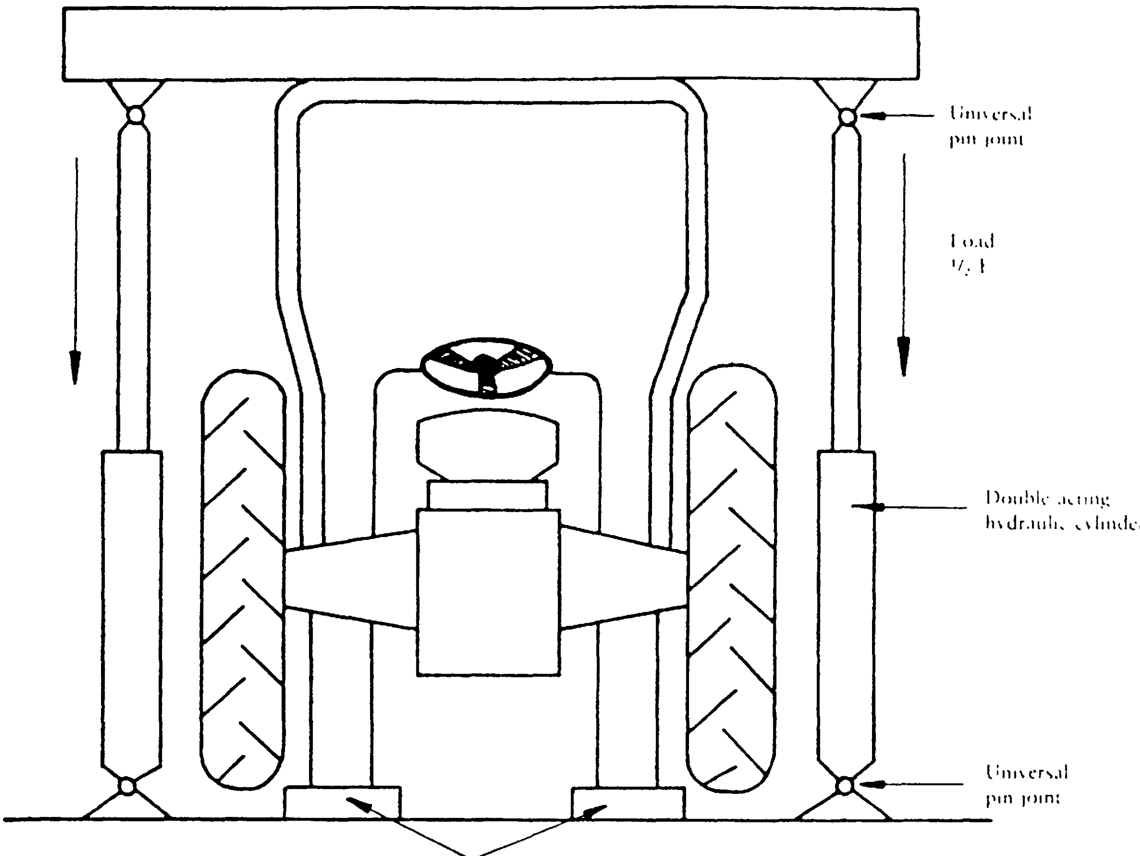


Figure 8

Crushing test

Note:

The configuration of the roll-over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.

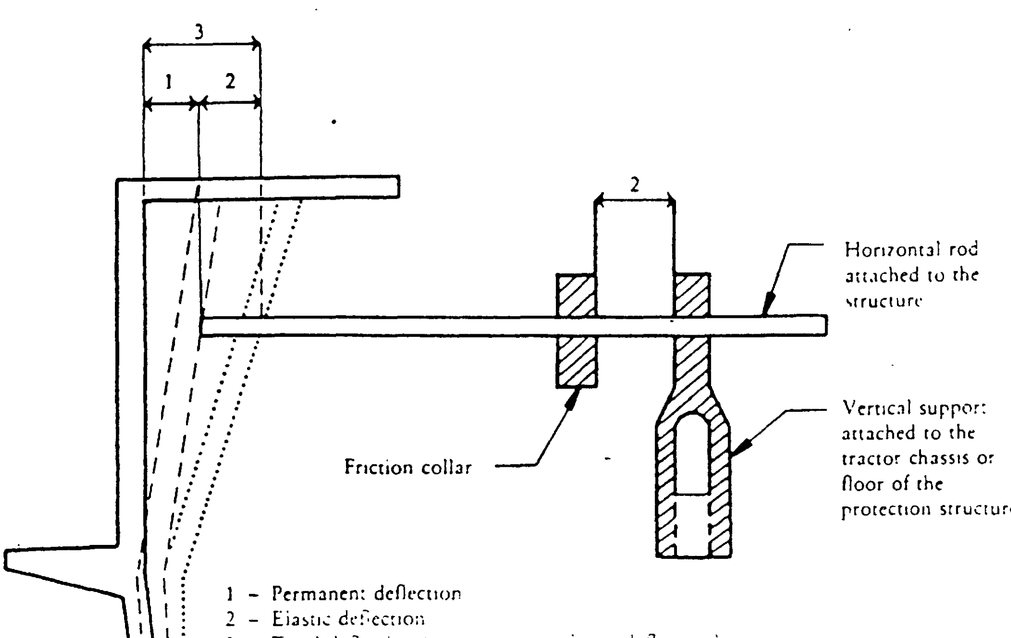
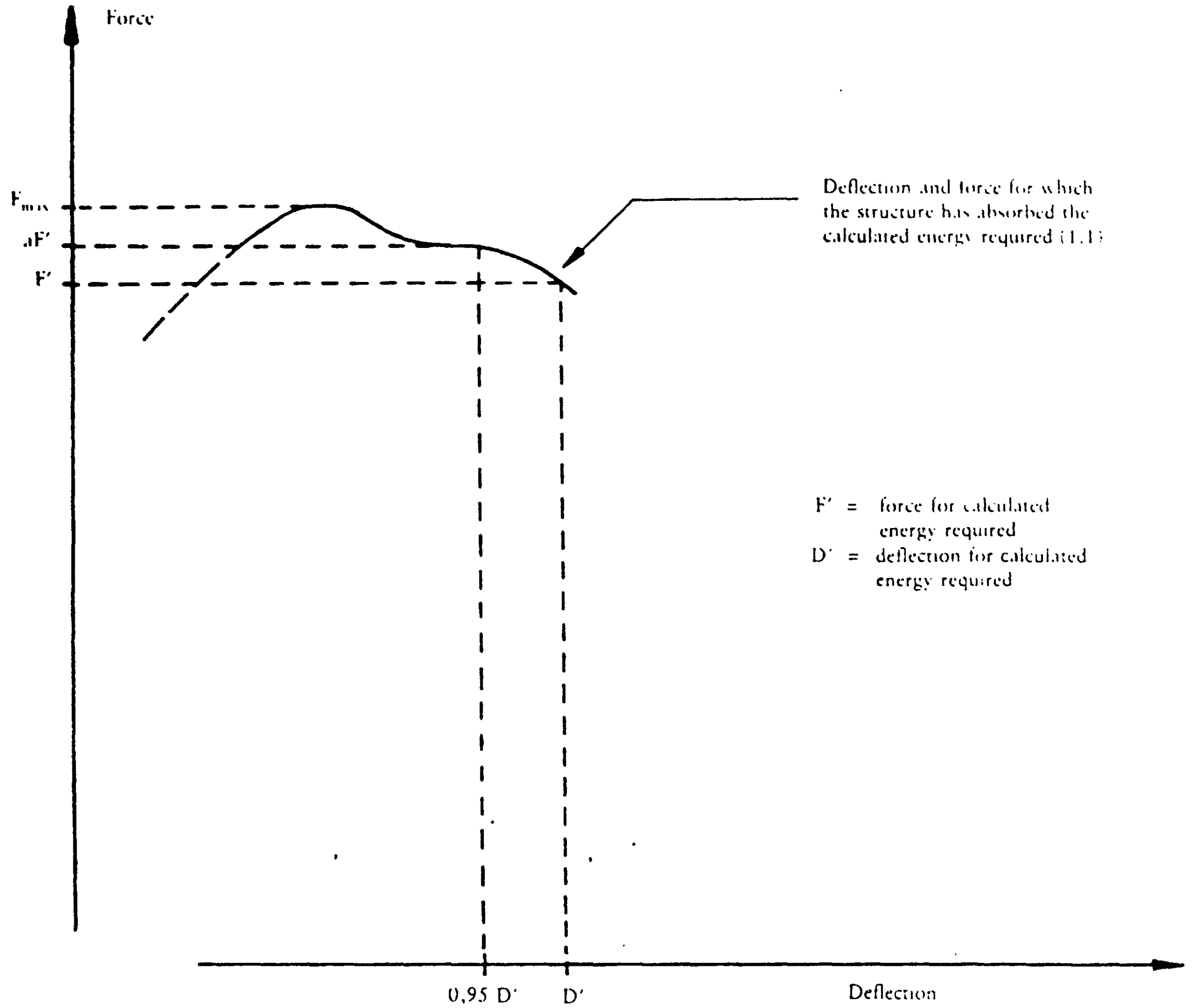


Figure 9

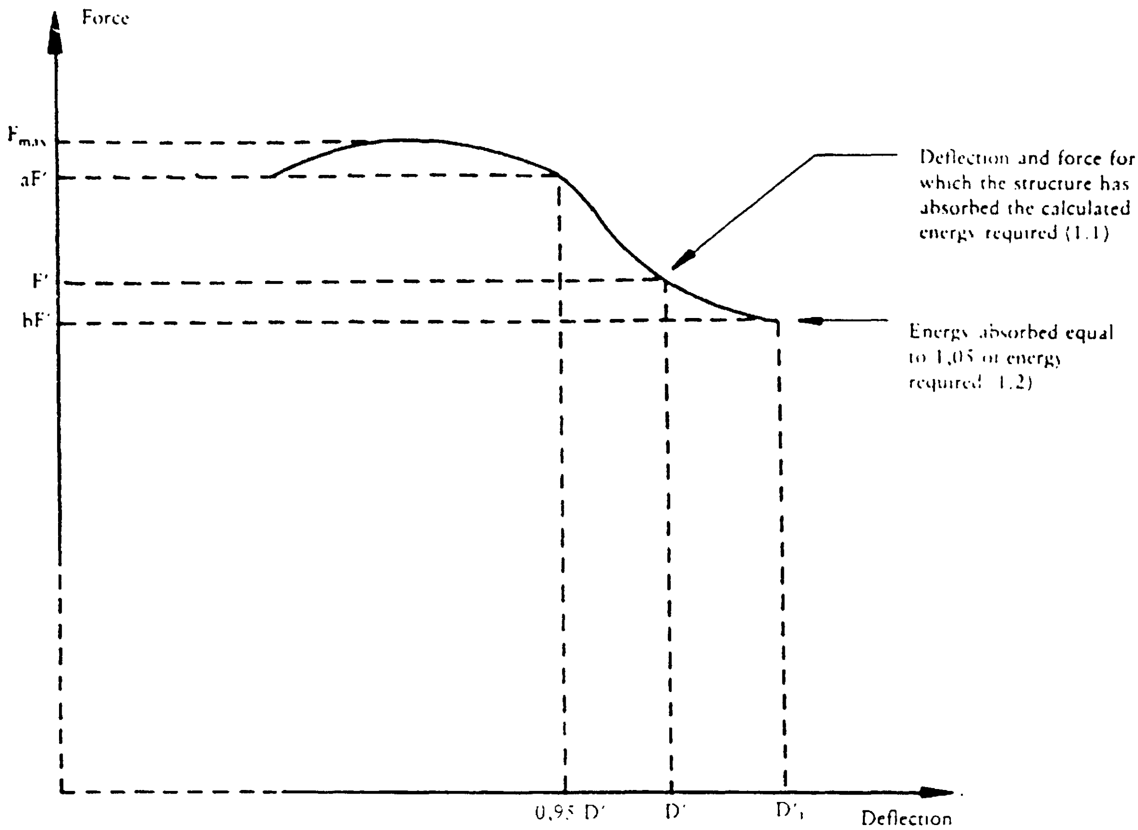
Example of apparatus for measuring elastic deflection



1. Reference aF' corresponding to 0,95 D'.
1.1. Overload test not necessary since aF' < 1,03 F'.

Figure 10a

Force/Deflection curve
Overload test not necessary

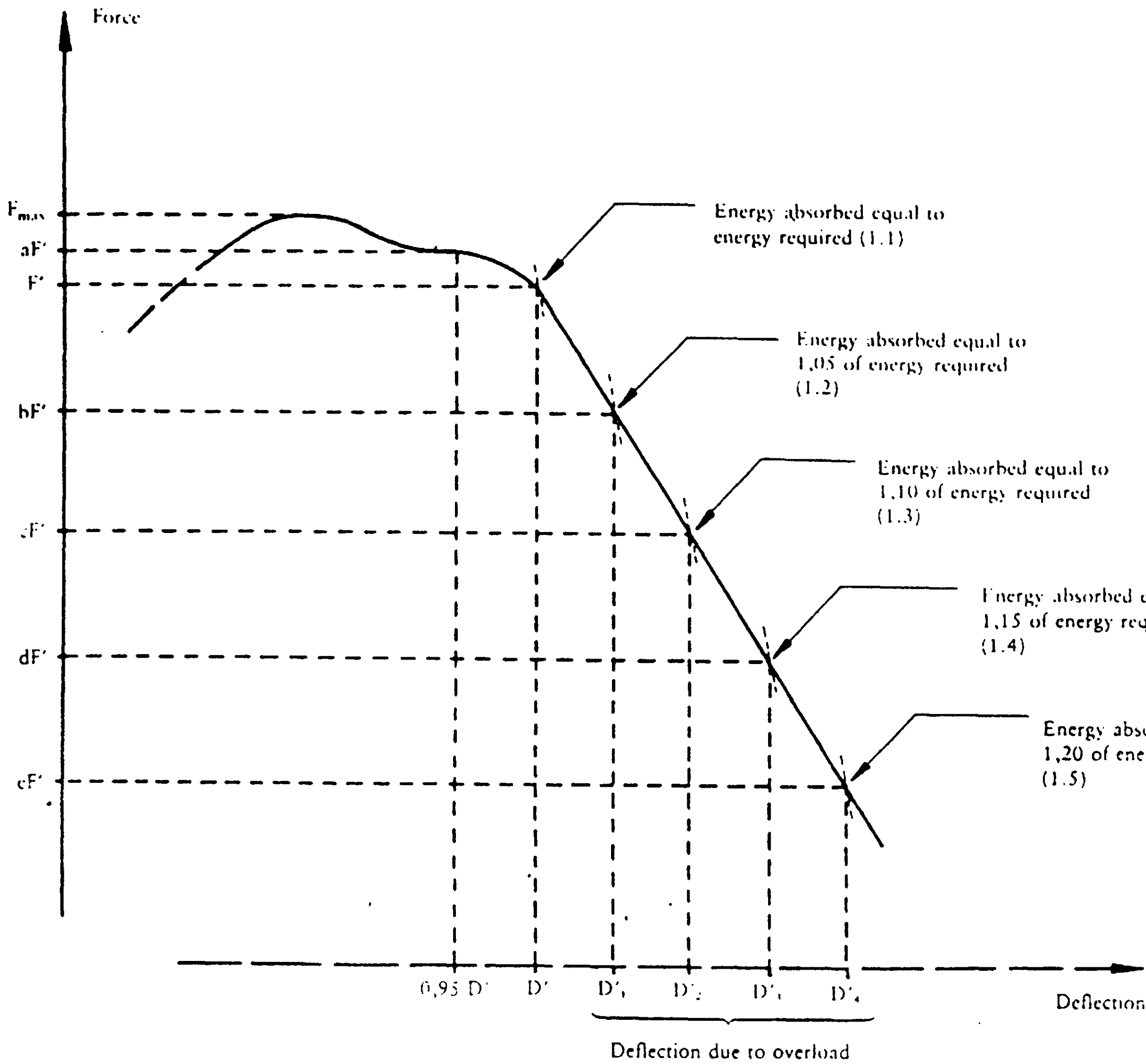


1. Reference aF' corresponding to 0,95 D'
1.1. Overload test necessary since aF' > 1,03 F'
1.2. Overload test satisfactory since
bF' > 0,97 F' and bF' > 0,8 F_{max}

Figure 10b

Force/Deflection curve
Overload test necessary

PAGE ANNULEE



Reference aF' corresponding to 0,95 D'.

1.1. Overload test necessary since aF' > 1,03 F'.
1.2. Since bF' < 0,97 F', overload test to be continued.
1.3. Since cF' < 0,97 bF', overload test to be continued.
1.4. Since dF' < 0,97 cF', overload test to be continued.
1.5. Overload test satisfactory since eF' > 0,8 $F_{maximum}$

Remark:

If at any moment F falls below 0,8 F_{max} the structure will be refused

Figure 10c

Force/Deflection curve
Overload test to be continued

PART 5

MODEL

REPORT RELATING TO THE EEC COMPONENT TYPE-APPROVAL TESTS OF A PROTECTION STRUCTURE (REAR-MOUNTED ROLLBAR, FRAME OR CAB) WITH REGARD TO ITS STRENGTH AS WELL AS TO THE STRENGTH OF ITS ATTACHMENT TO THE TRACTOR

Protection structure	
Make and type	
Tractor	
Make	
Type and commercial description	
Test method	Dynamic/static (1)

Identification of test station

EEC component type-approval No: ....

1. Trade mark or name and type of protection structure: ....

....

2. Name and address of manufacturer of tractor or protection structure: ....

....

3. If applicable, name and address of tractor or protection structure manufacturer's authorized representative: ....

....

4. Specifications of tractor on which the tests are carried out

4.1. Trade mark or name: ....

4.2. Type and commercial description: ....

4.3. Serial number: ....

4.4. Mass of unballasted tractor with protection structure fitted, without driver: .... kg

4.5. Wheelbase/moment of inertia (1): .... mm/kgm² (1)

4.6. Tyre sizes: front: ....

rear: ....

5. Extension of EEC component type-approval to other tractor types

5.1. Trade mark or name: ....

5.2. Type and commercial description: ....

5.3. Mass of unballasted tractor with protection structure fitted, without driver .... kg

(1) Delete where inapplicable.

5.4. Wheelbase/moment of inertia (1): .... mm/kgm² (1)

5.5. Tyre sizes: front: ....

rear: ....

6. Specifications of protection structure

6.1. General arrangement drawing of both the protection structure and its attachment to the tractor.

6.2. Photographs from side and rear showing mounting details.

6.3. Brief description of protection structure including type of construction, details of mounting on the tractor, details of cladding, means of access and escape, details of interior padding, features to prevent continuous rolling and details of heating and ventilation.

6.4. *Dimensions*

6.4.1. Height of roof members above the seat reference point: .... mm

6.4.2. Height of roof members above the tractor foot platform: .... mm

6.4.3. Interior width of the protection structure 900 mm above the seat reference point: .... mm

6.4.4. Interior width of the protection structure at a point above the seat at the height of the centre of the steering wheel: .... mm

6.4.5. Distance from the centre of steering wheel to the right-hand side of roll-over protection structure: .... mm

6.4.6. Distance from the centre of the steering wheel to the left-hand side of roll-over protection structure: .... mm

6.4.7. Minimum distance from the steering wheel rim to the roll-over protection structure: .... mm

6.4.8. Width of the doorways:

at the top .... mm

in the middle: .... mm

at the bottom: .... mm

6.4.9. Height of the doorways:

above foot platform .... mm

above highest mounting step: .... mm

above lowest mounting step: .... mm

6.4.10. Overall height of the tractor with the protection structure fitted .... mm

6.4.11. Overall width of the protection structure: .... mm

6.4.12. Horizontal distance to the rear of the protection structure from the back of the seat at a height of 900 mm above the seat reference point: .... mm

6.5. Details and quality of materials used, standards used:

Main frame: .... (material and dimensions)

Mountings: .... (material and dimensions)

Cladding: .... (material and dimensions)

Roof: .... (material and dimensions)

Interior padding: .... (material and dimensions)

(1) Delete where inapplicable.

7. Test results

7.1. *Impact/load (1) and crushing tests*

Impact/load (1) tests were made to the left/right-hand (1) rear and to the right/left-hand (1) front and right/left-hand side (1). The reference mass used for calculating impact energies/the load (1) and crushing forces was .... kg

The test requirements concerning fractures or cracks, maximum instantaneous deflection and the zone of clearence were/were not (1) satisfactorily fulfilled.

7.2. *Deflection measured after the tests*

Permanent deflection:

rear: left-hand: .... mm

right-hand: .... mm

front: left-hand: .... mm

right-hand: .... mm

side sideways:

front: .... mm

rear: .... mm

top downwards:

front: .... mm

rear: .... mm

Difference between maximum momentary and residual deflection during sideways impact test: .... mm

7.3 Indication and results of any additional dynamic test

....

89/682/EEC

8. Report number: ....

9. Report date: ....

10. Signature: ....

86/298/EEC

(1) Delete where inapplicable.

PART 6

MARKS

The EEC component type-approval mark shall consist of:

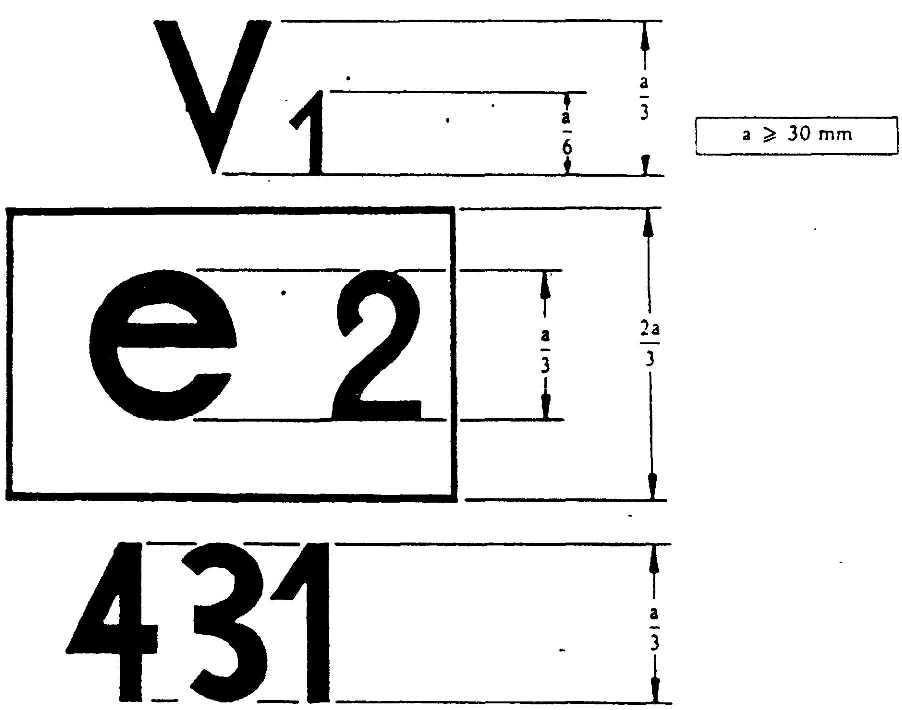
— a rectangle surrounding the lower-case letter 'e' followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval:

1 for Germany,
2 for France,
3 for Italy,
4 for the Netherlands,
6 for Belgium,
9 for Spain,
11 for the United Kingdom,
13 for Luxembourg,
18 for Denmark,
IRL for Ireland,
EL for Greece,
21 for Portugal,

— the EEC component type-approval number which corresponds to the number of the EEC component type-approval certificate issued with regard to the strength of the type of protection structure and its attachment to the tractor placed under and in the vicinity of the rectangle,

— the letters V or SV, depending on whether a dynamic (V) or static (SV) test was conducted, followed by the number 1, indicating that this is a protection structure within the meaning of this Directive.

Example of EEC component type-approval mark



The protection structure bearing the EEC component type-approval mark shown above is a structure of the rear-mounted rollbar, frame or cab type which has been subjected to a dynamic test, is intended for a narrow-track tractor (V1) and for which EEC component type-approval was granted in France (e2) under the number 431.

PART 7

MODEL EEC COMPONENT TYPE-APPROVAL CERTIFICATE

Name of competent authority

Notification concerning the granting, refusal, withdrawal or extension of EEC component type-approval with regard to the strength of a protection structure (rear-mounted rollbar, frame or cab) and to the strength of its attachment to the tractor

EEC component type-approval No: .... extension (1)

1. Trade name or mark and type of protection structure: ....

2. Name and address of manufacturer of protection structure: ....

3. If applicable, name and address of authorized representative of manufacturer of protection structure: ....

4. Trade mark or name, type and commercial description of tractor for which protection structure is intended: ....

5. Extension of EEC component type-approval for tractors of the following type's, and, where appropriate, commercial descriptions: ....

5.1. The mass of the unballasted tractor, as defined in point 1.4 of Part 2, exceeds/does not exceed (2) the reference mass used for the test by more than 5 %.

5.2. The method of attachment and points of attachment are/are not (2) identical.

5.3. All the components likely to serve as supports for the protection structure are/are not (2) identical.

6. Submitted for EEC component type-approval on: ....

7. Test station: ....

8. Date and number of the report of the test station: ....

9. Date of granting/refusal/withdrawal of EEC component type-approval (2): ....

10. Date of granting/refusal/withdrawal of the extension of EEC component type-approval (2): ....

11. Place: ....

12. Date: ....

13. The following documents, bearing the component type-approval number shown above, are annexed to this certificate (e.g. report of the test station). These documents must be sent to the competent authorities of the other Member States if they so request ....

14. Remarks, if any: ....

15. Signature: ....

---

(1) If applicable, state whether this is the first, etc. extension of the original EEC component type-approval.
(2) Delete where inapplicable.

PART 8

CONDITIONS FOR EEC TYPE-APPROVAL

1 The application for EEC type-approval of a tractor with regard to the strength of a protection structure and the strength of its attachment to the tractor shall be submitted by the tractor manufacturer or by his authorized representative.

2. A tractor representative of the tractor type to be approved, on which a protection structure and its attachment, duly approved, are mounted, shall be submitted to the technical services responsible for conducting the type-approval tests.

3. The technical service responsible for conducting the type-approval tests shall check whether the approved type of protection structure is intended to be mounted on the type of tractor for which the type-approval is requested. In particular, it shall ascertain whether the attachment of the component type-approval was granted.

4. The holder of the EEC type-approval may ask for its extension to other types of protection structures.

5. The competent authorities shall grant such extension on the following conditions:

5.1. The new type of protection structure and its tractor attachment must have received EEC component type-approval.

5.2. The new type of protection structure must be designed to be mounted on the type of tractor for which the extension of the EEC type-approval is requested.

5.3. The attachment of the protection structure to the tractor must correspond to that which was tested when EEC component type-approval was granted.

6 A certificate, of which a model is shown in Part 9 , shall be annexed to the EEC type-approval certificate for each type-approval or type-approval extension which has been granted or refused.

7. If the application for EEC type-approval for a type of tractor is introduced at the same time as the request for EEC component type-approval for a type of protection structure intended to be mounted on the type of tractor for which type-approval is requested, the checks laid down in points 2 and 3 are not applicable.

PART 9

MODEL

Name of competent authority

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE STRENGTH OF PROTECTION STRUCTURES (REAR-MOUNTED ROLLBAR, FRAME OR CAB) AND THE STRENGTH OF THEIR ATTACHMENT TO THE TRACTOR

(Article 4 (2))

EEC type-approval No: .... extension (1)

1. Trade name or mark of tractor: ....

2. Tractor type and commercial description: ....

3. Name and address of tractor manufacturer: ....
....

4. If applicable, name and address of manufacturer's authorized representative. ....
....

5. Trade name or mark and type of protection structure: ....
....

6. Extension of EEC-approval for the following type(s) of protection structure: ....
....

7. Tractor submitted for EEC type-approval on: ....

8. Technical service responsible for EEC type-approval conformity control: ....
....

9. Date of report issued by that service: ....

10. Number of report issued by that service. ....

11. EEC type-approval with regard to the strength of the protection structures and the strength of their attachment to the tractor has been granted/refused (2).

12. The extension of EEC type-approval with regard to the strength of the protection structures and the strength of their attachment to the tractor has been granted/refused (2).

13. Place: ....

14. Date: ....

15. Signature: ....

(1) If applicable, state whether this is the first, etc. extension of the original EEC type-approval.
(2) Delete where inapplicable.

ANNEX XXI

FRONT- MOUNTED ROLL-OVER PROTECTION DEVICES

PART 1 : CONDITIONS FOR EEC COMPONENT TYPE-APPROVAL

1. DEFINITION

1.1. 'Roll-over protection structure', hereinafter called 'protection structure', means the structure on a tractor the essential purpose of which is to avoid or limit risks to the driver resulting from roll-over of the tractor during normal use.

1.2. The structures mentioned in point 1.1 display the following characteristics.

— the principal structures are mounted in front of the centre of the steering wheel,

— the structures have a zone of clearance as defined in Part 4A, point 2.

2. GENERAL REQUIREMENTS

2.1. Every protection structure and its attachment to a tractor must be so designed and constructed as to fulfil the essential purpose laid down in point 1.1.

2.2. This condition is considered to be fulfilled if the requirements of Parts 2,3 and 4 are complied with.

3. APPLICATION FOR EEC COMPONENT TYPE-APPROVAL

3.1. The application for EEC component type-approval with regard to the strength of a protection structure and the strength of its attachment to a tractor must be submitted by the tractor manufacturer or by the manufacturer of the protection structure or by their authorized representatives.

3.2. The application must be accompanied by the undermentioned documents in triplicate and by the following particulars:

— a drawing, either to scale or with indication of the principal dimensions, showing the general arrangement of the protection structure. This drawing must, in particular, show details of the mounting components,

— photographs from side and front showing mounting details,

— a brief description of the protection structure, including type of construction, method of mounting on the tractor and, where necessary, details of cladding and interior padding,

— details of materials used in the structure and in the roll-over protection structure mountings (see Part 6).

3.3. A tractor representative of the tractor type for which the protection structure to be approved is intended must be submitted to the technical service responsible for conducting the component type-approval tests. This tractor must be equipped with the protection structure.

Furthermore, the manufacturer must indicate the sizes of tyres fitting or able to fit the front and rear axles.

3.4. The holder of EEC component type-approval may request its extension to other tractor types. The competent authority which has granted the original EEC component type-approval must grant the extension if the approved protection structure and the type(s) of tractor for which the extension is requested comply with the following conditions:

— the mass of the unballasted tractor, as defined in point 1.4 of Part 3, does not exceed by more than 5 % the reference mass used in the test;

— the method of attachment and the points of attachment to the tractor are identical.

— any components such as mudguards and bonnet which may provide support for the protection structure have identical strength and are identically situated with respect to the protection structure,

— the critical dimensions and the position of the seat and steering wheel relative to the protection structure, and the position relative to the protection structure of the points deemed rigid and taken into consideration for the purpose of verifying that the zone of clearance is protected, are such that the zone of clearance continues to be protected by the structure after the latter has undergone the deformation resulting from the various tests.

4. MARKINGS

4.1. Every protection structure conforming to the approved type must bear the following markings:

4.1.1. The trade mark or name;

4.1.2. A component type-approval mark conforming to the model in Part 7 ,

4.1.3. Serial number of the protection structure;

4.1.4. Make and type(s) of tractor(s) for which the protection structure is intended.

4.2. All these particulars must appear on a small plate.

4.3. These markings must be visible, legible and indelible.

PART 2

PRIOR CONDITIONS FOR THE STRENGTH TESTS LAID DOWN IN PARTS 3 and 4

1. PREPARATION FOR THE PRELIMINARY TEST

The tractor must be equipped with the protection structure in its safety position. The tractor must be fitted with tyres having the greatest diameter indicated by the manufacturer and the smallest cross-section for tyres of that diameter. The tyres must not be liquid-ballasted and must be inflated to the pressure recommended for field work.

The rear whells must be set to the narrowest track width; the front wheels must be set as closely as possible to the same track width. If it is possible to have two front track settings which differ equally from the narrowest rear track setting, the wider of these two front track settings must be selected.

All the tractor's tanks must be filled or the liquids must be replaced by an equivalent mass in the corresponding position.

2. LATERAL STABILITY TEST

Place the tractor, prepared as specified above, on a horizontal plane so that the tractor font-axle pivot point or, in the case of an articulated tractor, the horizontal pivot point between the two axles can move freely.

Using any appropriate means, such as a jack or a hoist, tilt the part of the tractor which is rigidly connected to the axle that bears more than 50 % of the tractor's weight, while constantly measuring the angle of inclination. This angle must be at least 38° at the moment when the tractor is resting in a state of unstable equilibrium on the wheels touching the ground.

Perform the test once with the steering wheel turned to full right lock and once with the steering wheel turned to full left lock.

3. NON-CONTINUOUS ROLLING TEST

3.1. General remarks

This test is intended to check whether a structure fitted to the tractor for the protection of the driver can satisfactorily prevent continuous roll-over of the tractor in the event of its overturning laterally on a slope with a gradient of 1 in 1,5.

Evidence of non-continuous rolling can be provided in accordance with one of the two methods described in points 3.2 and 3.3.

3.2. Demonstration of non-continuous rolling behaviour by means of the overturning test

The overturning test must be carried out on a test slope at least four metres long (see Part 5, Figure 1). The surface must be covered with an 18 cm layer of a material which — measured in accordance with ASAE Recommendation No R 313, Point 1 has a cone penetration index of A (235 ± 20) or B (335 ± 20).

The tractor is tilted laterally with zero initial speed; for this purpose it is placed at the start of the test slope in such a way that the wheels on the downhill side rest on the slope and the tractor's medium plane is parallel with the contour lines.

After striking the surface of the test slope, the tractor may lift itself from the surface by pivoting about the upper corner of the protection structure, but it must not roll over. It must fall back on the side which it first struck.

3.3. Demonstration of non-continuous rolling behaviour by calculation

3.3.1 For the purpose of verifying non-continuous rolling behaviour by calculation, the following characteristic tractor data must be ascertained (see Figure in Appendix 2):

H_S (m): Height of centre of gravity.

L_3 (m): Horizontal distance between the centre of gravity and rear axle.

L 2 (m):	Horizontal distance between the centre of gravity and the front axle.
D 3 (m):	Height of rear tyres.
D 2 (m):	Height of front tyres.
H 6 (m):	Overall height (point-of-impact height).
L 6 (m):	Horizontal distance between the centre of gravity and the leading point of intersection of the protection structure (to be preceded by a minus sign if this point lies in front of the plane of the centre of gravity).
B 6 (m):	Width of protection structure.
H 7 (m):	Height of engine bonnet.
B 7 (m):	Width of engine bonnet.
L 7 (m):	Horizontal distance between the centre of gravity and the front corner of the engine bonnet.
H 0 (m):	Height of the front-axle pivot point.
S (m):	Rear track width.
B 0 (m):	Rear tyre width.
D 0 (rad):	Front-axle swing angle (from zero position to end of travel).
M (kg):	Tractor mass.
Q (kgm^2):	Moment of inertia about the longitudinal axis through the centre of gravity.

The sum of the track width S and tyre B 0 must be greater than the width B 6 of the protection structure.

3.3.2. For the purposes of calculation, the following simplifying assumptions can be made:

- the stationary tractor overturns on a slope with a 1 in 1,5 gradient with a balanced front axle, as soon as the centre of gravity is vertically above the axis of rotation,
- the axis of rotation is parallel to the tractor's longitudinal axis and passes through the centre of the contact surfaces of the downhill front and rear wheel,
- the tractor does not slide downhill,
- impact on the slope is partly elastic, with a coefficient of elasticity of U = 0,2,
- the depth of penetration into the slope and the deformation of the protection structure together amount to T = 0,2 m,
- no other componentes of the tractor penetrate into the slope.

4. CONDITIONS GOVERNING STRENGTH TESTS

The protection structure may only be subjected to the strength tests described in Parts 3 and 4 if both of the tests described in points 2 and 3 of this Part have been satisfactorily completed.

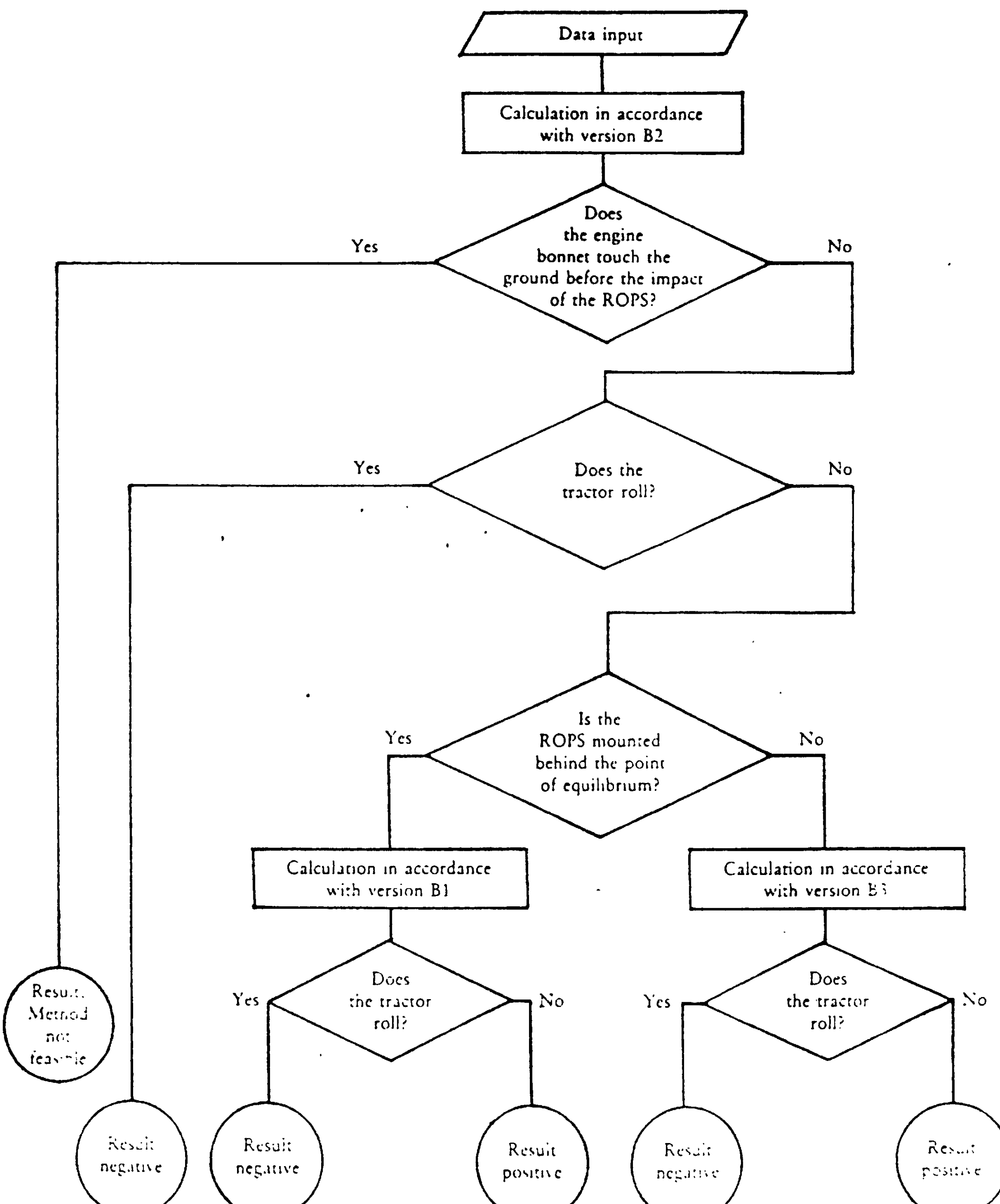
Appendix 1

Flow diagram for determining the continuous roll-over behaviour of a laterally overturning tractor with a front, centre or rear-mounted roll-over protection structure (ROPS)

Version B1: Point of impact of ROPS behind longitudinally unstable equilibrium point

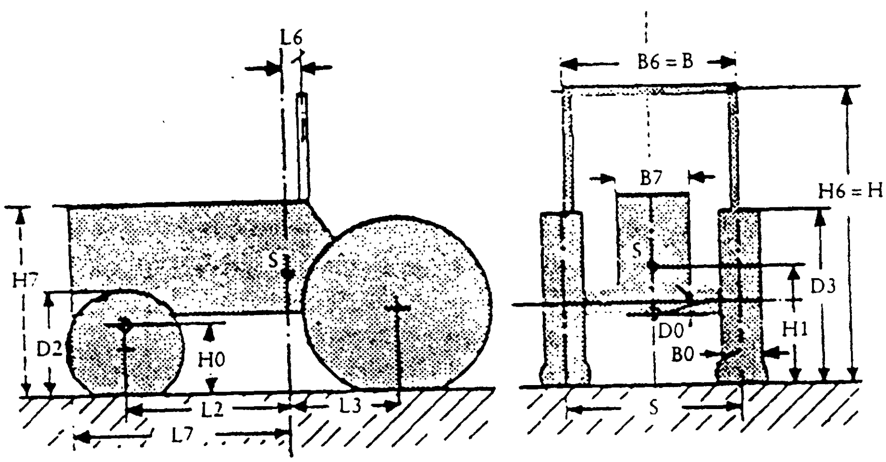
Version B2: Point of impact of ROPS near longitudinally unstable equilibrium point

Version B3: Point of impact of ROPS in front of longitudinally unstable equilibrium point



Appendix 2

Figures relating to non-continous roll-over



Mass M	.... kg
Front tyres	.... \
Rear tyres	... h
Moment of inertia Q	.... kgm²

Data required for calculating the overturn of a tractor with triaxial rolling behaviour.

PART 3

CONDITIONS FOR TESTING THE STRENGTH OF PROTECTION STRUCTURES AND OF THEIR ATTACHMENT TO TRACTORS

1. GENERAL REQUIREMENTS

1.1. **Test purposes**

Tests made using special rigs are intended to simulate such loads as are imposed on a protection structure, when the tractor overturns. These tests, described in Part 4, enable observations to be made on the strength of the protection structure and any brackets attaching it to the tractor and any parts of the tractor which transmit the test load.

1.2. **Test methods**

Tests may be performed in accordance with the dynamic procedure (see Parts 3A and 4A) or the static procedure (see Parts 3B and 4B), the choice being left to the manufacturer.

The two methods are equivalent.

1.3. **General rules governing preparation for tests**

1.3.1. The protection structure must conform to the series production specifications. It must be attached in accordance with the manufacturer's recommended method to one of the tractors for which it is designed.

A complete tractor is not required for the static strength test; however, the protection structure and parts of the tractor to which it is attached represent an operating installation, hereinafter referred to as 'the assembly'.

1.3.2. For both the static test and the dynamic test the tractor as assembled must be fitted with all series production components which may affect the strength of the protection structure or which may be necessary for the strength test.

Components which may create a hazard in the zone of clearance must also be fitted so that they may be examined to see whether the requirements of points 3.1 and 3.2 of this Part have been fulfilled.

All components of the tractor or the protection structure including weather protection must be supplied or described on drawings.

1.3.3. For the strength test, all panels and detachable non-structural components must be removed so that they may not contribute to the strengthening of the protection structure.

1.3.4. *Track width*

The track width must be adjusted so that the protection structure will as far as possible not be supported by the tyres during the strength tests. If these tests are conducted in accordance with the static procedure, it must be possible to remove the wheels.

1.4. **Tractor reference mass**

The reference mass m_t, used in the formulae (see Parts 4A and B) to calculate the height of the fall of the pendulum block, the loading energies and the crushing forces, must be at least that defined in point 2.4 of Part 1 of Annex I (i.e., excluding optional accessories but including coolant, oils, fuel, tools and driver) plus the protection structure and less 75 kilograms. Not included are optional front or rear weights, tyre ballast, mounted implements, mounted equipment or any specialized components.

2. TESTS

2.1. Sequence of tests

The sequence of tests is as follows, without prejudice to the additional tests mentioned in point 1.6 of Part 4A and 1.6 and 1.7 of Part 4B.

2.1.1. Impact (dynamic tests) or loading (static test) at the rear of the structure (see point 1.1 of Parts 4A and 4B.).

2.1.2. Rear crushing test (dynamic or static tests) (see point 1.4 of Parts 4 A and 4 B).

2.1.3. Impact (dynamic tests) or loading (static tests) at the front of the structure (see point 1.2 of Parts 4A and 4B).

2.1.4. Impact (dynamic tests) or loading (static tests) at the side of the structure (see point 1.3 of Parts 4A and 4B).

2.1.5. Crushing at the front of the structure (dynamic or static tests) (see point 1.5 of Parts 4A and 4B).

2.2. **General requirements**

2.2.1. If, during the test, any part of the restraining equipment breaks or moves, the test must be restarted.

2.2.2. No repairs or adjustments of the tractor or protection structure may be carried out during the tests.

2.2.3. The tractor gear box must be in neutral and the brakes off during the tests.

2.2.4. If the tractor is fitted with a suspension system, between the tractor body and the wheels, it must be blocked during the tests.

2.2.5. The side chosen for application of the first impact on the rear of the structure (in the case of dynamic tests) or the first load on the rear of the structure (in the case of static tests) must be that which, in the opinion of the testing authorities, will result in the application of the series of impacts or loads under the most unfavourable conditions for the structure. The side impact or load and the rear impact or load must be applied on both sides of the median longitudinal plane of the protection structure. The front impact or load must be applied on the same side of the median longitudinal plane of the protection structure as the side impact or load.

2.3. Mesurement tolerances

2.3.1. Linear dimensions: ± 3 mm

except for:

— tyre deflection. ± 1 mm,

— structure deflection during horizontal loadings: ± 1 mm,

— each of the two measurements for the height of fall of the pendulum block: ± 1 mm

2.3.2. Masses: ± 1 %

2.3.3 Forces: ± 2 %

2.3.4. Angles: ± 2 degrees.

3. ACCEPTANCE CONDITIONS

3.1. A protection structure submitted for EEC component type-approval is regarded as having satisfied the strength requirements if it fulfils the following conditions:

3.1.1. After each part-test it must be free from cracks or tears within the meaning of point 3.1 of Parts 4A and 4B. If, during one of the tests, significant cracks or tears appear, an additional test, in accordance with Part 4 A or Part 4 B.

3.1.2. During the tests no part of the protection structure must enter the zone of clearance as defined in point 2 of Parts 4A and 4B.

3.1.3. During the tests no part of the zone of clearance must be outside the protection of the structure, in accordance with point 3.2 of Parts 4A and 4B.

3.1.4. The elastic deflection, measured in accordance with point 3.3 of Parts 4 and 4B, must be less than 250 mm.

3.2. There must be no accessories presenting a hazard for the driver. There must be no projecting accessory or part which is liable to injure the driver should the tractor overturn, or any accessory or part which is liable to trap him — for example by the leg or the foot — as a result of the deflections of the structure.

4. TEST REPORT

4.1. The test report is attached to the EEC component type-approval certificate referred to in Part 8

The presentation of the report is as shown in Part 6.

The report must include:

4.1.1. A general description of the protection structure's shape and construction (normally at least a scale of 1:20 for the general drawings and 1:2,5 for drawing of the attachments). The main dimensions must figure on the drawings; external dimensions of tractor with protection structure fitted; main interior dimensions and details of provisions for normal entry and exit and for escape where appropriate; and details of heating and ventilation system, where appropriate.

4.1.3. A brief description of any interior padding.

4.2. The report must identify clearly the tractor type (make, type, trade-name, etc.) used for testing and the types for which the protection structure is intended.

4.3. If EEC component type-approval is being extended to other tractor types, the report must include the exact reference of the report of the original EEC component type-approval as well as precise indications regarding the requirements laid down in point 3.4 of Part 1.

A. Apparatus and equipment for dynamic tests

87/402/EEC

1. PENDULUM BLOCK

1.1. A pendulum block must be suspended by two chains or wire ropes from pivot points not less than six metres above the ground. Means must be provided for adjusting independently the suspended height of the block and the angle between the block and the supporting chains or wire ropes.

1.2. The mass must be 2 000 ± 20 kilograms excluding the mass of the chains or wire ropes which themselves must not exceed 100 kilograms. The length of the sides of the impact face must be 680 ± 20 mm (see Figure 4, of Part 5). The block must be filled in such a way that the position of its centre of gravity is constant and coincides with the geometrical centre of the parallelepiped.

1.3. The parallelepiped must be connected to the system which pulls it backwards by an instantaneous release mechanism which is so designed and located as to enable the pendulum block to be released without causing the parallelepiped to oscillate about its horizontal axis perpendicular to the pendulum's plane of oscillation.

2. PENDULUM SUPPORTS

The pendulum pivot points must be rigidly fixed so that their displacement in any direction does not exceed 1 % of the height of fall.

3. LASHINGS

3.1. Anchoring rails with the requisite track width and covering the necessary area for lashing the tractor in all the cases illustrated (see Figures 5, 6, and 7, Part 5) must be rigidly attached to a non-yielding base beneath the pendulum.

3.2. The tractor must be lashed to the rails by means of wire rope with round strand, fibre core, construction 6 × 19 in accordance with ISO 2408 and a nominal diameter of 13 mm. The metal strands must have an ultimate tensile strength of 1 770 MPa.

3.3. The central pivot of an articulated tractor must be supported and lashed down as appropriate for all tests. For the side impact test, the pivot must also be propped from the side opposite the impact. The front and rear wheels need not be in line if this facilitates the attachment of the wire ropes in the appropriate manner.

4. WHEEL PROP AND BEAM

4.1. A softwood beam of 150 mm square must be used as a prop for the wheels during the impact tests (see Figures 5, 6 and 7, Part 5).

4.2. A softwood beam must be clamped to the floor to brace the rim of the wheel opposite the side impact as shown in Figure 7, Part 5.

5 PROPS AND LASHINGS FOR ARTICULATED TRACTORS

5.1. Additional props and lashings must be used for articulated tractors. Their purpose is to ensure that the section of the tractor on which the protection structure is fitted is as rigid as that of a rigid tractor.

5.2. Additional specific details are given in Part 4A for the impact and crushing tests.

6 TYRE PRESSURES AND DEFLECTIONS

6.1. The tractor tyres must not be liquid-ballasted and must be inflated to the pressures prescribed by the tractor manufacturer for field work.

6.2. The lashings must be tensioned in each particular case that the tyres undergo a deflection equal to 12 % of the tyre wall height before tensioning.

7. CRUSHING RIG

A rig as shown in Figure 8, Part 5 , must be capable of exerting a downward force on a protection structure through a rigid beam approximately 250 mm wide connected to the load-applying mechanism by means of universal joints. Suitable axle stands must be provided so that the tractor tyres do not bear the crushing force.

8. MEASURING APPARATUS

8.1 A device such as that illustrated in Part 5 , Figure 9, for measuring the elastic deflection , the difference between the maximum momentary deflection and the permanent deflection

8.2. A device for checking that the protection structure has not entered the zone of clearance and that the latter has remained within the structure's protection during the test (see point 3.2 of Part 4A.

B. Apparatus and equipment for static tests

1. STATIC TESTING RIG

1.1. The static testing rig must be designed in such a way as to permit thrusts or 'loads' to be applied to the protection structure.

1.2. Provision must be made so that the load can be uniformly distributed normal to the direction of loading and along a flange having a length of one of the exact multiples of 50 between 250 and 700 mm. The stiff flange must have a vertical face dimension of 150 mm. The edges of the flange in contact with the protection structure must be curved with a maximum radius of 50 mm.

1.3. The pad must be capable of being adjusted to any angle in relation to the load direction, in order to be able to follow the angular variations of the structure's load-bearing surface as the structure deflects.

1.4. Direction of loading (deviation from horizontal and from vertical):

— at start of test, under zero load: ± 2°

— during test, under load: 10° above and 20° below the horizontal.

These variations must be kept to a minimum.

1.5. The deflection rate must be sufficiently slow (less than 5 mm/s) for the load at all moments to be considered as 'static'.

2. APPARATUS FOR MEASURING THE ENERGY ABSORBED BY THE STRUCTURE

2.1. The 'force versus deflection' curve must be plotted in order to determine the energy absorbed by the structure. There is no need to measure the force and deflection at the point where the load is applied to the structure; however, 'force' and 'deflection' must be measured simultaneously and co-linearly.

2.2. The point of origin of deflection measurements must be selected so as to take account only of the energy absorbed by the structure and/or by the deflection of certain parts of the tractor. The energy absorbed by the deflection and/or the slipping of the anchoring must be ignored.

3. MEANS OF ANCHORING THE TRACTOR TO THE GROUND

3.1. Anchoring rails with the requisite track width and covering the necessary area for anchoring the tractor in all the cases illustrated must be rigidly attached to a non-yielding base near the testing rig.

3.2. The tractor must be anchored to the rails by any suitable means (plates, wedges, wire ropes, jacks, etc.) so that it cannot move during the tests. This requirement must be checked during the test, by means of the usual devices for measuring length.

If the tractor moves, the entire test must be repeated, unless the system for measuring the deflections taken into account for plotting the 'force versus deflection' curve is connected to the tractor.

4. CRUSHING RIG

4.1. A rig as shown in Figure 8 of Part 5 must be capable of exerting a downward force on a protection structure through a rigid beam approximately 250 mm wide connected to the load-applying mechanism by means of universal joints. Suitable axle stand must be provided so that the tractor tyres do not bear crushing force.

5. OTHER MEASURING APPARATUS

5.1. A device such as that illustrated in Figure 9 of Part 5, for measuring the elastic deflection (the difference between the maximum momentary deflection and the permanent deflection).

5.2. A device for checking that the protection structure has not entered the zone of clearance and that the latter has remained within the structure's protection during the test (see point 3.2 of Part 4B.

C. Symbols

m_t (kg):	tractor reference mass, as defined in point 1.4 of this Part.
$D_{(mm)}$:	deflection of the structure at the point of impact (dynamic tests) or at the point of, and in line with, the load application (static tests).
$H_{(mm)}$:	falling height of the pendulum block.
F (N) (Newton):	static load force.
F_{max}:	maximum static load force occurring during loading, (N) with the exception of the overload.
F' (N):	loading force corresponding to E'$_i$
F-D:	force/deflection diagram
E_{is} (J) (Joule):	energy input to be absorbed during side loading.
E_{il} (J):	energy input to be absorbed during longitudinal loading.
F_v (N):	vertical crushing force.
E_i (J):	strain energy absorbed. Area under F-D curve (see Figure 10a, Part 5).
E'_i (J):	strain energy absorbed after additional loading following a crack or tear (see Figures 10b and 10c, Part 5).
E_a (J):	strain energy absorbed at point when load is removed. Area contained within F-D curve (see Figure 10b, Part 5.
E''_i (J):	strain energy absorbed in overload test in the event of the load having been removed before starting this overload test. Area under F-D curve (see Figure 10c, Part 5.

PART 4
TEST PROCEDURES

A. Dynamic tests

1. IMPACT AND CRUSHING TESTS

1.1. **Impact at the rear**

1.1.1. The tractor must be so placed in relation to the pendulum block that the block will strike the protection structure when the impact face of the block and the supporting chains or wire ropes are at an angle with the vertical plane equal to $m_t/100$ with a 20° maximum, unless, during deflection, the protection structure at the point of contact forms a greater angle to the vertical. In this case the impact face of the block must be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at the angle defined above.

The suspended height of the block must be adjusted and necessary steps taken so as to prevent the block from turning about the point of impact.

The point of impact is that part of the protection structure likely to hit the ground first in a rearward overturning accident, normally the upper edge. The position of the centre of gravity of the block is one-sixth of the width of the top of the protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the protection structure.

If the structure is curved or protruding at this point, wedges enabling the impact to be applied thereon must be added, without thereby reinforcing the structure.

1.1.2. The tractor must be lashed to the ground by means of four wire ropes, one at each end of both axles, arranged as indicated in Figure 5 of Part 5. The spacing between the front and rear lashing points must be such that the wire ropes make an angle of less than 30° with the ground. The rear lashings must in addition be so arranged that the point of convergence of the two wire ropes is located in the vertical plane in which the centre of gravity of the block travels.

The wire ropes must be tensioned so that the tyres undergo the deflections given in point 6.2 of Part 3A.

With the wire ropes tensioned, the wedging beam must be placed in front of and tight against the rear wheels and then fixed to the ground.

1.1.3. If the tractor is of the articulated type, the point of articulation must in addition be supported by a wooden block at least 100 mm square and firmly lashed to the ground.

1.1.4. The pendulum block must be pulled back so that the height of its centre of gravity above that at the point of impact is given by one of the following two formulae, to be chosen according to the reference mass of the assembly subjected to the tests:

$H = 25 + 0{,}07\, m_t$ for assemblies with a reference mass of less than 2 000 kilograms.

$H = 125 + 0{,}02\, m_t$ for assemblies with a reference mass of more than 2 000 kilograms

The block is then released and strikes the protection structure.

1.2. **Impact at the front**

1.2.1. The tractor must be so placed in relation to the pendulum block that the block will strike the protection structure when the impact face of the block and the supporting chains or wire ropes are at an angle with the vertical plane equal to $m_t/100$ with a 20° maximum, unless, during deflection, the protection structure at the point of contact forms a greater angle to the vertical. In this case the impact face of the block must be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining at the angle defined above.

The suspended height of the pendulum block must be adjusted and the necessary steps taken so as to prevent the block from turning about the point of impact.

The point of impact is that part of the protection structure likely to hit the ground first if the tractor overturned sideways while travelling forward, normally the upper edge. The position of the centre of gravity of the weight is one-sixth of the width of the top of the protection structure inwards from a vertical plane parallel to the median plane of the tractor touching the outside extremity of the top of the protection structure.

If the structure is curved or protruding at this point, wedges enabling the impact to be applied thereon must be added, without thereby reinforcing the structure.

1.2.2. The tractor must be lashed to the ground by means of four wire ropes, one at each end of both axles, arranged as indicated in Figure 6 of Part 5. The spacing between the front and rear lashing points must be such that the wire ropes make an angle of less than 30° with the ground. The rear lashings must in addition be so arranged that the point of convergence of the two wire ropes is located in the vertical plane in which the centre of gravity of the pendulum blocks travels. The wire ropes must be tensioned so that the tyres undergo the deflections given in point 6.2 of Part 3A. With the wire ropes tensioned, the wedging beam must be placed behind and tight against the rear wheels and then fixed to the ground.

1.2.3. If the tractor is of the articulated type, the point of articulation must in addition be supported by a wooden block at least 100 mm square and firmly lashed to the ground.

1.2.4 The pendulum block must be pulled back so that the height of its centre of gravity above that at the point of impact is given by one of the following two formulae, to be chosen according to the reference mass of the assembly subjected to the tests:

$H = 25 + 0,07\ m_t$ for assemblies with a reference mass of less than 2 000 kilograms,

$H = 125 + 0,02\ m_t$ for assemblies with a reference mass of more than 2 000 kilograms.

The pendulum block is then released and strikes the protection structure.

1.3. Impact from the side

1.3.1 The tractor must be so placed in relation to the pendulum block that the block will strike the protection structure when the impact face of the weight and the supporting chains or wire ropes are vertical unless, during deflection, the protection structure at the point of contact forms an angle of less than 20° to the vertical.

In this case the impact face of the block must be adjusted by means of an additional support so that it is parallel to the protection structure at the point of impact at the moment of maximum deflection, the supporting chains or wire ropes remaining vertical on impact.

The suspended height of the pendulum block must be adjusted and necessary steps taken so as to prevent the block from turning about the point of impact.

The point of impact must be that part of the protection structure likely to hit the ground first in a sideways overturning accident

1.3.2. The tractor wheels on the side which is to receive the impact must be lashed to the ground by means of wire ropes passing over the corresponding ends of the front and rear axles. The wire ropes must be tensioned to produce the tyre deflection values given in point 6.2 of Part 3A.

With the wire ropes tensioned, the wedging beam must be placed on the ground, pushed tight against the tyres on the side opposite that which is to receive the impact and then fixed to the ground. It may be necessary to use two beams or wedges if the outer sides of the front and rear tyres are not in the same vertical plane.

The prop must then be placed as indicated in Figure 7 of Part 5, against the rim of the most heavily loaded wheel opposite to the point of impact, pushed firmly against the rim and then fixed at its base.

The length of the prop must be such that it makes an angle of 30 ± 3° with the ground when in position against the rim. In addition, its length must, if possible, be between 20 and 25 times greater than its thickness and its thickness between two and three times less than its width. The props must be shaped at both ends as shown in the details on Figure 7 of Part 5.

1.3.3. If the tractor is of the articulated type, the point of articulation must in addition be supported by a wooden block at least 100 mm square and laterally supported by a device similar to the prop pushed against the rear wheel. The point of articulation must then be lashed firmly to the ground.

1.3.4. The weight must be pulled back so that the height of its centre of gravity above that at the point of impact is given by one of the following two formulae, to be chosen according to the reference mass of the assembly subjected to the tests:

$H = (25 + 0{,}20\ m_t) \cdot \frac{B_h + B}{2B}$ for assemblies with a reference mass of less than 2 000 kilograms,

$H = (125 + 0{,}15\ m_t) \cdot \frac{B_h + B}{2B}$ for assemblies with a reference mass of more than 2 000 kilograms,

where B_h is the maximum outer width of the protection structure, and B is the minimum overall width of the tractor.

1.4. Crushing at the rear

The beam must be positioned over the rear uppermost structural member(s) and the resultant of crushing forces must be located in the tractor's median plant.

A force $F_v = 20\ m_t$ must be applied.

Where the rear part of the protection structure roof will not sustain the full crushing force, the force must be applied until the roof is deflected to coincide with the place joining the upper part of the protection structure with that part of the rear of the tractor capable of supporting the vehicle's mass when overturned. The force must then be removed, and the tractor or loading force repositioned so that the beam is over that point of the protection structure which would then support the tractor when completely overturned.

The force F_v is then applied. The force is applied for a minimum of five seconds following the cessation of any visually detectable deflection.

1.5. Crushing at the front

The beam must be positioned across the front uppermost structural member(s) and the resultant of crushing forces must be located in the tractor's median plane.

A force $F_v = 20\ m_t$ must be applied.

Where the front part of the protection structure roof will not sustain the full crushing force, the force must be applied until the roof is deflected to coincide with the plane joining the upper part of the protection structure with that part of the front of the tractor capable of supporting the vehicle's mass when overturned. The force must then be removed, and the tractor or loading force repositioned so that the beam is over that point of the protection structure which would then support the tractor when completely overturned.

The force F_v is then applied. The force is applied for a minimum of five seconds following the cessation of any visually detectable deflection.

89/681/EEC

1.6. Additional tests

1.6.1. If cracks or tears which cannot be considered negligible appear during an impact test, a second, similar test, but with a height of fall of:

$$H' = \frac{H}{10} \times \frac{12 + 4a}{1 + 2a}$$

shall be performed immediately after the impact tests causing these tears or cracks to appear, "a" being the ratio of the permanent deformation to the elastic deformation ($a = D_p/D_e$) as measured at the point of impact.

The additional permanent deformation due to the second impact must not exceed 30 % of the permanent deformation due to the first impact.

In order to be able to carry out the additional test, it is necessary to measure the elastic deformation during all of the impact tests.

1.6.2. If, during a crushing test, significant cracks or tears appear, a second, similar, crushing test, but with a force equal to 1,2 F_v, shall be performed immediately after the crushing test which caused these tears or cracks to appear.

2. ZONE OF CLEARANCE

2.1. The zone of clearance is shown in Part 5, Figures 2a, 2b, 2c, 2d and 2e.

The zone of clearance is defined on the basis of:

2.1.1. A vertical reference plane, generally longitudinal to the tractor and passing through the seat reference point and the centre of the steering wheel; this plane must be able to move horizontally with the seat and steering wheel during impacts but to remain perpendicular to the floor of the tractor or of the protection structure if this is resiliently mounted.

2.1.2. A reference line contained in the reference plane, which passes through the seat reference point and the first point on the steering wheel rim that it intersects when brought to the horizontal.

2.2. The zone of clearance is bounded by the following planes, the tractor being on a horizontal surface and, where the steering wheel is adjustable, its position adjusted for the middle position for driving.

2.2.1. Two vertical planes 250 mm on either side of the reference plane, these vertical planes extending 300 mm upwards from the horizontal plane passing through the seat reference point and longitudinally at least 550 mm in front of the vertical plane perpendicular to the reference plane passing 350 mm in front of the seat reference point.

2.2.2. Two vertical planes 200 mm on either side of the reference plane, these vertical planes extending 300 mm upwards from the horizontal plane passing through the seat reference point and longitudinally from the surface defined in point 2.2.11 to the vertical plane perpendicular to the reference plane passing 350 mm in front of the seat reference point.

2.2.3. An oblique plane perpendicular to the reference plane, parallel with and 400 mm above the reference line, extending backwards to the point where it interesects the vertical plane which is perpendicular to the reference plane and which passes through the seat reference point.

2.2.4. An oblique plane, perpendicular to the reference plane and resting on the top of the seat backrest, which meets the previous plane at its rearmost edge.

2.2.5. A vertical plane perpendicular to the reference plane, passing at least 40 mm forward of the steering wheel and at least 900 mm forward of the seat reference point.

2.2.6. A curvilinear surface with its axis perpendicular to the reference plane, having a radius of 150 mm and meeting the planes defined in points 2.2.3 and 2.2.5 at a tangent.

2.2.7. Two parallel oblique planes passing through the upper edges of the planes defined in point 2.2.1, with the oblique plane on the side where the impact is applied no closer than 100 mm to the reference plane above the zone of clearance,

2.2.8. A horizontal plane passing through the seat reference point.

2.2.9. Two portions of the vertical plane perpendicular to the reference plane passing 350 mm forward of the seat reference point, both these part planes joining respectively the rearmost limits of the planes defined in point 2.2.1 to the foremost limits of the planes defined in point 2.2.2.

2.2.10. Two portions of the horizontal plane passing 300 mm above the seat reference point, both these part planes joining respectively the uppermost limits of the vertical planes defined in point 2.2.2 to the lowermost limits of the oblique planes defined in point 2.2.7.

2.2.11. A curvilinear surface whose generating line is perpendicular to the reference plane and rests on the back of the seat backrest.

2.3. **Seat location and seat reference point**

2.3.1. *Seat reference point*

2.3.1.1 The reference point must be established by means of the apparatus illustrated in Figures 3a and 3b of Part 5. The apparatus consists of a seat pan board and backrest boards. The lower backrest board is jointed in the region of the ischium humps (A) and loin (B), the joint (B) being adjustable in height.

2.3.1.2. The reference point is defined as the point in the median longitudinal plane of the seat where the tangential plane of the lower backrest and a horizontal plane intersect. This horizontal plane cuts the lower surface of the seat pan board 150 mm in front of the abovementioned tangent.

2.3.1.3. The apparatus is positioned on the seat. It is then loaded with a force of 550 N at a point 50 mm in front of joint (A), and the two parts of the backrest board lightly pressed tangentially against the backrest.

2.3.1.4. If it is not possible to determine definite tangents to each area of the backrest (above and below the lumbar region) the following steps must be taken:

2.3.1.4.1. Where no definite tangent to the lower area is possible, the lower part of the backrest board is pressed against the backrest vertically.

2.3.1.4.2. Where no definite tangent to the upper area is possible, the joint (B) is fixed at a height of 230 mm above the lower surface of the seat pan board, the backrest board being perpendicular to the seat pan board. Then the two parts of the backrest board are lightly pressed against the backrest tangentially.

2.3.2 *Seat position and adjustment for determining the location of the seat reference point*

2.3.2.1. Where the seat position is adjustable, the seat must be adjusted to its rear uppermost position.

2.3.2.2. Where the inclination of the backrest and seat pan is adjustable, these must be adjusted so that the reference point is in its rear uppermost position.

2.3.2.3. Where the seat is equipped with suspension, the latter must be blocked at mid-travel, unless this is contrary to the instructions clearly laid down by the seat manufacturer. If such instructions exist, they must be complied with.

3 MEASUREMENTS TO BE MADE

3.1. Fractures and cracks

After each test all structural members, joints and fastening systems shall be visually examined for fractures or cracks, any small cracks in unimportant parts being ignored.

Any tears caused by the edges of the pendulum weight are to be ignored.

3.2. Zone of clearance

3.2.1 During each test the protection structure must be examined to see whether any part of the protection structure has entered a zone of clearance round the driving seat as defined in point 3.

3.2.2 In addition, the protection structure must be examined to determine whether any part of the zone of clearance is outside the protection of the structure. For this purpose it is considered to be outside the protection of the roll-over protection structure if any part of it would have come in contact with the ground plane if the tractor had overturned in the direction from which the impact came. For this purpose the front and rear tyres and track setting are assumed to be the smallest specified by the manufacturer. Moreover, if the tractor is fitted with a rigid section, a housing or other hard fixture placed behind the driver's seat, this fixture shall be regarded as a protection point, in the event of sideways or rear overturning. However, the height of this rear structure over the seat reference point must be less than 500 mm (see Part 5, figure 2 f).

In addition, it must be sufficiently rigid and firmly attached to the rear of the tractor. This structure mounted on the tractor should withstand, without breaking, a load which will be defined six months before implementation of the Directive, together with any detailed instructions for the testing to be carried out, under the procedure for adaptation to technical progress; this load will be applied horizontally at the point likely to hit the ground first if the tractor up-ends.

3.3. **Elastic deflection**

The elastic deflection is measured 900 mm above the reference point, in the vertical plane passing through the point of impact. For this measurement, apparatus similar to that illustrated in Figure 9, Part 5, must be used.

3.4. **Permanent deflection**

After the final crushing test the permanent deflection of the protection structure is recorded. For this purpose, before the start of the test, the position of the main roll-over protection structure members in relation to the seat reference point must be recorded.

B. Static tests

1. LOADING AND CRUSHING TESTS

1.1. **Loading at the rear**

1.1.1. The load is applied horizontally, in a vertical plane parallel to the tractor's median plane.

The load application point is that part of the roll-over protection structure likely to hit the ground first in a rearward overturning accident, normally the upper edge. The vertical plane in which the load is applied is located at a distance of one-third of the external width of the upper part of the structure from the median plane.

If the structure is curved or protruding at this point, wedges enabling the load to be applied thereon must be added, without thereby reinforcing the structure.

1.1.2. The assembly is lashed to the ground as described in point 3 of Part 3 B.

1.1.3. The energy absorbed by the protection structure during the test must be at least

$$E_{il} = 500 - 0{,}5\ m_t.$$

1.2. **Loading at the front**

1.2.1 The load is applied horizontally, in a vertical plane parallel to the tractor's median plane and located at a distance of one-third of the external width of the upper part of the structure therefrom.

The load application point is that part of the roll-over protection structure likely to hit the ground first if the tractor overturned sideways while travelling forward, normally the upper edge.

If the structure is curved or protruding at this point, wedges enabling the load to be applied thereon must be added, without thereby reinforcing the structure.

1.2.2. The assembly is lashed to the ground as described in point 3 of Part 3 B.

1.2.3. The energy absorbed by the protection structure during the test must be at least

$$E_{il} = 500 + 0,5\ m_t.$$

1.3. Loading from the side

1.3.1. The side loading is applied horizontally, in a vertical plane perpendicular to the tractor's median plane.

The load application point is that part of the roll-over protection structure likely to hit the ground first in a sideways overturning accident, normally the upper edge.

1.3.2. The assembly must be lashed to the ground as described in point 3 of Part 3 B.

1.3.3. The energy absorbed by the protection structure during the test must be at least

$$E_{is} = 1,75\ m_t \frac{B_b + B}{2B}$$

where B_b is the maximum external width of the protection structure and B is the minimum overall width of the tractor.

1.4. Crushing at the rear

All provisions identical to those given in point 1.4 of Part 4A.

1.5. Crushing at the front

All provisions identical to those given in point 1.5 of Part 4 A.

1.6. Overload test (additional test)

1.6.1. An overload test must be carried out in all cases where the force decreases by more than 3 % during the last 5 % of the deflection reached when the energy required is absorbed by the structure (see Figure 10b).

1.6.2. The overload test involves the gradual increase of the horizontal load by increments of 5 % of the initial energy requirement up to a maximum of 20 % of energy added (see Figure 10c).

1.6.2.1. The overload test is satisfactory if, after each increase by 5, 10, or 15 % in the energy required, the force decreases by less than 3 % for a 5 % increment and remains more than 0,8 F_{max}

1.6.2.2. The overload test is satisfactory if, after the structure has absorbed 20 % of the added energy, the force exceeds 0,8 F_{max}

1.6.2.3. Additional cracks or tears and/or entry into or lack of protection of the zone of clearance due to elastic deflection are permitted during the overload test. However, after the removal of the load, the structure must not enter the zone of clearance, which must be completely protected.

1.7. Crushing test

If cracks or tears which cannot be considered as negligible appear during a crushing test, a second, similar crushing, but with a force of 1.2 F_v, must be applied immediately after the crushing test which caused the cracks or tears to appear.

2 ZONE OF CLEARANCE

Identical to the zone of clearance described in point 2 of Part 4 [illegible], except that the word 'impact' is to be replaced by 'load' in the third line of point 2.2.[illegible].

87/402/EEC

3. MEASUREMENTS TO BE MADE

3.1. Fractures and cracks

After each test all structural members, joints and attachment systems must be visually examined for fractures or cracks, any small cracks in unimportant parts being ignored.

3.2. Zone of clearance

3.2.1. During each test the protection structure must be examined to see whether any part of the protection structure has entered a zone of clearance as defined in point 2 above.

3.2.2. In addition, the protection structure must be examined to determine whether any part of the zone of clearance is outside the protection of the structure. For this purpose it is considered to be outside the protection of the roll-over protection structure if any part of it would have come in contact with the ground plane if the tractor had overturned in the direction from which the impact came. For this purpose the front and rear tyres and track setting are assumed to be the smallest specified by the manufacturer. Moreover, if the tractor is fitted with a rigid section, a housing or other hard fixture placed behind the driver's seat, this fixture shall be regarded as a protection point, in the event of sideways or rear overturning. However, the height of this rear structure over the seat reference point must be less than 500 mm (see Part 5 , Figure 2f).

In addition, it must be sufficiently rigid and firmly attached to the rear of the tractor. This structure mounted on the tractor should withstand, without breaking, a load which will be defined six months before implementation of the Directive, together with any detailed instructions for the testing to be carried out, under the procedure for adaptation to technical progress; this load will be applied horizontally at the point likely to hit the ground first if the tractor up-ends.

3.3. Elastic deflection (under side loading)

The elastic deflection is measured 900 mm above the seat reference point, in the vertical plane in which the load is applied. For this measurement, any apparatus similar to that illustrated in Part 5 , Figure 9 may be used.

3.4. Permanent deflections

After the final crushing test the permanent deflection of the protection structure is recorded. For this purpose, before the start of the test, the position of the main roll-over protection structure members in relation to the seat reference point must be recorded.

PART 5

FIGURES

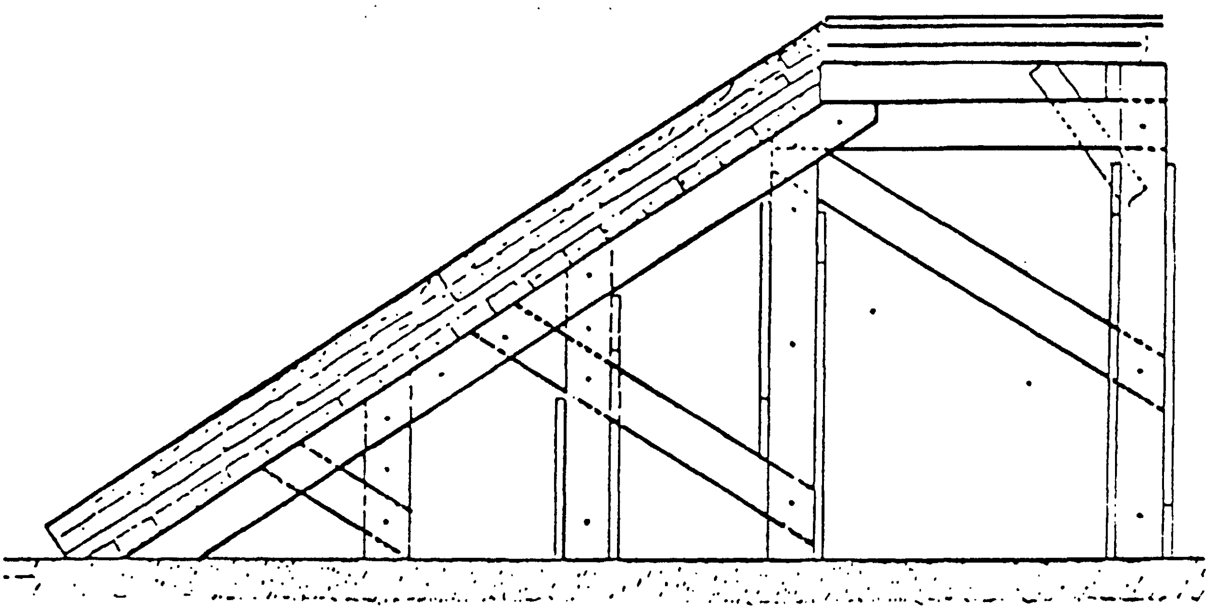


Figure 1

Rig for testing anti-roll properties on 1 in 1,5 gradient

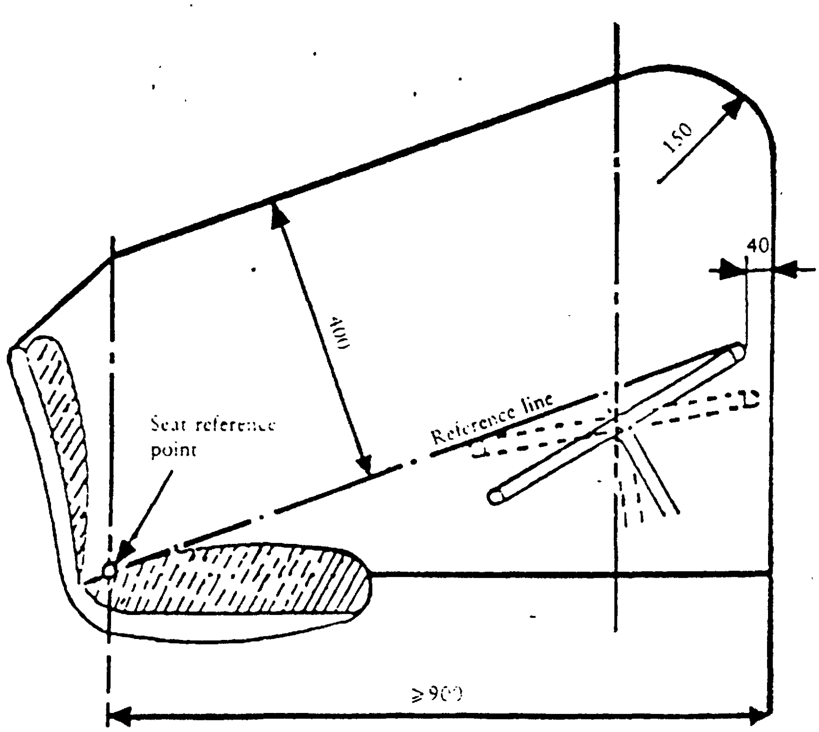


Figure 2a

Zone of clearance — Cross-section through the reference plane

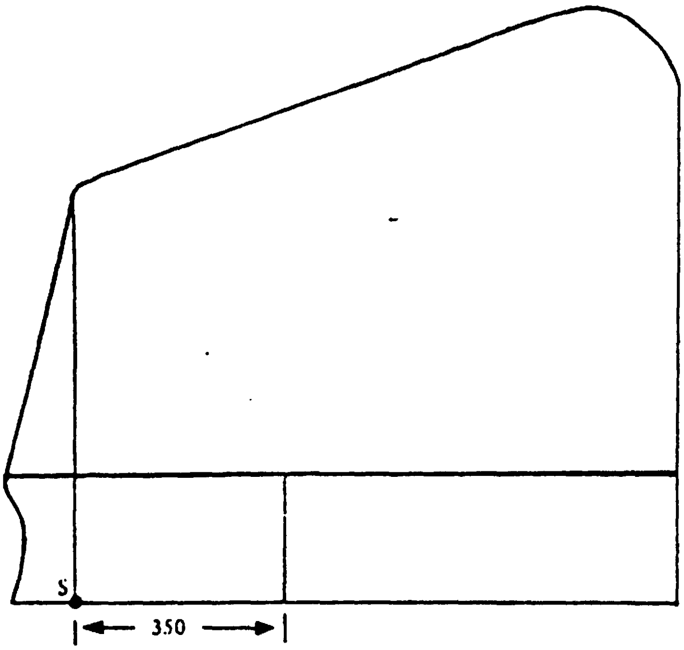


Figure 2b

Zone of clearance — Side view

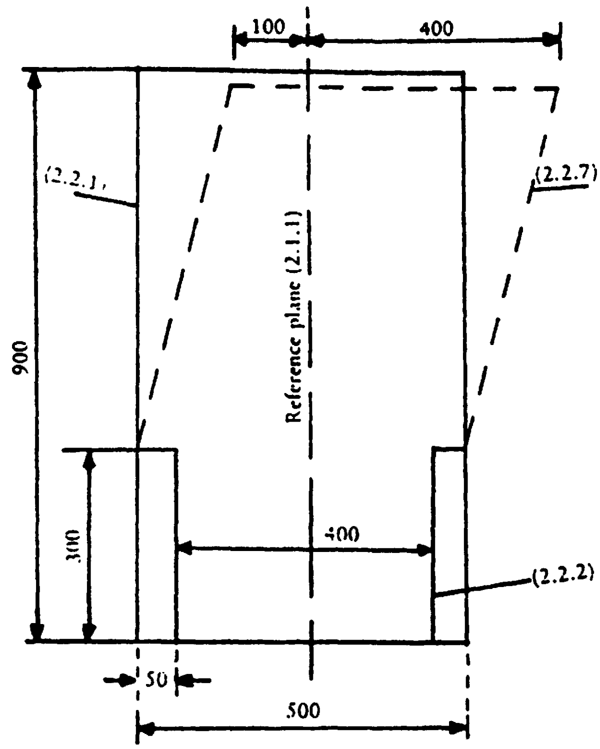


Figure 2c

Zone of clearance — Rear view

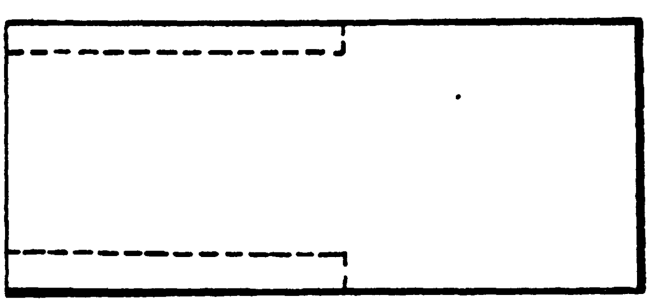


Figure 2d

Zone of clearance — seen from above

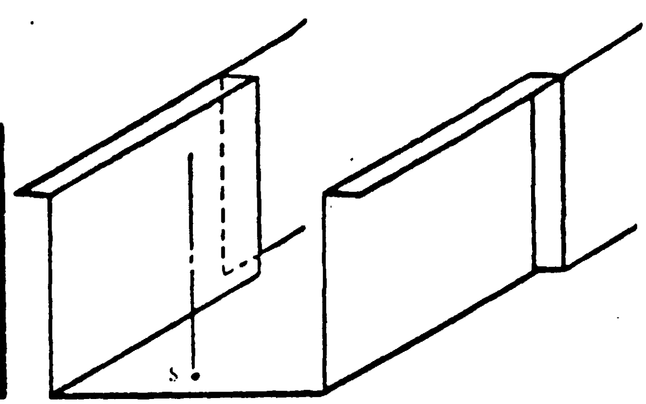


Figure 2e

Lower part of the zone of clearance 3/4 rear view

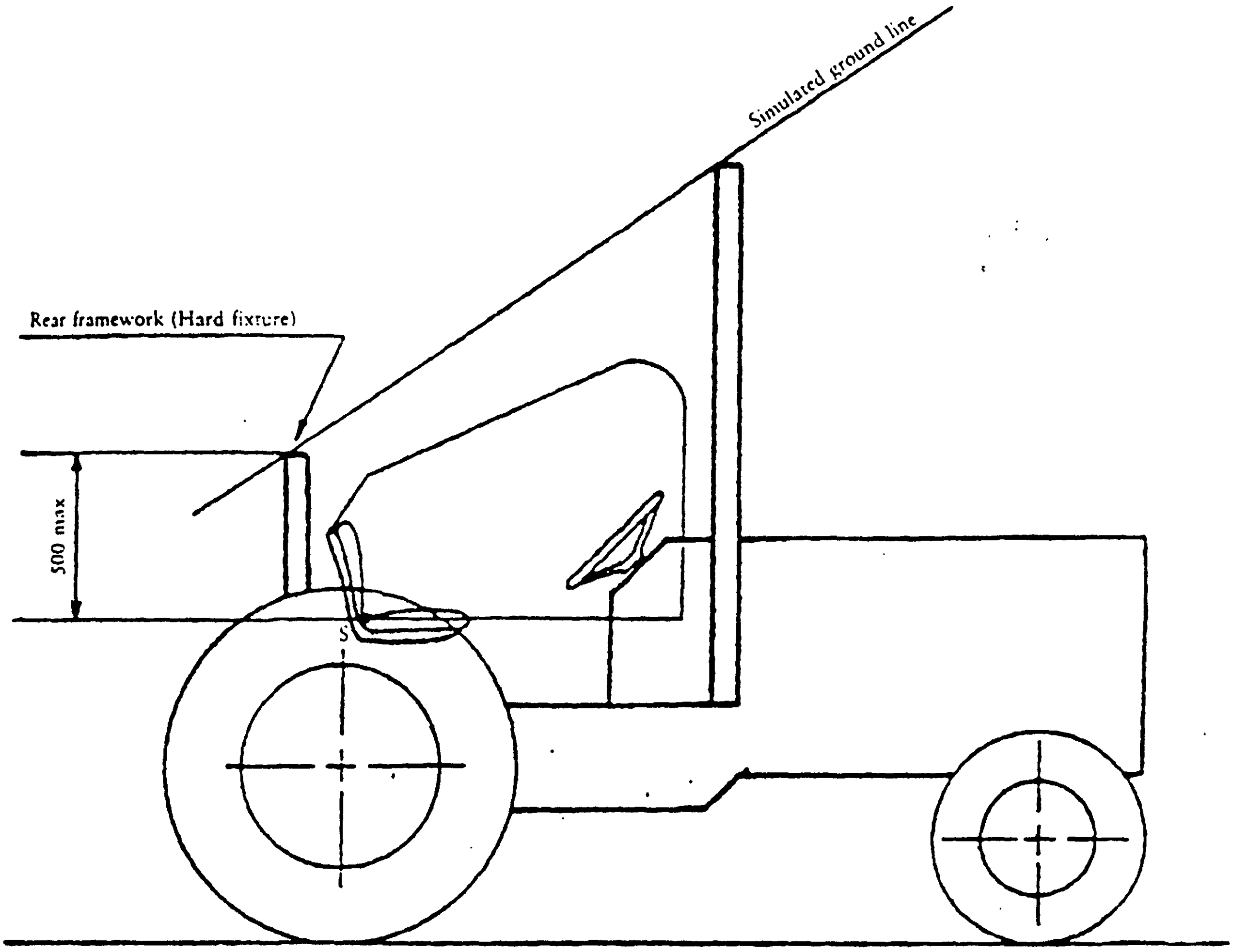

Simulated ground line
Rear framework (Hard fixture)
500 max
S

Figure 2f

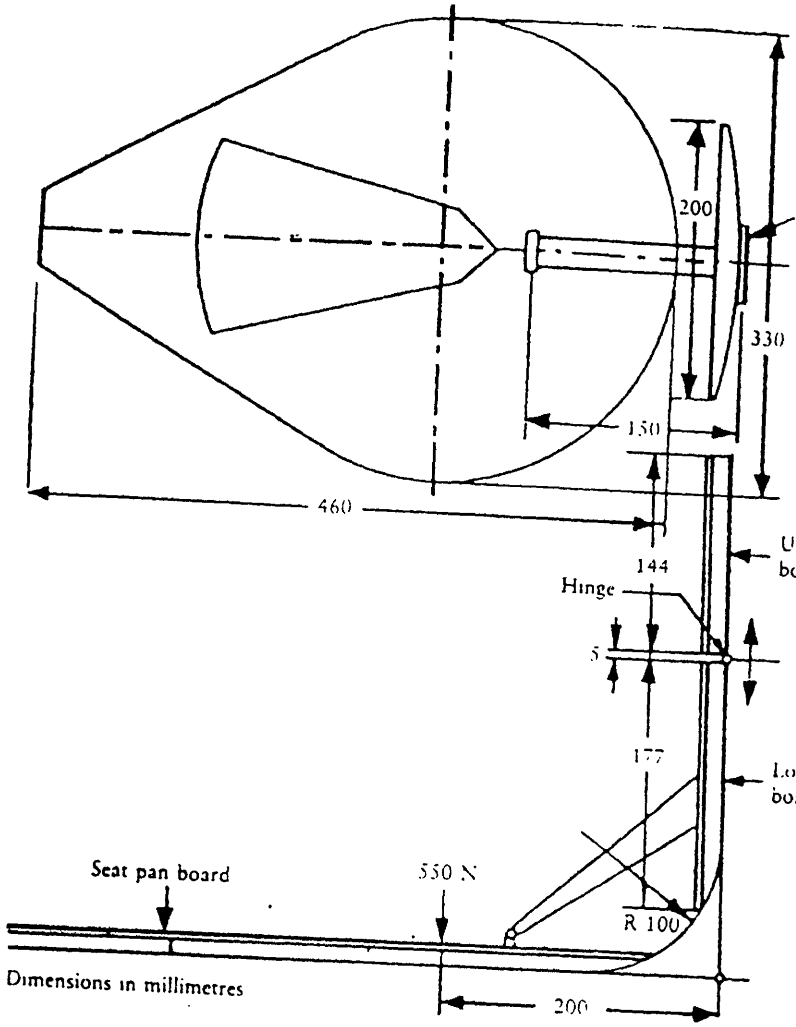


Figure 3a

Apparatus for determination of seat reference point

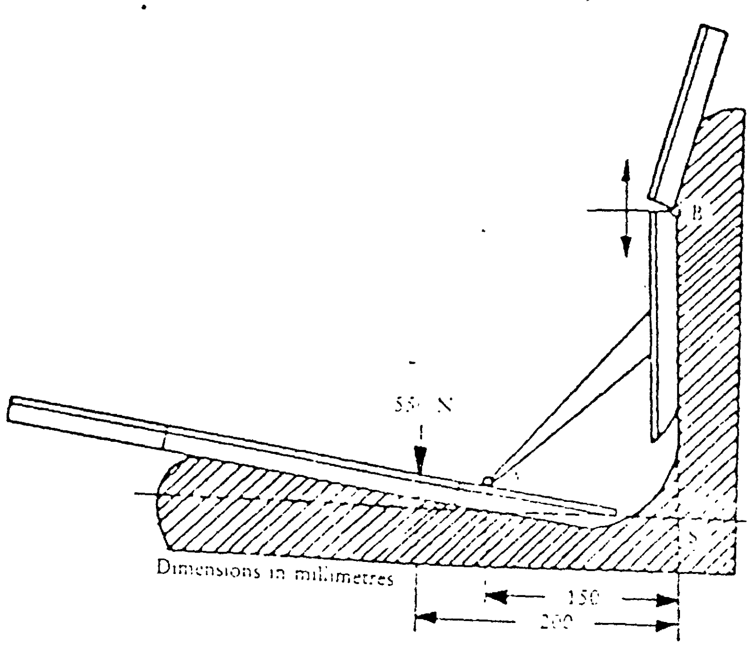


Figure 3b

Method of determining seat reference point

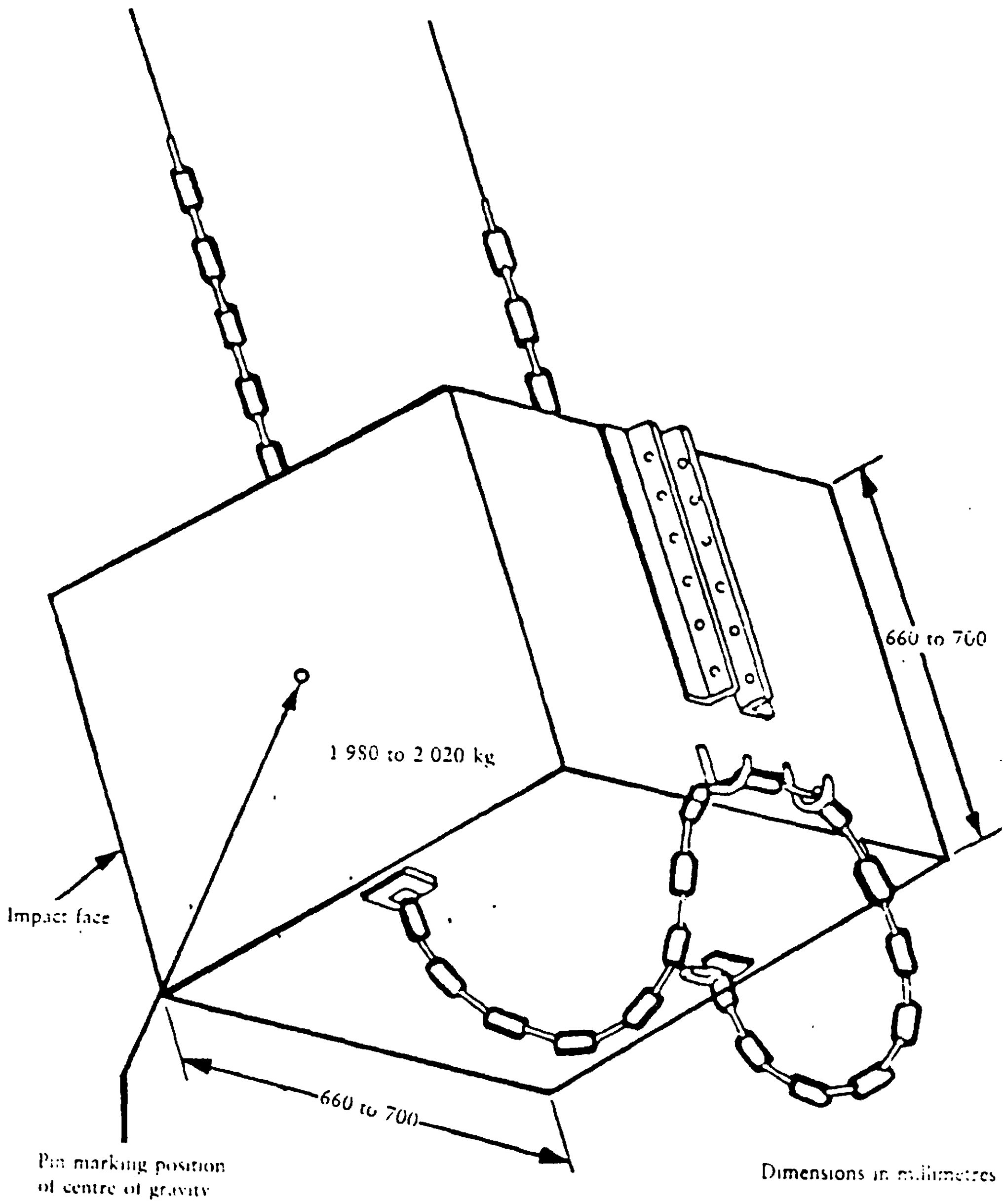


Figure 4

Pendulum block and its suspending chains or wire ropes

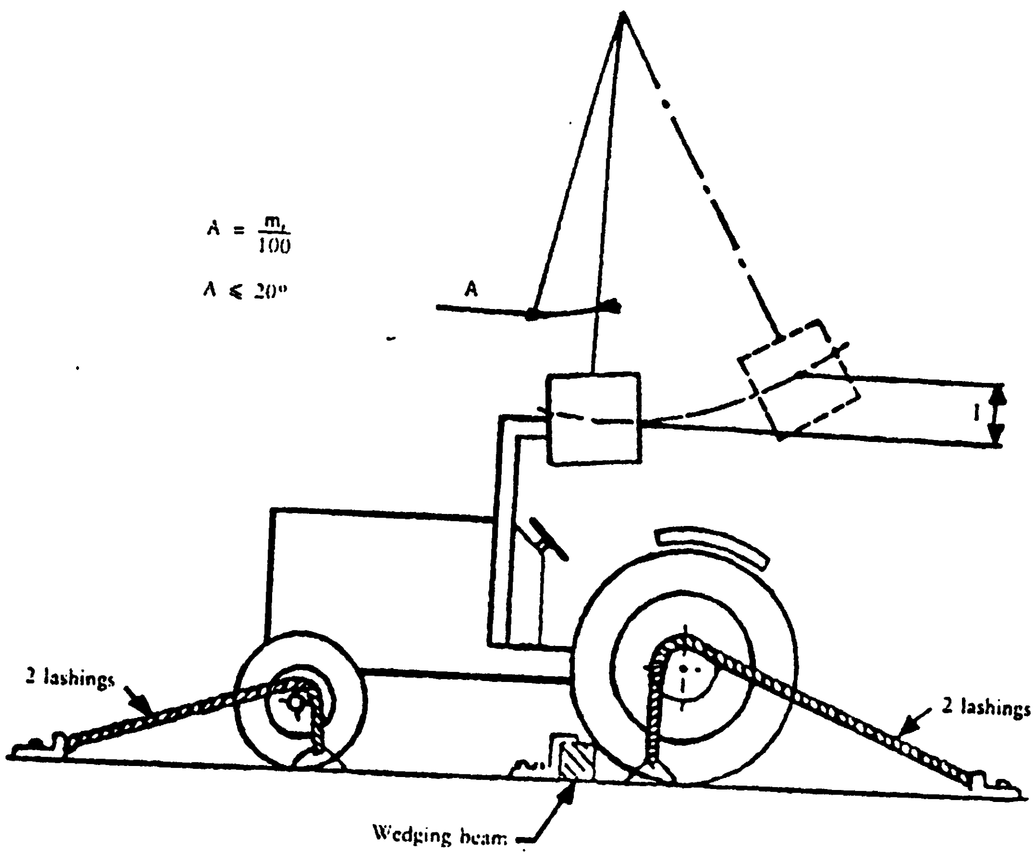


Figure 5

Example of tractor lashing — Rear impact

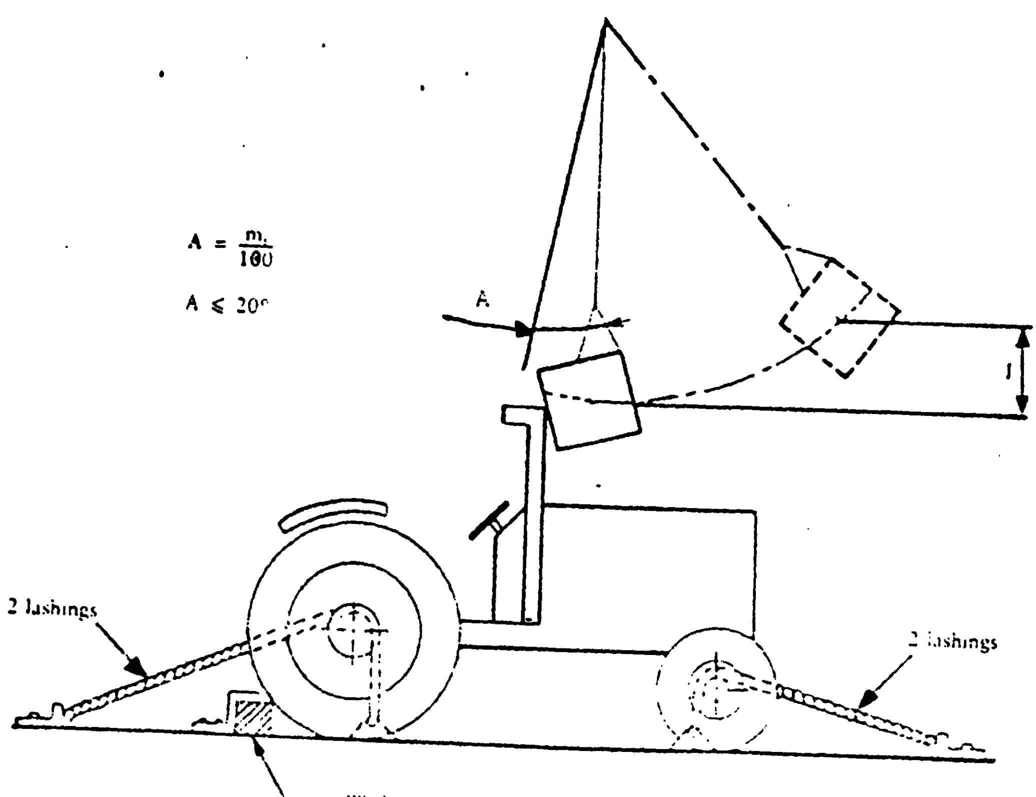


Figure 6

Example of tractor lashing — Front impact

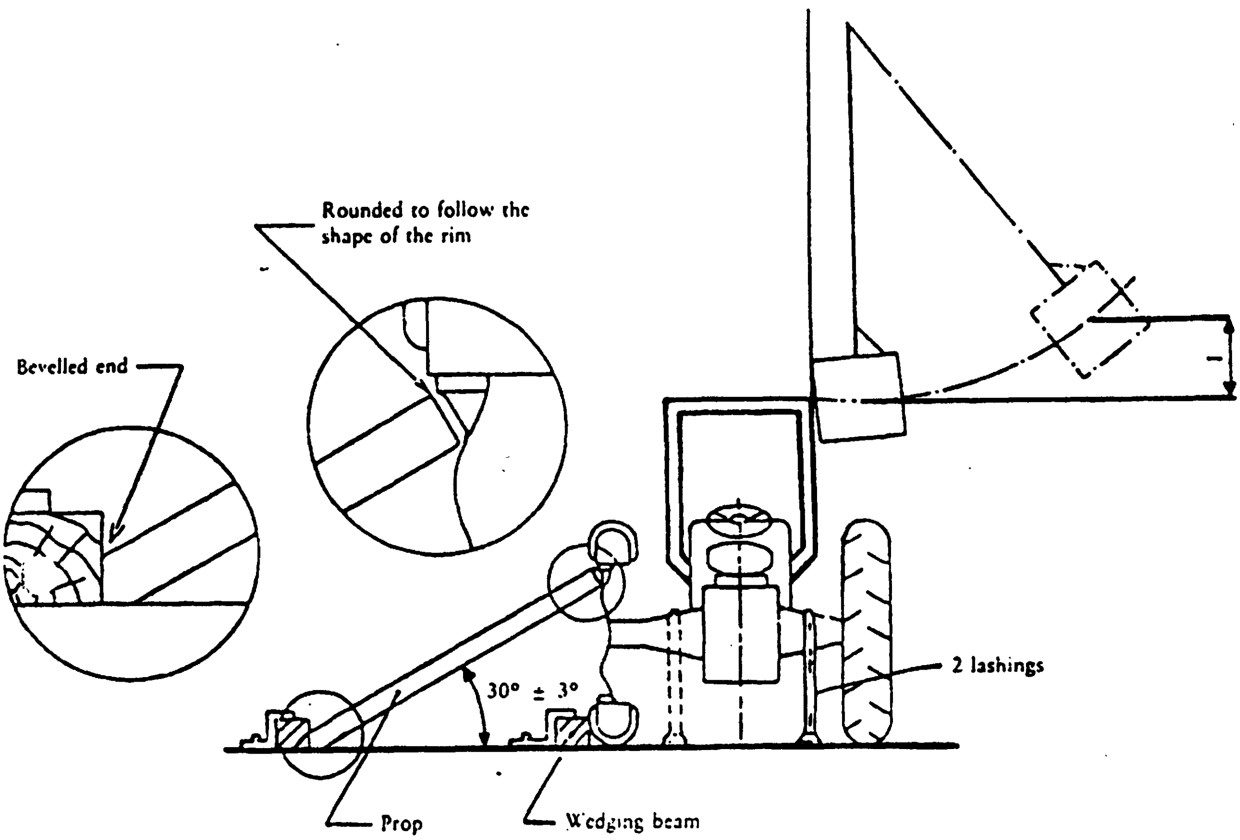


Figure 7

Example of tractor anchorage — Side impact

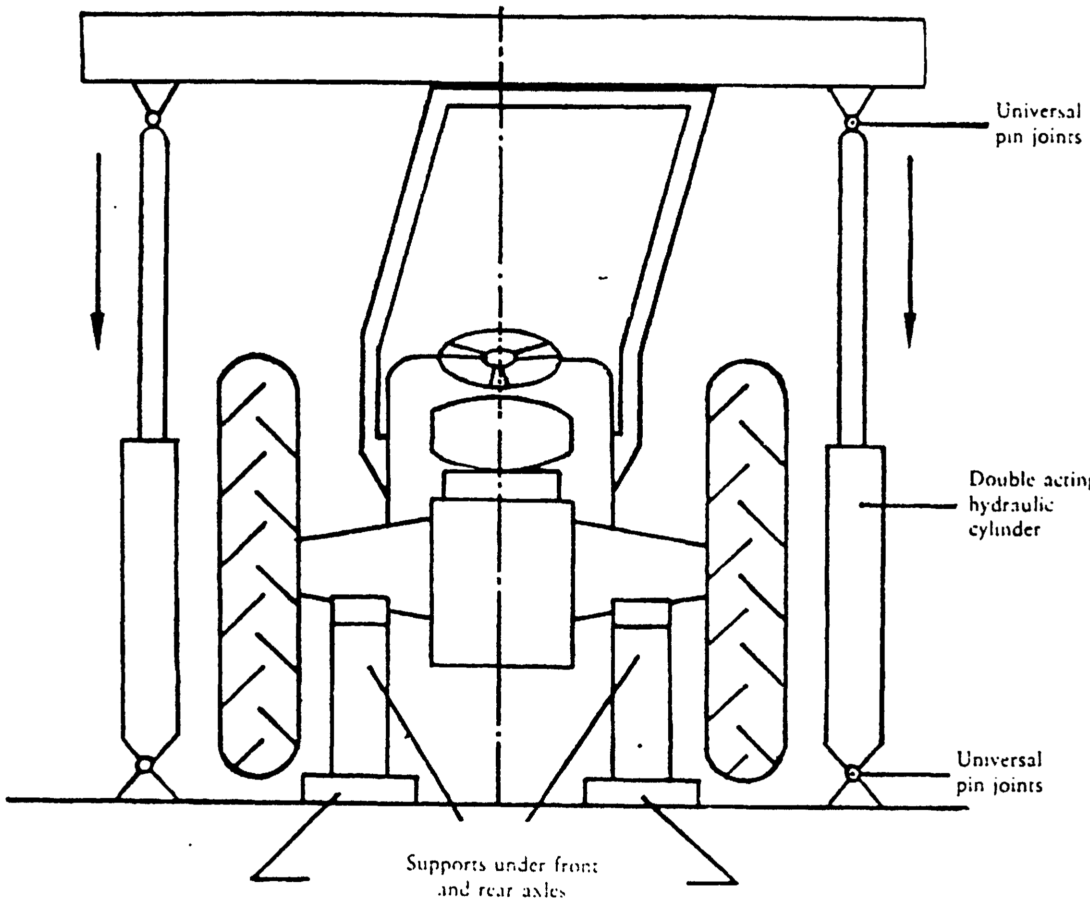
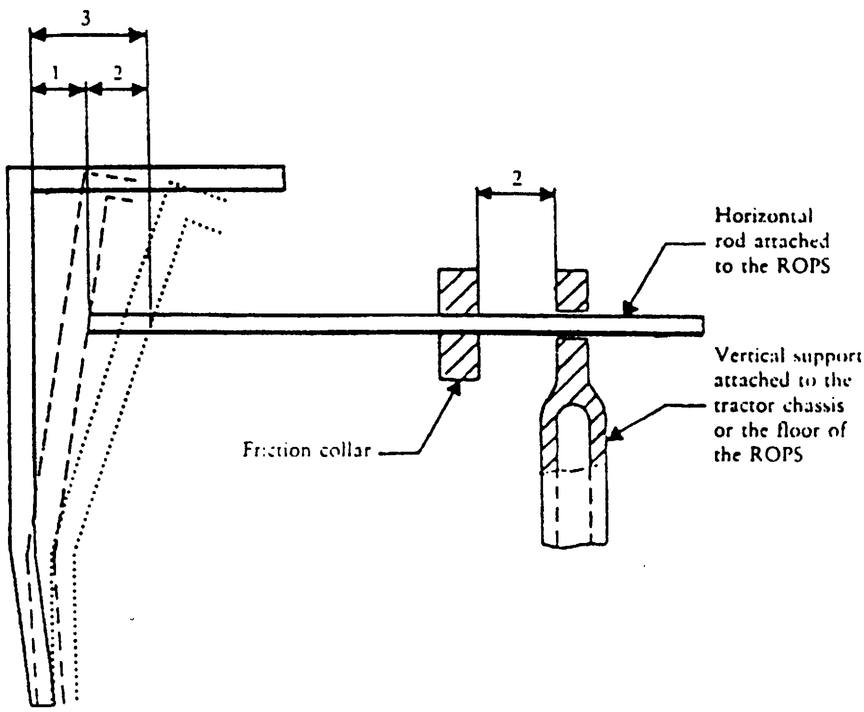


Figure 8

Crushing rig

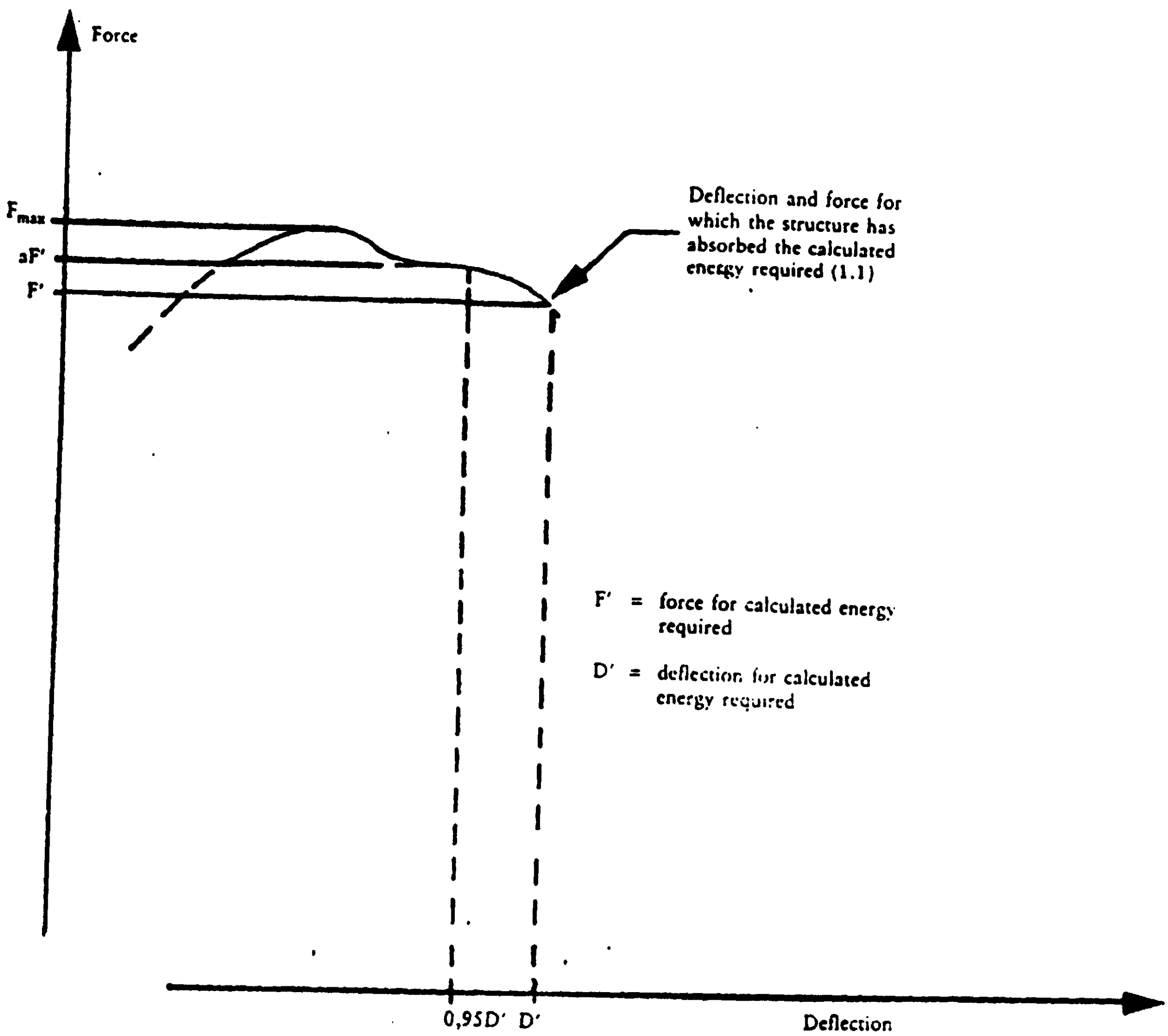
Note: The configuration of the roll-over protection structure shown is solely for the purpose of illustration and for dimensional reference. It does not purport to denote design requirements.



1 — Permanent deflection
2 — Elastic deflection
3 — Total deflection
(permanent + elastic deflection

Figure 9

Example of apparatus for measuring elastic deflection



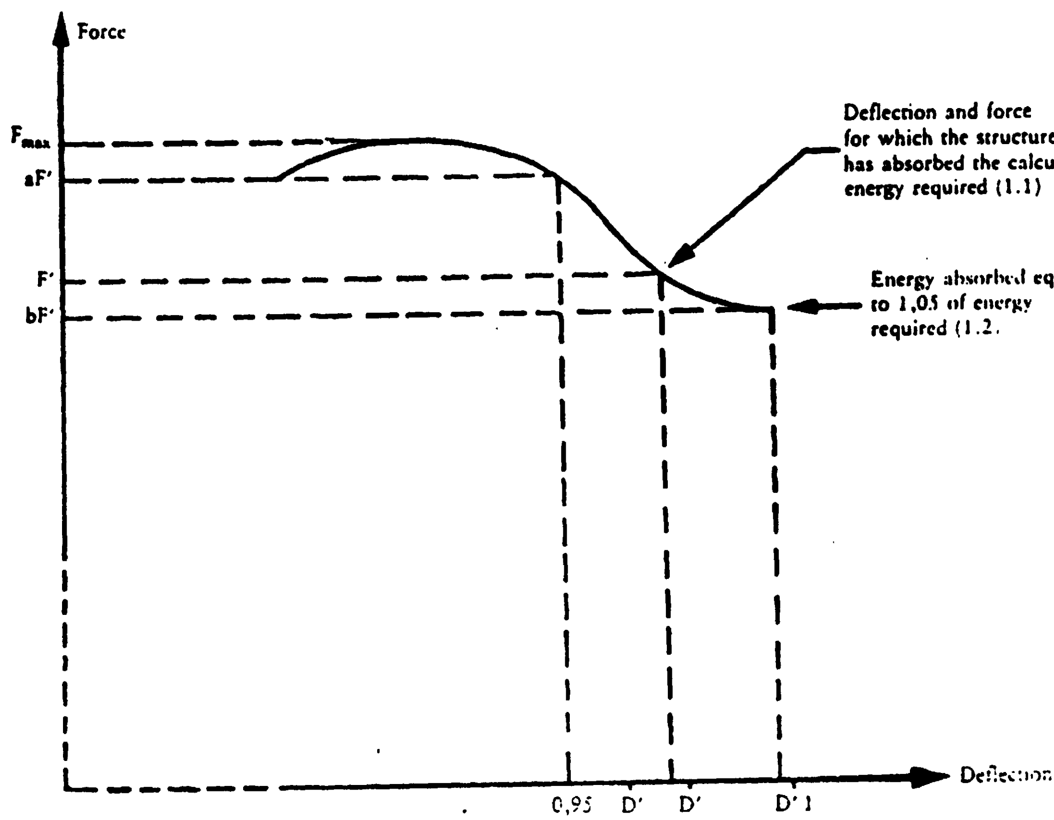
1. Reference aF' corresponding to 0,95 D'.

1.1. Overload test not necessary since aF' < 1,03 F'.

Figure 10a

Force/Deflection curve

Overload test not necessary



1. Reference aF' corresponding to 0,95 D'.

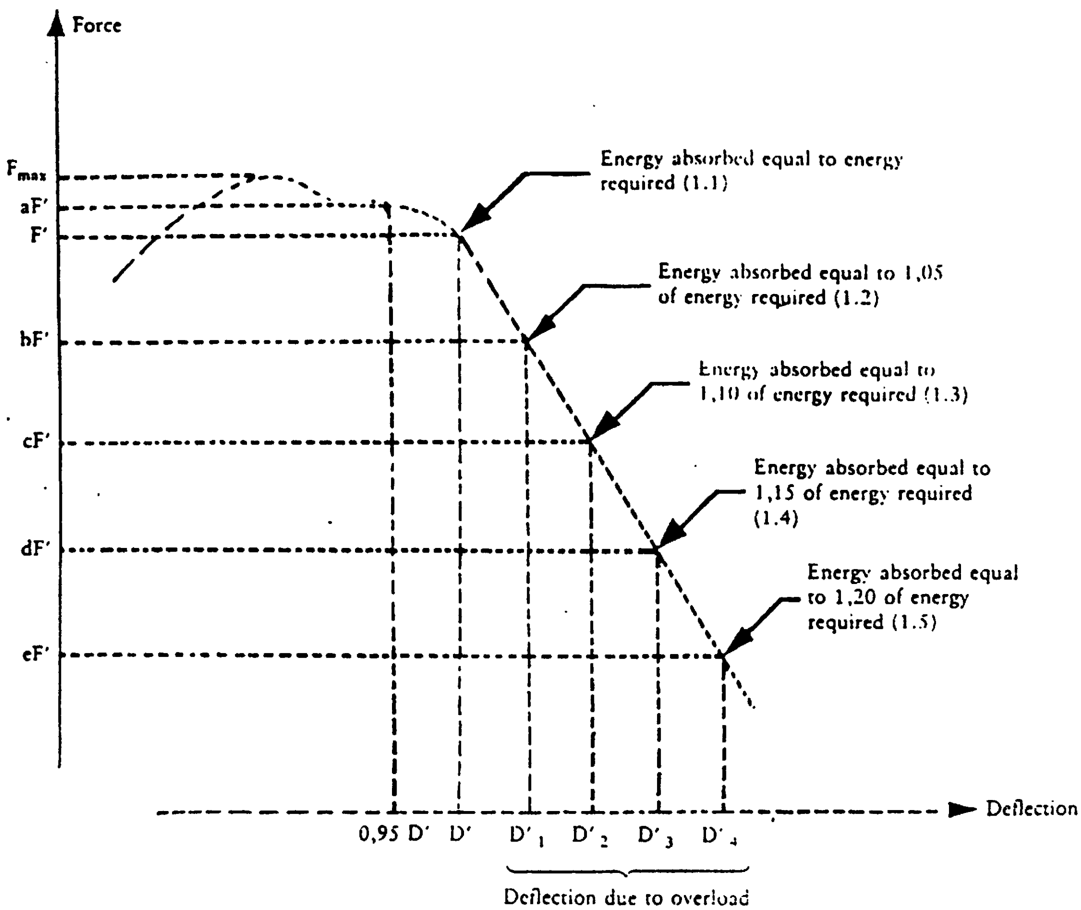
1.1. Overload test necessary since aF' > 1,03 F'.

1.2. Overload test satisfactory since bF' > 0,97 F' and bF' > 0,8 F_{max}.

Figure 10b

Force/Deflection curve

Overload test necessary



1. Reference aF' corresponding to 0,95 D'.

1.1. Overload test necessary since aF' > 1,03 F'.

1.2. Since bF' < 0,97 F', overload test to be continued.

1.3. Since cF' < 0,97 bF', overload test to be continued.

1.4. Since dF' < 0,97 cF', overload test to be continued.

1.5. Overload test satisfactory since eF' > 0,8 F_{max}.

Note: If at any moment F falls below 0,8 F_{max} the structure will be refused.

Figure 10 c

Force/Deflection curve

Overload test to be continued

PART 6

MODEL

REPORT RELATING TO THE EEC COMPONENT TYPE-APPROVAL TEST OF A PROTECTION STRUCTURE (FRONT-MOUNTED BAR) WITH REGARD TO ITS STRENGTH AS WELL AS TO THE STRENGTH OF ITS ATTACHMENT TO THE TRACTOR

Protection structure	
Make	
Type	
Tractor make	
Tractor type	
Test method	I/II (1)

Identification of test station

EEC component type-approval No: ....

1. Trade mark or name of protection structure: ....

....

2. Name and address of manufacturer of tractor or protection structure: ....

....

3. If applicable, name and address of tractor or protection structure manufacturer's authorized representative ....

....

4. Specifications of tractor on which the tests are carried out

4.1. Trade mark or name: ....

4.2. Type: ....

4.3. Serial number: ....

4.4. Wheelbase/moment of inertia (1) .... mm/kgm² (1)

4.5. Tyre sizes: front: ....

rear: ....

5. Extension of EEC component type-approval to other tractor types

5.1. Trade mark or name ....

5.2. Type: ....

5.3. Mass of unballasted tractor, with roll-over protection structure fitted, without driver .... kg

---

(1) Delete where inapplicable.

5.4. Tyre sizes: front ....

rear ....

6. **Specifications of protection structure**

6.1. General arrangement drawing of both the protection structure and its attachment to the tractor

6.2. Photographs showing mounting details ....

6.3. Brief description of roll-over protection structure including type of construction, details of mounting on the tractor, details of cladding, means of access and escape, details of interior padding and features to prevent continuous rolling ....

6.4. Dimensions

6.4.1. Height of roof members above the loaded tractor seat/above the seat reference point (1) ... mm

6.4.2. Height of roof members above the tractor platform .... mm

6.4.3. Minimum distance from the steering wheel rim to the protection structure .... mm

6.4.4. Overall height of the tractor with the protection structure fitted .... mm

6.4.5. Overall width of the protection structure: .... mm

6.5. Details and quality of materials used, standards used: ....

Main frame: .... (material and dimensions)

Mountings: .... (material and dimensions)

Roof: .... (material and dimensions)

Interior padding: .... (material and dimensions)

Assembly and mounting bolts: .... (grade and dimensions)

7. Test results

7.1. Impact/load (1) and crushing tests

Impact/load tests were made to the left/right-hand (2) rear and to the right/left-hand (2) front and right/left-hand side (2). The reference mass used for calculating impact energies and crushing forces was .... kg

The test requirements concerning fractures or cracks, maximum instantaneous deflection and the zone of clearence were/were not (2) satisfactorily fulfilled.

7.2. Deflection measured after the tests

Permanent deflection:

rear: left-hand: .... mm

right-hand: .... mm

front: left-hand .... mm

right-hand .... mm

---

(1) Delete where inapplicable, according to the test method used.

(2) Delete where inapplicable.

side sideways:

front: .... mm

rear: .... mm

top downwards:

front: .... mm

rear: .... mm

Difference between maximum momentary and residual deflection during sideways impact test:

.... mm

87/402/EEC

7.3 Indication and results of any additional dynamic tests.

89/681/EEC

8. Report number: ....

9. Report date: ....

10. Signature: ....

87/402/EEC

PART 7

MARKS

The EEC component type-approval mark consists of:

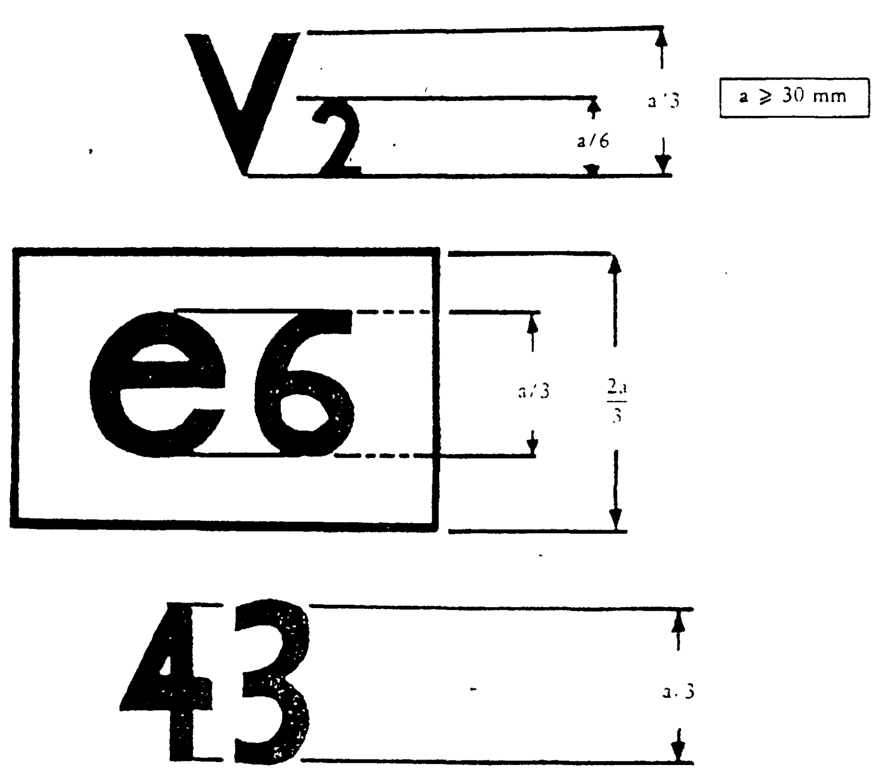
— a rectangle surrounding the lower-case letter 'e' followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval:

1 for Germany,
2 for France,
3 for Italy,
4 for the Netherlands,
6 for Belgium,
9 for Spain,
11 for the United Kingdom,
13 for Luxembourg,
18 for Denmark,
IRL for Ireland,
EL for Greece,
21 for Portugal,

— the EEC component type-approval number which corresponds to the number of the EEC component type-approval certificate issued with regard to the strength of the type of protection structure and its attachment to the tractor placed under and in the vicinity of the retangle,

— the letters V or SV, depending on whether a dynamic (V) or static (SV) test was conducted, followed by the number 2, indicating that this is a protection structure within the meaning of the Directive.

EXAMPLE OF AN EEC COMPONENT TYPE-APPROVAL MARK



Legend: The protection structure bearing the EEC component type-approval mark shown above is a structure of the bar type subjected to a dynamic test with two front-mounted uprights intended for a narrow-track tractor (V2), for which EEC component type-approval was granted in Belgium (e6) under the number 43.

PART 8

MODEL EEC COMPONENT TYPE-APPROVAL CERTIFICATE

Name of competent authority

NOTIFICATION CONCERNING THE GRANTING, REFUSAL, WITHDRAWAL OR EXTENSION OF EEC COMPONENT TYPE-APPROVAL WITH REGARD TO THE STRENGTH OF A PROTECTION STRUCTURE (FRONT-MOUNTED BAR) AND TO THE STRENGTH OF ITS ATTACHMENT TO THE TRACTOR

EEC component type-approval No: ....

.... extension (1)

1. Trade name or mark and type of protection structure: ....

....

2. Name and address of manufacturer of protection structure: ....

....

3. If applicable, name and address of authorized representative of manufacturer of protection structure:

....

....

4. Trade mark or name and type of tractor for which protection structure is intended. ....

....

5. Extension of EEC component type-approval for the following tractor type s ....

....

5.1. The mass of the unballasted tractor, as defined in point 1.4 of Part 3, exceeds/does not exceed (2) the reference mass used for the test by more than 5 %.

5.2. The method of attachment and points of attachment are/not (2) identical

5.3. All the components likely to serve as supports for the protection structure are/are not (2) identical

6. Date of submission for EEC component type-approval: ....

7. Test station. ....

8. Date and number of the report of the test station: ....

9. Date of granting/refusal/withdrawal of EEC component type-approval (2): ....

10. Date of granting/refusal/withdrawal of the extension of EEC component type-approval (2): ....

11. Place. ....

12. Date. ....

13. The following documents, bearing the component type-approval number shown above, are annexed to this certificate (e.g. report of the test station): ....

14. Remarks, if any: ....

15. Signature ....

---

(1) If applicable, state whether this is the first, second, etc. extension of the original EEC component type-approval.

(2) Delete where inapplicable.

PART 9

CONDITIONS FOR EEC TYPE-APPROVAL

1. The application for EEC type-approval of a tractor with regard to the strength of a protection structure and the strength of its attachment to the tractor is submitted by the tractor manufacturer or by his authorized representative.

2. A tractor representative of the tractor type to be approved, on which a protection structure and its attachment, duly approved, are mounted, must be submitted to the technical services responsible for conducting the type-approval tests.

3. The technical service responsible for conducting the type-approval tests checks whether the approved type of protection structure is intended to be mounted on the type of tractor for which the type-approval is requested. In particular, it must ascertain that the attachment of the protection structure corresponds to that which was used when the EEC component type-approval was granted.

4. The holder of the EEC type-approval may ask for its extension for other types of protection structures.

5. The competent authorities grant such extension on the following conditions:

5.1. The new type of protection structure and its tractor attachment must have received EEC component type-approval.

5.2. It is designed to be mounted on the type of tractor for which the extension of the EEC type-approval is requested.

5.3. The attachment of the protection structure to the tractor must correspond to that which was tested when EEC component type-approval was granted.

6. A certificate, of which a model is shown in Part 10 is annexed to the EEC type-approval certificate for each type-approval or type-approval extension which has been granted or refused.

7. If the application for EEC type-approval for a type of tractor is introduced at the same time as the request for EEC component type-approval for a type of roll-over protection structure intended to be mounted on the type of tractor for which EEC type-approval is requested, the checks laid down in 2 and 3 are not applicable.

PART 10

MODEL

Name of competent authority

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE STRENGTH OF PROTECTION STRUCTURES (FRONT-MOUNTED BAR) AND THE STRENGTH OF THEIR ATTACHMENT TO THE TRACTOR

(Article 4(2))

EEC type-approval No: ....

.... extension (1)

1. Trade name or mark of tractor: ....

2. Tractor type: ....

3. Name and address of tractor manufacturer: ....

....

4. If applicable, name and address of manufacturer's authorized representative: ....

....

5. Trade name or mark of protection structure: ....

....

6. Extension of EEC-approval for the following type(s) of protection structure: ....

....

7. Date tractor sumbitted for EEC type-approval: ....

8. Technical service responsible for EEC type-approval conformity control: ....

9. Date of report issued by that service: ....

10. Number of report issued by that service: ....

11. EEC type-approval with regard to the strength of the protection structures and the strength of their attachment to the tractor has been granted/refused (2)

12. The extension of EEC type-approval with regard to the strength of the protection structures and the strength of their attachment to the tractor has been granted/refused (2)

13. Place. ....

14. Date: ....

15. Signature. ....

(1) If applicable, state whether this is the first, second, etc. extension of the original EEC type-approval.
(2) Delete where inapplicable.

ANNEX XXII

POWER TAKE-OFFs AND THEIR PROTECTION

PART I

DEFINITION AND SCOPE, APPLICATION FOR EEC TYPE-APPROVAL, EEC, TYPE-APPROVAL, TYPES OF POWER TAKE-OFF AND DESIGN AND POSITIONING REQUIREMENTS IN RESPECT OF THE LATTER AND THEIR PROTECTIVE GUARDS 86/297/EEC

1. DEFINITION AND SCOPE

1.1. 'Power take-off' (PTO) means the projecting part of the tractor drive shaft which transmits motion to a machine.

1.2. The provisions of this Directive shall apply only to power take-offs as defined in point 1.1 and located at the rear of the tractor. However, point 5.2 below shall apply only to tractors with a minimum fixed or adjustable track at one of the drive axles of at least 1 150 mm.

2. APPLICATION FOR EEC TYPE-APPROVAL

2.1. The application for the type approval of a tractor type as regards the power take-off and its protection must be submitted by the tractor manufacturer or his authorized representative.

2.2. It must be accompanied by drawings, in triplicate, on an appropriate and suitably detailed scale, of those parts of the tractor subject to the requirements of this Directive.

2.3. A tractor representative of the type submitted for approval or those part(s) of the tractor considered essential for the execution of the tests required by this Directive must be supplied to the technical service responsible for conducting the type-approval tests.

3. EEC TYPE-APPROVAL

3.1. A certificate conforming to the model which appears in Part 2 must be attached to the EEC type-approval certificate for each approval granted or refused.

4. TYPES OF POWER TAKE-OFF

4.1. The characteristics of PTOs must conform to one of the types described in Table 1:

TABLE 1

Characteristics of types of PTO

Type	Nominal Diameter (mm)	Number of splines		Nominal PTO rotation speed rpm (¹)
1	35	6	straight splines	540 and/or 1 000
2	35	21	Involute serrations	
3	45	20		

(¹) Except PTO whose rotation speed is linked to the tractor's ground speed.

4.2. It must be possible to maintain the rotation speed of the PTO by suitable means.

4.3. Should more than one ratio between the engine speed and the PTO rotation speed be provided, any change of ratio must be perceptible. In addition, specific design measures must be taken to ensure that unintentional changes of ratio — in particular changing to a higher rotation speed — cannot occur. This safety device must operate each time the PTO is engaged.

4.4. Means must be provided by which the selected PTO rotation speed is clearly indicated at all times.

86/297/EEC

5. DESIGN AND POSITIONING REQUIREMENTS

5.1. Direction of rotation of the rear PTO

Clockwise when the PTO is observed in the direction of travel of the tractor.

5.2. Zone of clearance around the PTO

The PTO zone of clearance must be in conformity with the drawings in Figure 1 and the dimensions in Table 2.

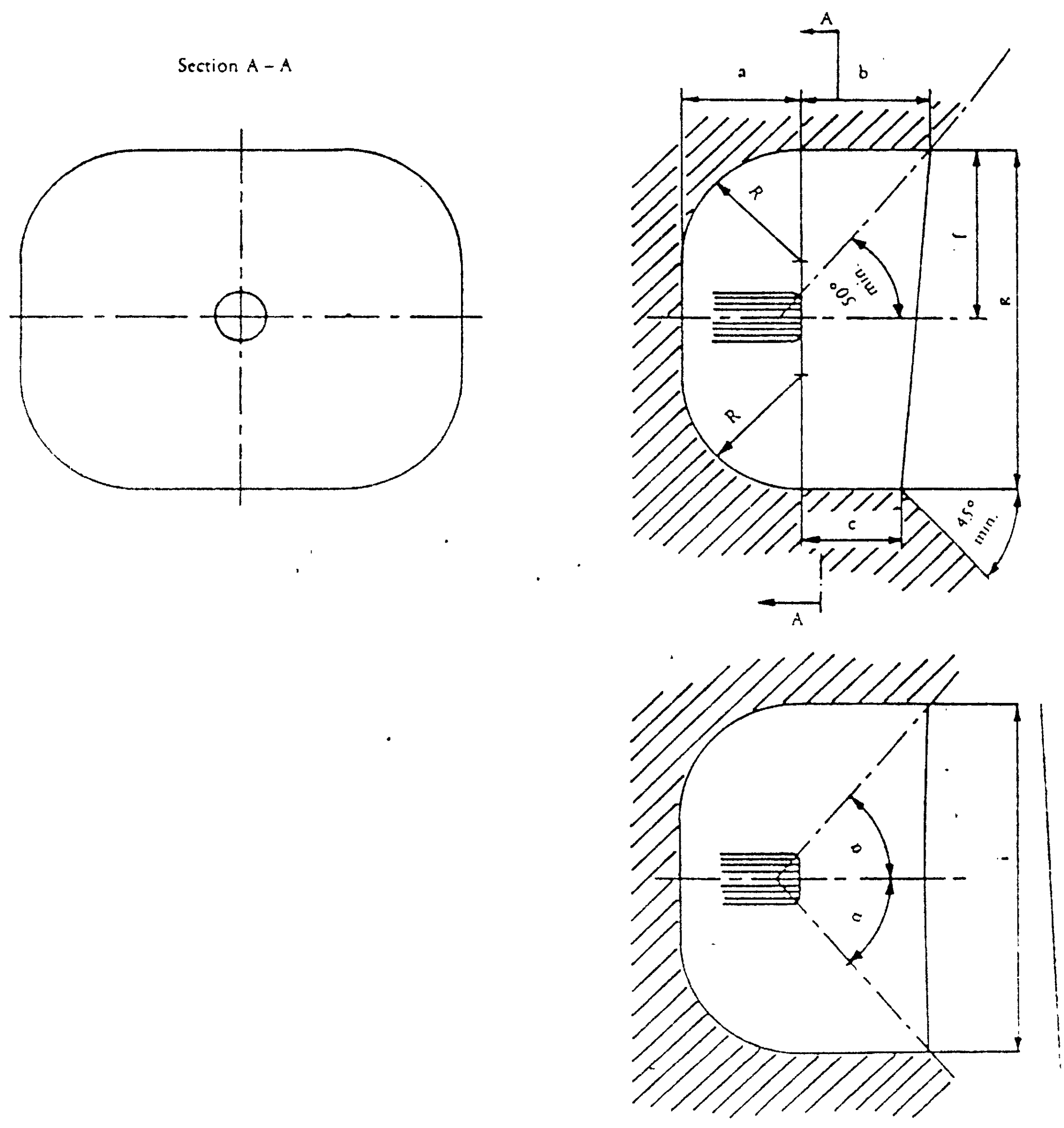


Figure 1

Zone of clearance around PTO

TABLE 2

Dimensions of the clearance zone

Type	a min.	b max.	c max.	f min.	g min.	i min.	R spheric max.	α min.
1	76	80	60	120	240	280	76	55°
2								
3	89	100	65	145	290	295	89	51°

5.3. **Protection of PTOs**

5.3.1. *Protection*

5.3.1.1. The power take-off must be protected by a guard mounted on the tractor which covers at least the top part and the two sides of the PTO as shown in Figure 2 below, or by other means providing a similar degree of protection such as the location of the PTO in a recess that is part of the tractor or is formed by a separate part (tow-hook mounts, coupling cover, etc.).

5.3.1.2. The dimensions of the protective guard are laid down, as a function of the type of PTO, in Table 3 below.

5.3.1.3. An additional non-rotating protective device which fully covers the PTO must also be supplied with the tractor to protect the PTO when the latter is not in use.

5.3.2. *Characteristics of protective guards*

5.3.2.1. The protective guard must be designed so as not to impede (or in order to facilitate) the use and maintenance of the tractor.

It must be possible to carry out maintenance operations without removing the protective guard.

5.3.2.2. The materials used must be able to withstand bad weather, must retain their mechanical properties in cold weather and must be sufficiently sturdy.

5.3.2.3. The protective guard must have no points or sharp edges; it must contain no orifices exceeding 8 mm diameter or side of a square or rectangle other than that necessary for attaching the chain of the protective device for the universal-joint drive shaft and must be able to bear a weight of 120 daN, unless it is designed in such a way that it cannot be used as a step.

86/297/ EEC

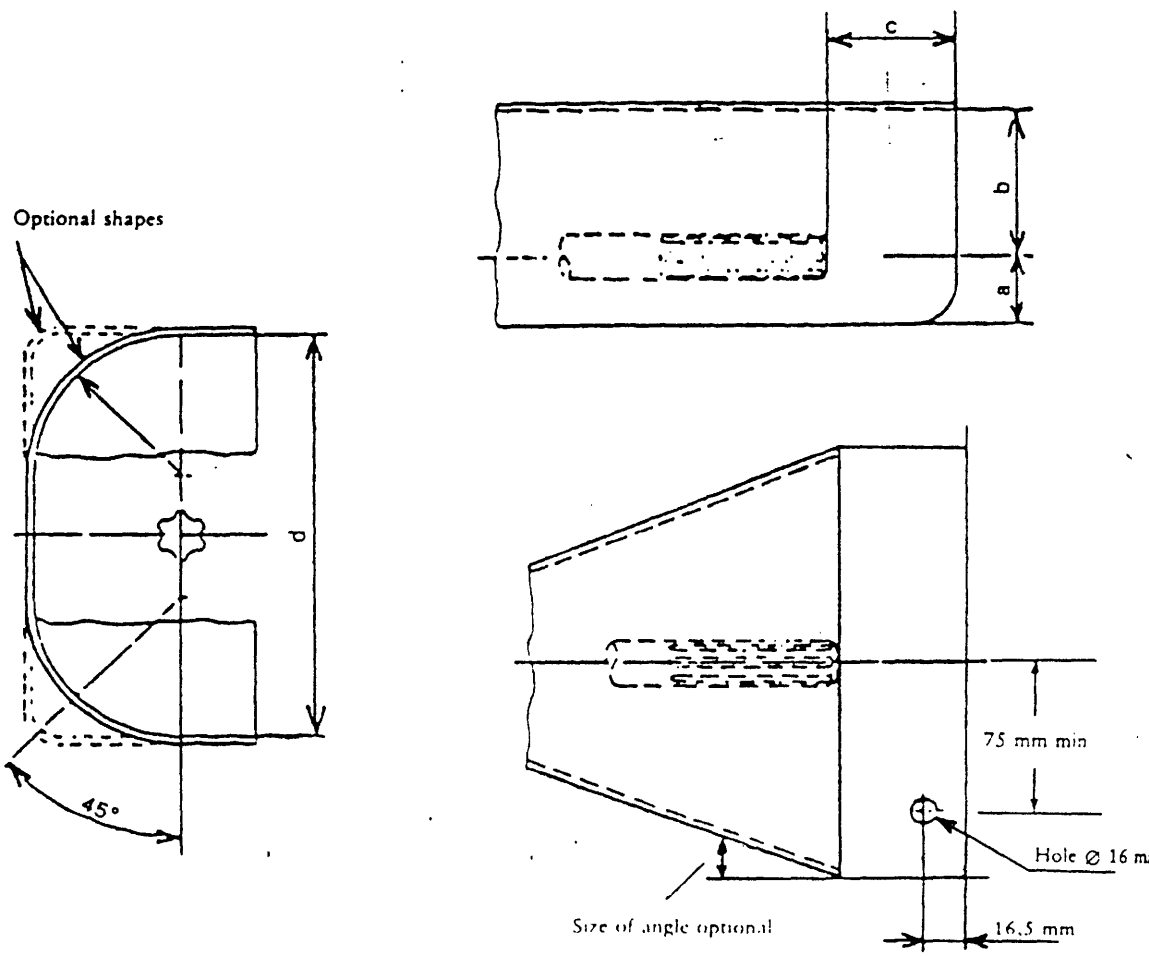


Figure 2

Protective guard for type 1, 2 and 3 PTOs

TABLE 3

Dimensions of the power take-off protective guard

Type	Dimensions of protective guard ([1]) (mm)			
	a	b ± 5	c ± 5	d ± 5
1	70	125	85	285
2	70	125	85	285
3	80	150	100	300

([1]) In the case of tractors having two rear PTO shafts, the dimensions b and/or d may be adjusted in order to maintain equivalent clearance areas between the shafts and the protective guard.

PART 2

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVED CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE POWER TAKE-OFF AND ITS PROTECTION

(Article 4 (2))

EEC type-approval No: ....

1. Trade name or mark of tractor: ....

2. Tractor type: ....

3. Name and address of manufacturer: ....

....

4. If applicable, name and address of manufacturer's authorized representative. ....

....

5. Brief description of type of power take-off and its protection: ....

....

6. Date tractor submitted for type-approval: ....

7. Technical service responsible for type-approval tests: ....

8. Date of report by that service: ....

9. Number of report issued by that service: ....

10. EEC type-approval with regard to the power take-off and its protection has been granted/refused (1).

11. The following drawings bearing the abovementioned type-approval No are attached to this communication:

A set of drawings of those parts of the tractor considered of interest for the purposes of this Annex.

These drawings will be supplied to the competent authorities of the Member States at their express request.

12. Remarks, if any: ....

....

....

....

....

13. Place: ....

14. Date: ....

15. Signature:

(1) Delete where inapplicable.

ANNEX XXIII

INSTALLATION, LOCATION, OPERATION AND IDENTIFICATION OF CONTROLS

PART 1

DEFINITIONS, APPLICATION FOR EEC-TYPE APPROVAL, EEC TYPE-APPROVAL

1. DEFINITIONS

1.1 Tractor type

'Tractor type as regards the installation, location, operation and identification of controls' means tractors which do not differ in such essential respects as regards those internal fittings which may affect the location and identification of controls.

1.2. Control

'Control' means any part which, when directly actuated, enables the state or functioning of the tractor or of any equipment coupled to it to be changed.

2. APPLICATION FOR EEC TYPE-APPROVAL

2.1. The application for type-approval of a tractor type, with regard to the installation, location, operation and identification of controls, must be submitted by the tractor manufacturer or by his authorized representative.

2.2. The application must be accompanied by three copies of a description (photos or drawings) of the tractor parts covered by the requirements of this Directive.

2.3. A tractor representative of the type to be approved or such part or parts of the tractor as are considered to be essential for carrying out the checks laid down in this Directive must be submitted to the technical service responsible for conducting the type-approval test.

3. EEC TYPE-APPROVAL

A certificate conforming to the model in Part 5 should be attached to the EEC type-approval certificate.

PART 2

TECHNICAL REQUIREMENTS

1. GENERAL REQUIREMENTS

1.1. The controls must be easily accessible and must not constitute a danger to the operator, who must be able to actuate them without difficulty or risk; they must be so designed and laid out, or protected, as to preclude any inadvertent switching operation or any unintentional triggering of a movement or any other operation which might be dangerous.

1.2. For identification of the controls by means of symbols, the symbols used must conform to those shown in Part 3

1.3. Symbols other than those shown in Part 3 may be used for other purposes, provided that there is no danger of confusion with those shown in that Part.

1.4. Symbols are deemed to conform if the proportionality of the dimensions shown in Part 4 is respected.

1.5. The symbols must appear on or in the immediate proximity of the controls.

1.6. The symbols must stand out clearly against the background.

1.7. The controls must satisfy whatever particular requirements, insofar as they apply, are set out in section 2 as regards the installation, location, operation and identification of controls. Other arrangements are permitted, should a manufacturer provide evidence that they have an effect at least equivalent to the requirements specified in this Directive.

2. SPECIAL REQUIREMENTS

2.1. Starter control

It must not be possible to start the engine if there is a risk that this might cause an uncontrolled movement of the tractor.

This requirement is deemed to be fulfilled if the engine cannot be started unless:

- the gear change lever is in neutral position or in neutral gear, or
- the gear ratio selection lever is in neutral position or in neutral gear, or
- the clutch mechanism is disengaged, or
- the hydrostatic device is in neutral position or depressurized, or
- where hydraulic transmission is fitted, the engagement device reverts automatically to a neutral position.

2.2 Engine shut-off control

Actuating this device must stop the engine without sustained manual effort; it must not be possible for the engine to start again automatically.

Should the engine shut-off control not be combined with the starter control, it must be of a colour contrasting clearly with the background and the other controls. If the shut-off control is a button, it must be coloured red

2.3. DIFFERENTIAL LOCK CONTROL

Identification of the control, where fitted, is mandatory. The functioning of the differential lock must be clearly indicated, if this is not apparent from the position of the control.

2.4. Three-point lifting mechanism con[illegible]

2.4.1. E[illegible]ther the three-point lifting mech[illegible]sm controls must be fitted in such a way as to ensure that lifting and lowering manoeuvres can be carried out safe[illegible] and [illegible] [illegible] coupling parts should be fitted on the attachment devices of the lifting equipment so that the presence of an operator between the tractor and the equipment is not required. The presence of such a control, where fitted, must be indicated.

2.4.2. The safety requirements for the lifting and lowering of the tools being carried are deemed to be fulfilled where the following conditions are met:

2.4.2.1. *Main controls*

The main controls and any linkage are arranged or protected in such a way that the operator is unable to reach them if he is standing on the ground between the tractor and the mounted implement, or external controls must be fitted;

2.4.2.2. *External controls*

2.4.2.2.1. The controls must be laid out in such a way that the operator can actuate them from a non-dangerous spot, for instance where the three-point hydraulic lift controls or the additional controls for the lifting mechanism are located outside the vertical planes formed by the internal walls of the mudguards,

and

2.4.2.2.2. The three-point hydraulic lifting mechanism is actuated by means of controls which restrict the amount of movement to a maximum of 100 millimetres each time the control is actuated. The measurement points in this case are formed by the coupling points on the lower arms of the three-point coupling,

or

2.4.2.2.3. The three-point hydraulic lifting mechanism is actuated by means of controls which operate on the dead-man's control;

2.4.2.3. *Narrow tractors*

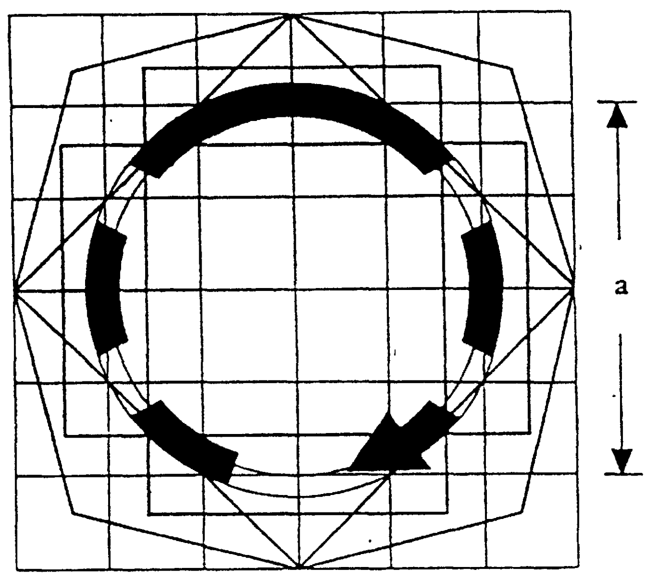
In the case of tractors with one driven axle having a fixed or adjustable minimum track not exceeding 1 150 millimetres, the main controls must be located in front of the vertical plane passing through the seat reference point, the seat being in a central position;

2.4.2.4. Other arrangements are permitted if the manufacturer provides evidence that they have an effect at least equivalent to the requirements set out in points 2.4.2.1., 2.4.2.2. and 2.4.2.3.

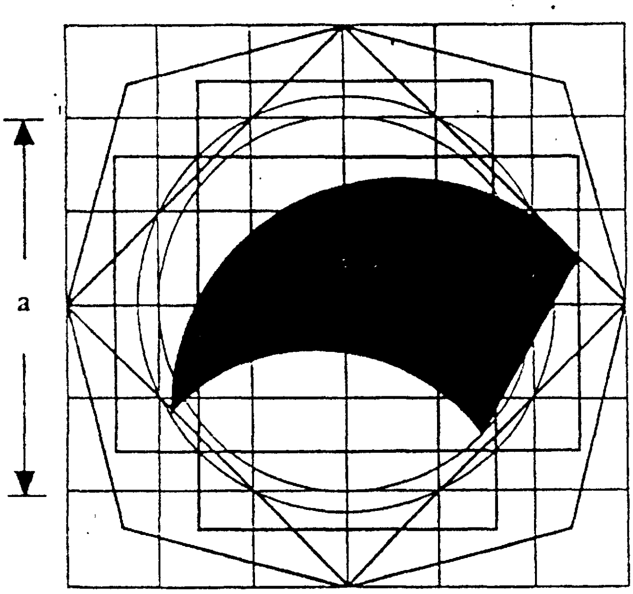
PART 3

SYMBOLS

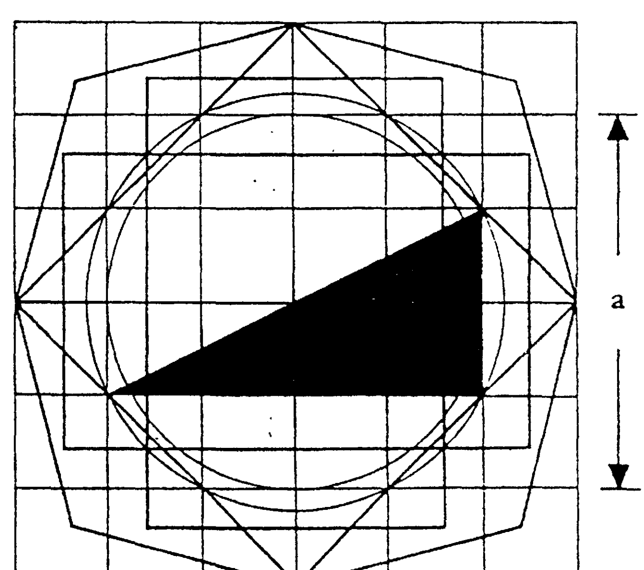
1. Starter control



2. Engine speed control



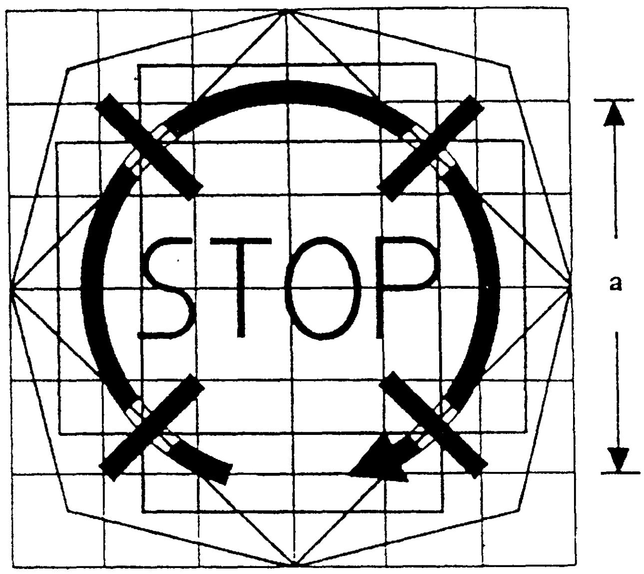
Signification: continuous rotary variation



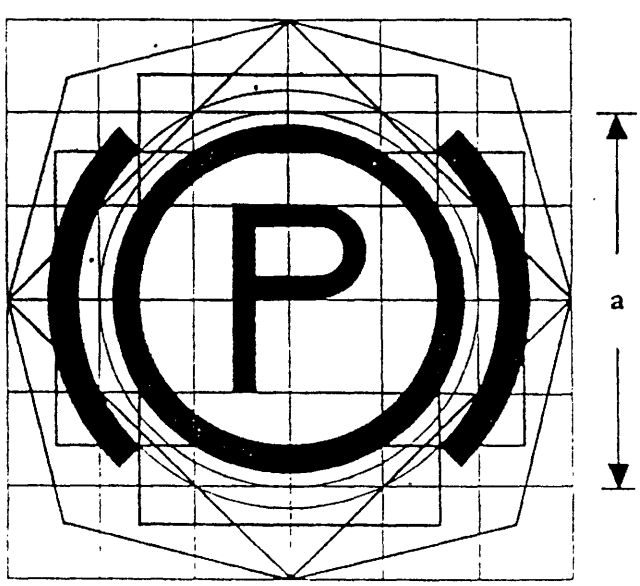
continuous linear variation

3. Engine shut-off control

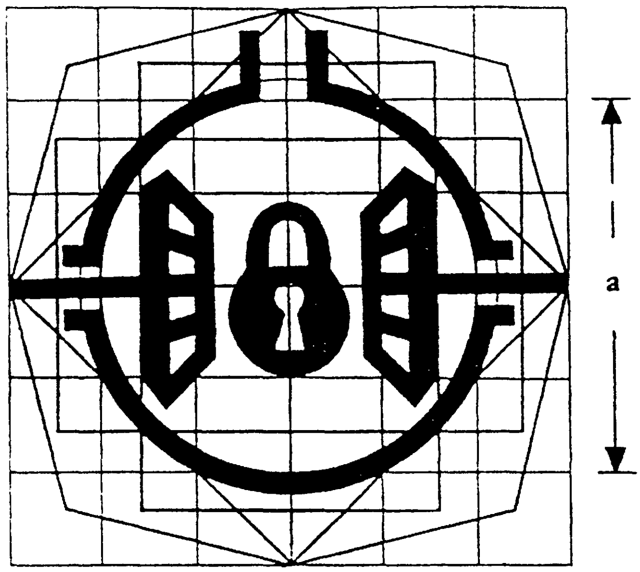
(Spark ignition engine and compression ignition engine)



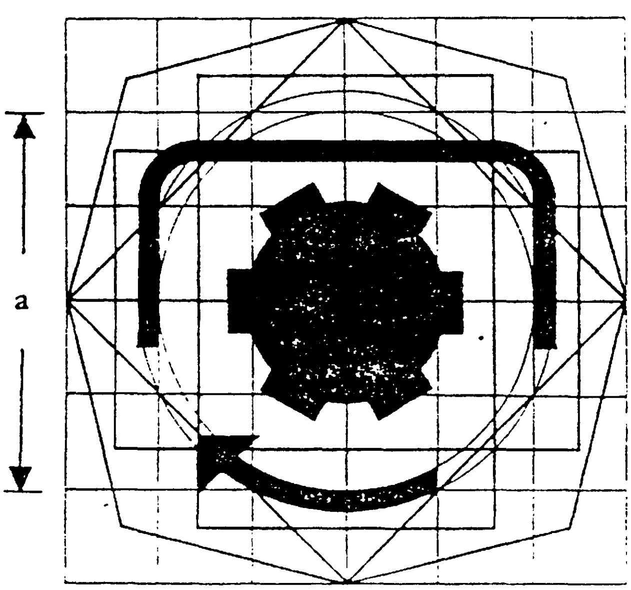
4. Parking brake control



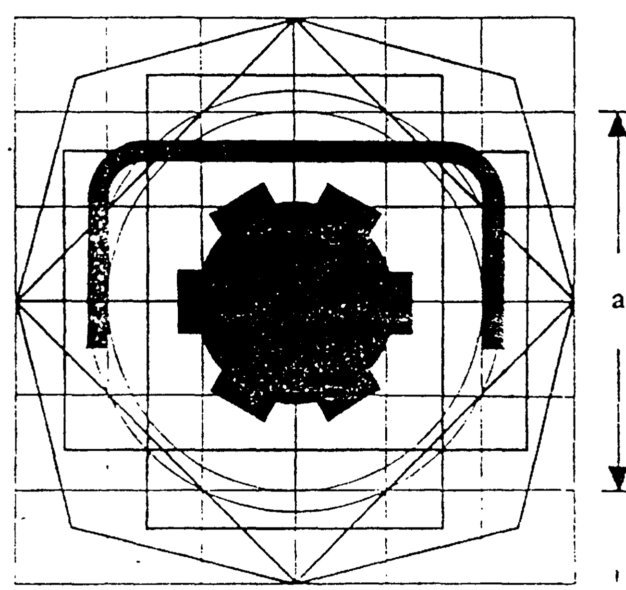
5. Differential lock control



6. Power take-off clutch control



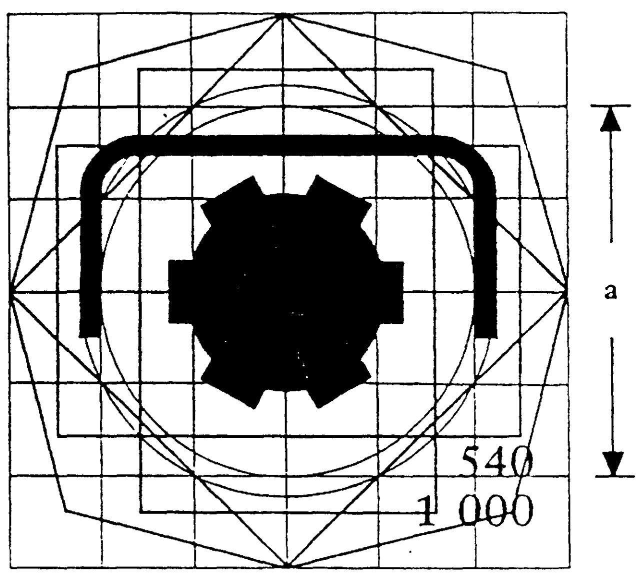
Signification 'on' position



'off' position

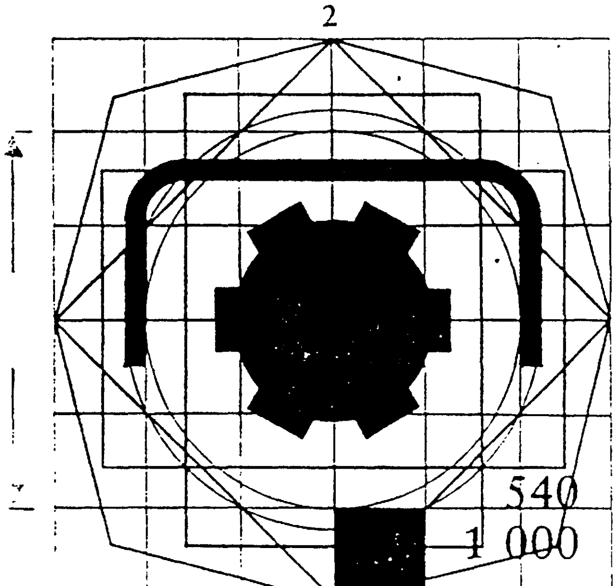
7. Power take-off actuator and/or rotational-speed selector

1



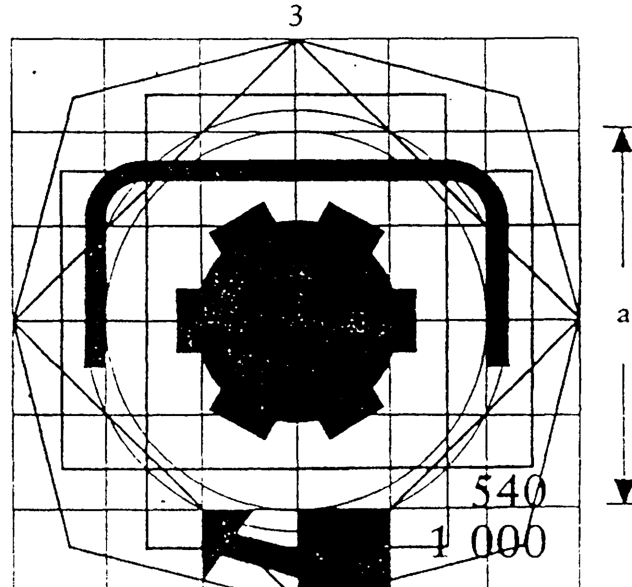
Signification: unit disengaged and not actuated

2



Signification: unit actuated but not engaged

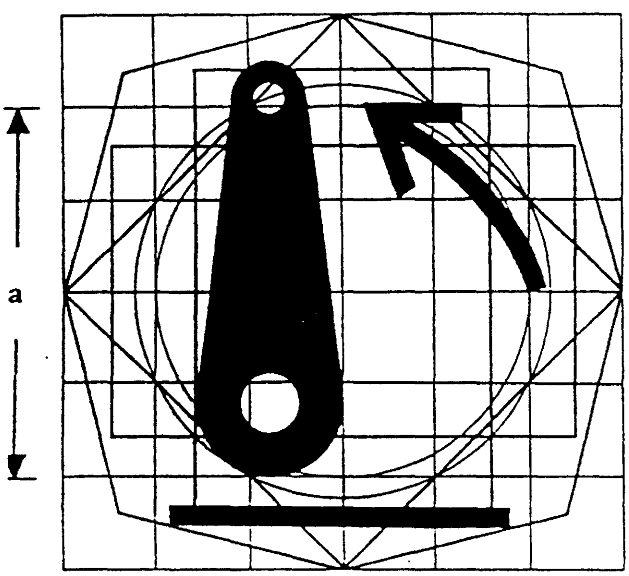
3



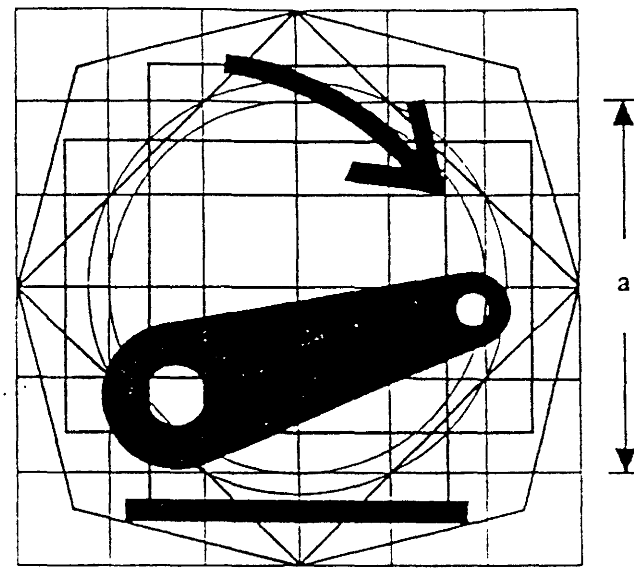
- unit engaged and actuated

NB These symbols relate to the actuator and rotational-speed selector of a two-speed power take-off. In Symbol No 1 the selector is shown in neutral and disengaged, in Symbol No 2 the power take-off is seen to be set to rotate at 1 000 rpm, but not engaged, and in Symbol No 3 it is engaged and actuated at the rotational speed of 1 000 rpm.

8. Lifting mechanism control

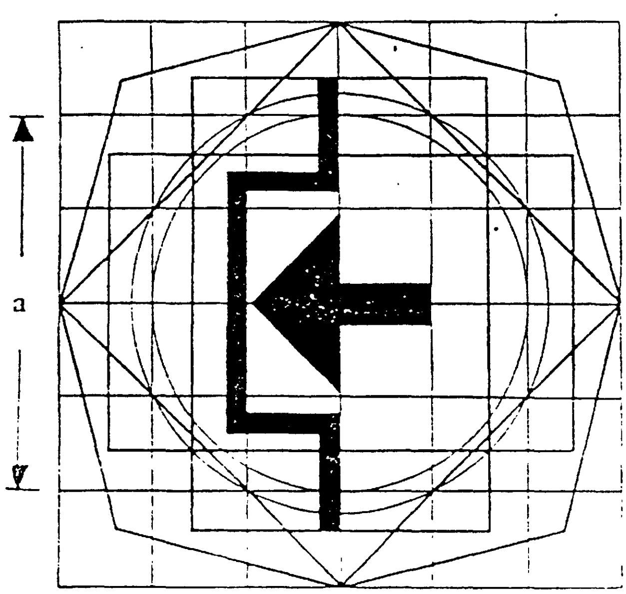


Signification: raised position

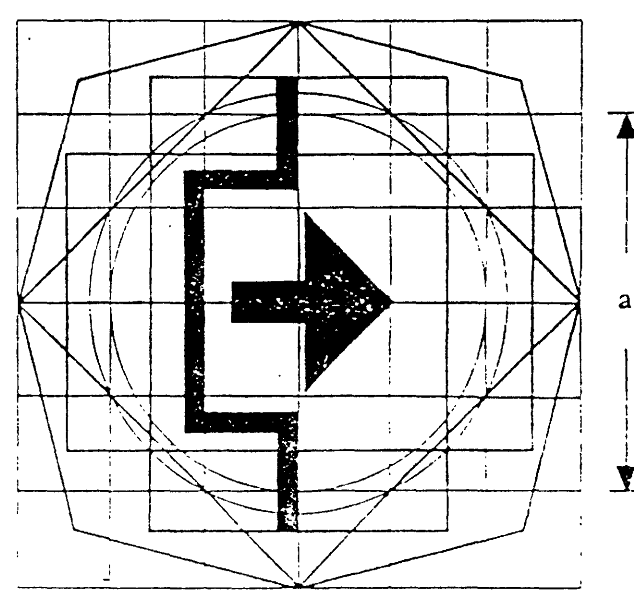


lowered position

9. Switch for remote control of external services

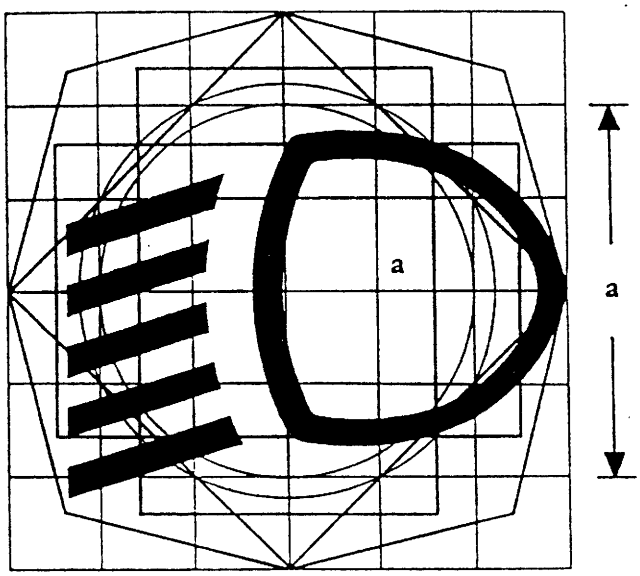


Signification: 'on' position

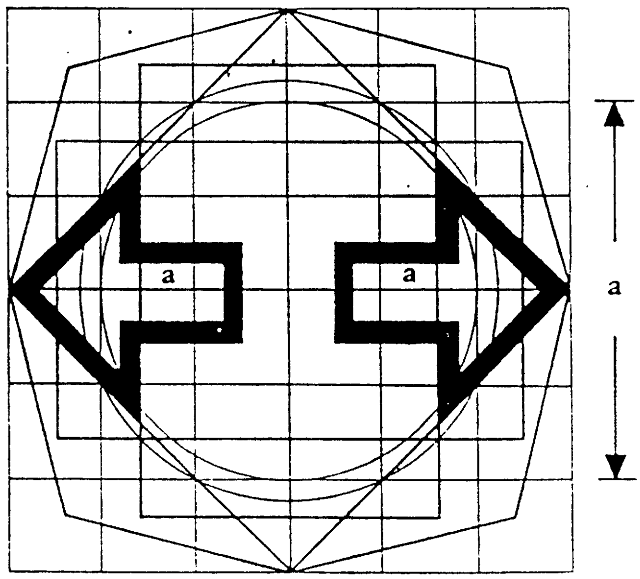


off position

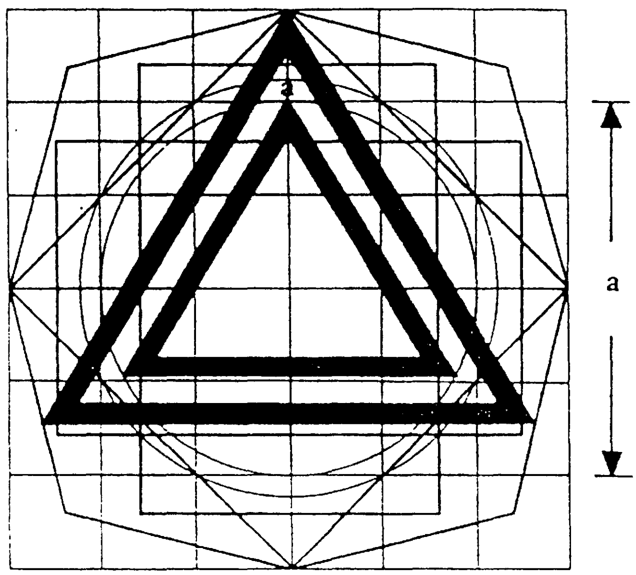
10. Dipped-beam headlamps control



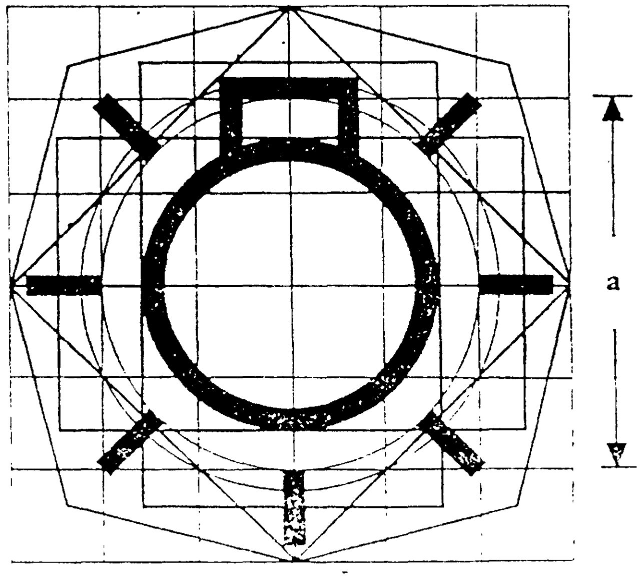
11. Direction-indicator lamp control



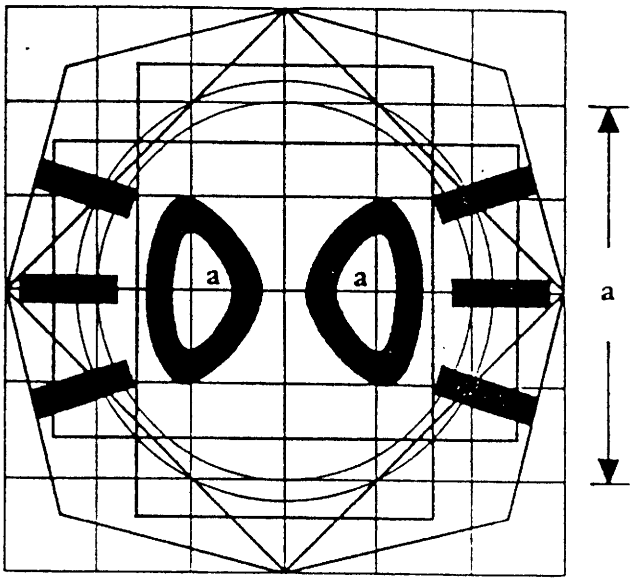
12. Hazard-warning control



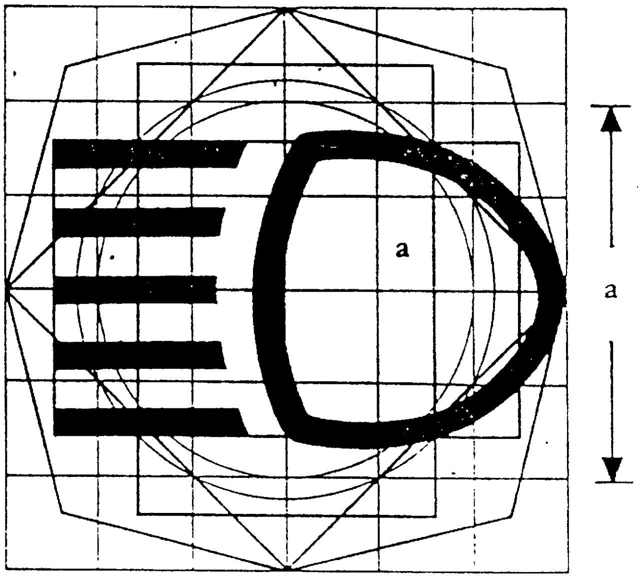
13 Master lighting switch



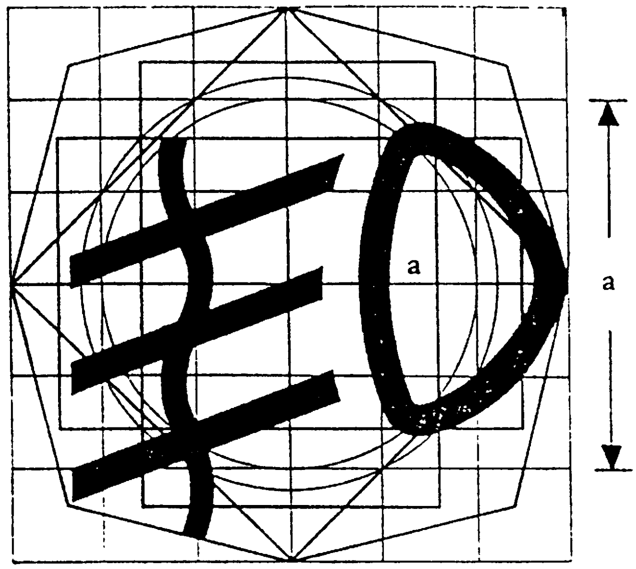
14. Front position (side) lamps control



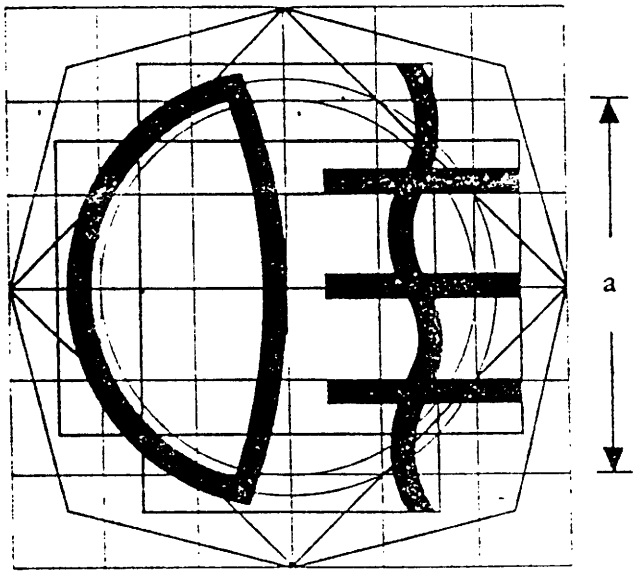
15. Main-beam headlamps control



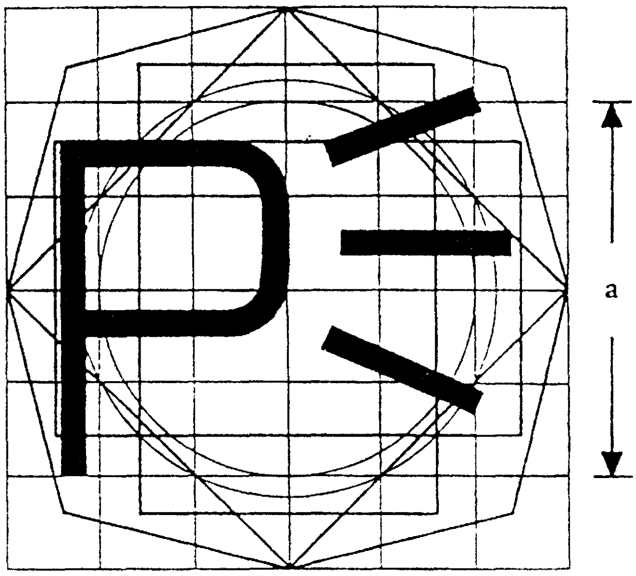
16. Front fog lamp(s) control



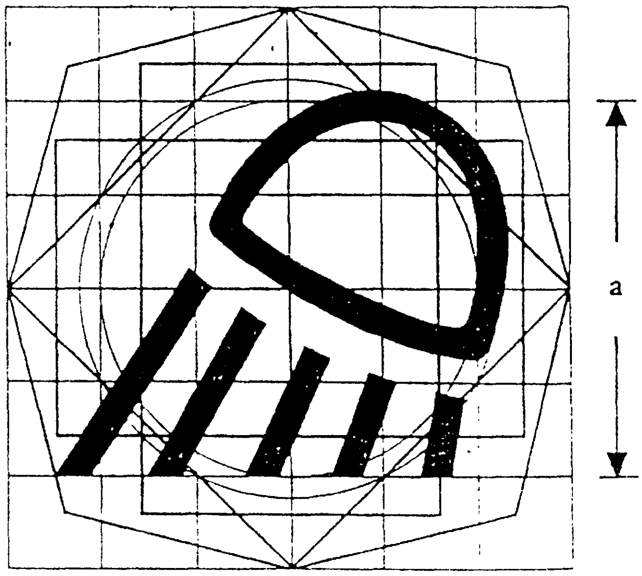
17. Rear fog lamp(s) control



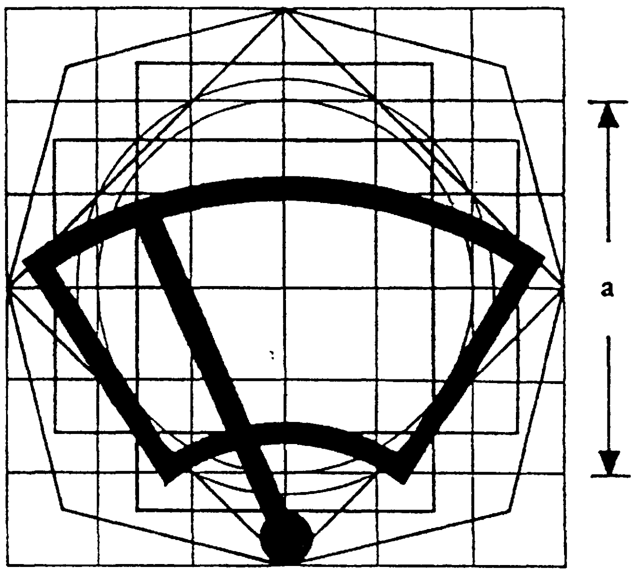
18. Parking lamp(s) control



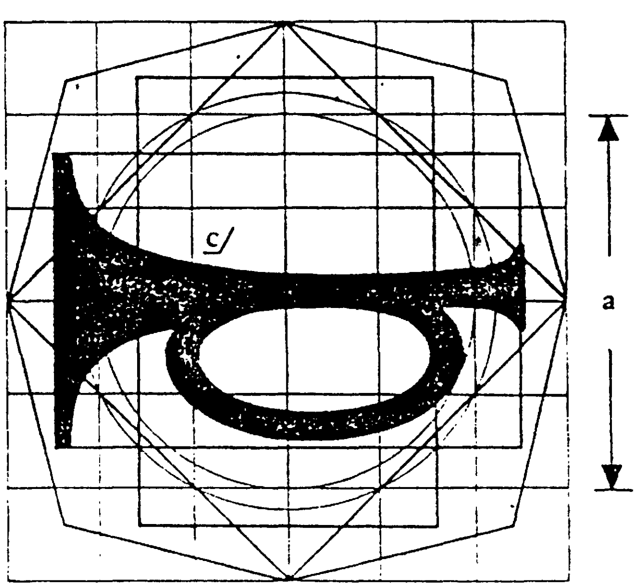
19. Working light control



20. Windscreen wiper control



21. Audible warning device control



PART 4

CONSTRUCTION OF THE BASIC MODEL FOR THE SYMBOLS SHOWN IN PART 3

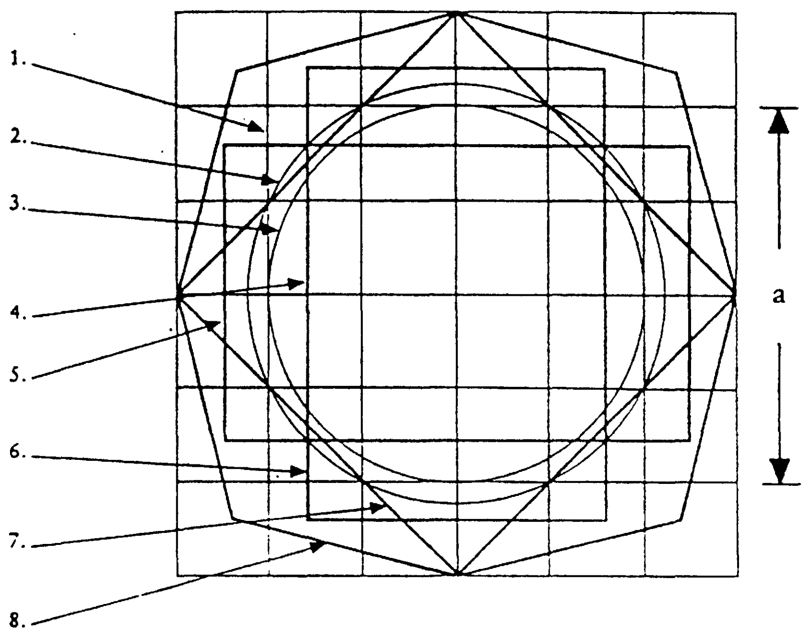


Figure 1

Basic model

The basic model consists of:

1. a basic square measuring 50 × 50 mm, the dimension (a) being equal to the nominal dimension (a) of the original;

2. a basic circle, 56 mm in diameter, having approximately the same surface area as the basic square (1);

3. a second circle, 50 mm in diameter, inscribed within the basic square (1);

4. a second square whose right angles are situated on the basic circle (2) and whose sides are parallel to the sides of the basic square (1);

5. and 6. two rectangles having the same surface area as the basic square (1); their respective sides are perpendicular and each of them is constructed in such a way as to intersect the opposite sides of the basic square at symmetrical points;

7. a third square whose sides pass through the points of intersection of the basic square (1) and of the basic circle (2) and are inclined at an angle of 45°, thus giving the largest horizontal and vertical dimensions of the basic model;

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

The basic model is situated on a 12.5 mm gauge grid which coincides with the basic square (1).

86/415 /EEC

PART 5

MODEL

Maximum format: DIN A4 (210 x 297 mm)

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE INSTALLATION, LOCATION, OPERATION AND IDENTIFICATION OF CONTROLS

(Article 4(2))

EEC-type approval No ....

1. Trade name or mark of the tractor ....

....

2. Tractor type ....
3. Name and address of manufacturer ....

....

....

4. Where applicable, name and address of manufacturer's authorized representative ....

....

....

5. Brief description of the tractor type with regard to the installation, location, operation and identification of controls ....

....

6. Date tractor submitted for type-approval ....
7. Technical service conducting type-approval tests ....
8. Date of report issued by that service ....
9. Number of report issued by that service. ....
10. Type-approval as regards the installation, location, operation and identification of controls has been granted/refused (*)
11. Place ....
12. Date ....
13. Signature ....
14. The following drawings, bearing the abovementioned type-approval number, are attached to this communication:

    A set of drawings of the controls and of the tractor giving information regarded as relevant for the purposes of this Annex.

    These drawings will be supplied to the competent authorities of the other Member States at their express request.
15. Comments if any ....

(*) Delete where inapplicable.

ANNEX XXIV

CERTAIN COMPONENTS AND CHARACTERISTICS OF TRACTORS

89/173/EEC

LIST OF PARTS COMPRISING THE ANNEX

		Page
Part 1 :	Dimensions and towable masses	341
Appendix:	Annex to the EEC type-approval certificate	343
Part 2 :	Speed governor and protection of drive components, projections and wheels	344
Appendix:	Annex to the EEC type-approval certificate	357
Part 3 A :	Windscreen and other glazing — Equipment requirements, definitions, application for component type-approval, component type-approval, markings, general specifications, tests and conformity of production	358
Appendix:	Examples of component type-approval marks	367
Part 3 B :	Communication on EEC component type-approval, refusal of EEC component type-approval, extension of EEC component type-approval and withdrawal of component type-approval	370
Appendix 1:	Toughened-glass windscreens	371
Appendix 2:	Uniformly toughened-glass panes other than windscreens	372
Appendix 3:	Laminated-glass windscreens	373
Appendix 4:	Laminated-glass panes other than windscreens	374
Appendix 5:	Glass-plastic windscreens	375
Appendix 6:	Glass-plastic panes other than windscreens	376
Appendix 7:	Double-glazed units	377
Appendix 8:	Contents of the list of windscreens	378
Part 3 C:	General test conditions	379
Part 3 D:	Toughened-glass windscreens	404
Part 3 E:	Uniformly toughened-glass panes other than windscreens	407
Part 3 F:	Ordinary laminated-glass windscreens	410
Part 3 G:	Laminated-glass panes other than windscreens	414
Part 3 H:	Treated laminated-glass windscreens	417
Part 3 I:	Safety-glass panes faced with plastic material on the inside	419
Part 3 J:	Glass-plastic windscreens	420
Part 3 K:	Glass-plastic panes other than windscreens	423
Part 3 L:	Double-glazed units	425
Part 3 M:	Grouping of windscreens for component type-approval testing	427
Part 3 N:	Measurement of the heights of segment and position of the points of impact	429
Part 3 O:	Checks on conformity of production	432
Part 3 P:	Annex to the EEC type-approval certificate	436
Part 4 :	Mechanical couplings between tractor and towed vehicle and the vertical load on the coupling point	437
Appendix 1:	Drawings of mechanical coupling components	441
Appendix 2:	Dynamic test method	444
Appendix 3:	Coupling device static test method	446
Appendix 4:	Component type-approval mark	447
Appendix 5:	Model EEC component type-approval certificate	448
Appendix 6:	Conditions for granting EEC type-approval	449
Appendix 7:	Annex to the EEC type-approval certificate	450
Part 5	Location and method of affixing statutory plates and inscriptions on the body of the tractor	451
Appendix:	Annex to the EEC type-approval certificate	453
Part 6 :	Brake control of towed vehicles and brake coupling between the tractor and towed vehicles	454
Appendix:	Annex to the EEC type-approval certificate	455

PART 1

DIMENSIONS AND TOWABLE MASSES

1. DEFINITIONS

1.1. **'Length' means:**

- the length of the tractor measured between the vertical planes at right angles to the longitudinal axis of the tractor and passing the outermost points thereof, but excluding:
  - all mirrors,
  - all starting handles,
  - all front or lateral position (side) lamps.

1.2. **'Width' means:**

- the width of the tractor measured between the vertical planes parallel to the longitudinal axis of the tractor and passing through the outermost points thereof, but excluding:
  - any mirrors,
  - any direction indicators,
  - any front, lateral or rear position (side) lamps; any parking lamps,
  - any distortion of the tyres caused by the weight of the tractor,
  - any folding components such as lift-up footrests and flexible mud-flaps.

1.3. **'Height' means:**

- the vertical distance between the ground and the point on the tractor the greatest distance from the ground, excluding the aerial. When this height is determined, the tractor must be:
  - fitted with new tyres having the greatest rolling radius specified by their manufacturer.

1.4. **'Permissible towable mass'**

means the mass which a type of tractor may tow. It may, for example, consist of one or more trailers towed or agricultural or forestry implements. A distinction is drawn between the technically permissible towable mass stated by the manufacturer and the authorized towable mass as laid down in Point 2.2 below.

1.5. 'Towing device'

means a component on the tractor designed to provide a mechanical link between a tractor and towed vehicle.

1.6. 'Unladen mass of tractor in running order (Mt)'

means the mass defined in point 2.4 of Part 1 of Annex I.

1.7. Technically permissable towable mass(es):

- unbraked towable mass,
- independently braked towable mass (as defined in point 1.12 of Part 1 of Annex IX ;
- inertia braked towable mass (as defined in point 1.14 of Part 1 of Annex IX ;
- towable mass fitted with hydraulic or pneumatic braking. such braking may be of the continuous, semi-continuous or independent power-operated type as defined in points 1.9, 1.10 and 1.11, respectively, of Annex IX.

(1) OJ No L 122, 8. 5. 1976, p. 1.

89/173/EEC

2. REQUIREMENTS

2.1. Dimensions

The maximum dimensions of a tractor are as follows:

2.1.1. length: 12 m;

2.1.2. width: 2,5 m;

2.1.3. height: 4 m.

2.1.4. The measurements intended to check these dimensions are carried out as follows:

- with the tractor unladen and in running order as indicated in point 1.6,
- on a flat horizontal surface,
- with the tractor stationary and the engine switched off,
- with the new tyres at the normal pressure recommended by the manufacturer,
- with doors and windows closed,
- with the steering wheel in the straight-ahead position,
- without any agricultural or forestry implement attached to the tractor.

2.2 Permissible towable mass

2.2.1. The permissible towable mass must not exceed:

2.2.1.1. the technically permissible towable mass as defined in point 1.7, recommended by the tractor manufacturer;

2.2.1.2. the towable mass laid down for towing device pursuant to EEC component-type approval.

2.2.2. Where a Member State applies Article 35(2), towable mass(es) must be specified on the tractor's registration certificate.

Appendix

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TYPE OF TRACTOR WITH REGARD TO DIMENSIONS AND TOWABLE MASSES

(Article 4 (2))

EEC type-approval No: ....

1. Component(s) or characteristic(s):

1.1. Dimensions:

1.1.1. length: .... m

1.1.2. width: .... m

1.1.3. height: .... m

1.2. Towable masses:

1.2.1. unbraked towable mass: .... kg

1.2.2. independently braked towable mass: .... kg

1.2.3. inertia-braked towable mass: .... kg

1.2.4. towable mass fitted with an assisted braking system (hydraulic or pneumatic): .... kg

2. Make of tractor or business name of manufacturer: ....

3. Type and where appropriate commercial name of tractor: ....

4. Manufacturer's name and address: ....

....

5. If applicable, name and address of manufacturer's authorized representative: ....

....

6. Date of submission of tractor for EEC type-approval: ....

7. Technical service conducting the type-approval tests: ....

....

8. Date of report issued by that service: ....

9. Number of report issued by that service: ....

10. EEC type-approval for dimensions and towable masses is granted/refused (¹).

11. Place: ....

12. Date: ....

13. Signature: ....

14. The following documents, bearing the EEC type-approval number indicated above are attached to this certificate:

.... dimensioned drawings;

.... drawing or photograph of the tractor.

The data must be supplied to the competent authorities of the other Member States at their request.

15. Remarks: ....

....

(¹) Delete where inapplicable.

PART 2

SPEED GOVERNOR AND PROTECTION OF DRIVE COMPONENTS, PROJECTIONS AND WHEELS

1. SPEED GOVERNOR

1.1. If a speed governor is fitted as standard by the manufacturer, it must be installed and designed in such a way that the tractor complies with this Directive on maximum design speed.

2. PROTECTION OF DRIVE COMPONENTS, PROJECTIONS AND WHEELS

2.1. General

2.1.1. Drive components, projections and wheels on tractors must be designed, fitted and protected in such a way as to prevent accidents to persons under normal conditions of use.

2.1.2. The requirements of point 2.1.1 are regarded as being fulfilled if the requirements set out in point 2.3 have been complied with. Solutions other than those described in point 2.3 are authorized if the manufacturer provides proof that they are at least equivalent to the requirements of point 2.3.

2.1.3. Protective devices must be firmly attached to the tractor. 'Firmly attached' means that removal of such devices should be possible only with the aid of tools.

2.1.4. Cowls, lids and hoods, which could cause injury if they are slammed shut, must be made in such a way as to preclude their shutting accidentally (e.g. by means of safety devices or suitable mounting or design).

2.1.5. A single protective device may protect a number of dangerous points. However, if adjustment, maintenance or interference suppression devices — which can be actuated only when the engine is running — are fitted beneath a single protective device, then further protective devices must be fitted.

2.1.6. Securing devices (e.g. spring clips or flaps)

— to secure quick-release mounting components (e.g. socket pins),

and such components of

— protective devices which open without the aid of tools (e.g. engine cowl)

must be firmly attached either to the tractor mounting or to the protective device.

2.2. Definitions

2.2.1. 'Protective device' means a device intended to protect dangerous parts. Within the meaning of this Directive, protective devices include shields, covers or guards.

2.2.1.1. 'Shield' means a protective device located immediately in front of a dangerous part and which, either on its own or with other parts of the machine, protects on all sides against contact with the dangerous part.

2.2.1.2 'Hood or cowl' means a protective device located in front of the dangerous part and which protects against contact with the dangerous part on the covered side.

2.2.1.3. 'Guard' means a protective device which, by means of a rail, grill or similar device provides the necessary safety distance preventing contact with the dangerous part.

2.2.2. 'Dangerous part' means any point which, owing to the arrangements or design of the fixed or movable part of a tractor, involves a risk of injury. The dangerous parts are, in particular, pinching, shearing, cutting, piercing, penetrating, snatching, entry and attack points.

2.2.2.1 'Pinching point' means any dangerous point where parts move in relation to each other or to fixed parts in such a way as may cause persons or certain parts of their bodies to be pinched.

2.2.2.2 'Shear point' means any dangerous point where parts move along each other or along other parts in such a way as may cause persons or certain parts of their bodies to be pinched or shorn

(1) OJ No L 84, 28. 3. 1974, p. 33.

2.2.2.2. 'Shear point' means any dangerous point where parts move along each other or along other parts in such a way as may cause persons or certain parts of their bodies to be pinched or shorn.

2.2.2.3. 'Cutting, piercing or penetration point' means any dangerous point where parts, either moving or fixed, sharp edged, pointed or blunt may injure persons or certain parts of their bodies.

2.2.2.4. 'Snatching point' means any dangerous point where sharp-edged projections, teeth, pins, screws and bolts, grease nipples, shafts, shaft ends and other parts move in such a way that persons, certain parts of their bodies or clothing may be snatched and pulled along.

2.2.2.5. 'Entry or attack point' means any dangerous point whose parts, by moving, narrow an aperture in which persons, certain parts of their bodies or clothes may be caught.

2.2.3. 'Reach' means the maximum distance which can be reached by persons or certain parts of their bodies upwards, downwards, inwards, above, around or across without the aid of any object (Figure 1).

2.2.4. 'Safety distance' means the distance corresponding to the reach or to the body dimension plus a safety margin (Figure 1).

2.2.5. 'Control' means any device whose direct actuation enables the state or operation of the tractor or of any equipment linked to it to be altered.

2.3. **Safety distances for avoiding contact with dangerous parts**

2.3.1. The safety distance is measured from those points which may be reached to actuate, service and inspect the tractor, and also from ground level. 'Servicing and inspecting the tractor' solely means work normally carried out by the driver himself in accordance with the instructions for use. In determining the safety distances the basic principle is that the tractor is in the state for which it has been designed and that no means has been used in order to reach the dangerous part.

Safety distances are set out in points 2.3.2.1 to 2.3.2.5. In certain specific areas or for certain specific component parts an appropriate safety level is provided if the tractor corresponds to the requirements set out in points 2.3.2.6 to 2.3.2.14.

2.3.2. *Protection of dangerous points*

Upwards

The upward safety margin is 2 500 mm (see Figure 1) in the case of persons standing upright.

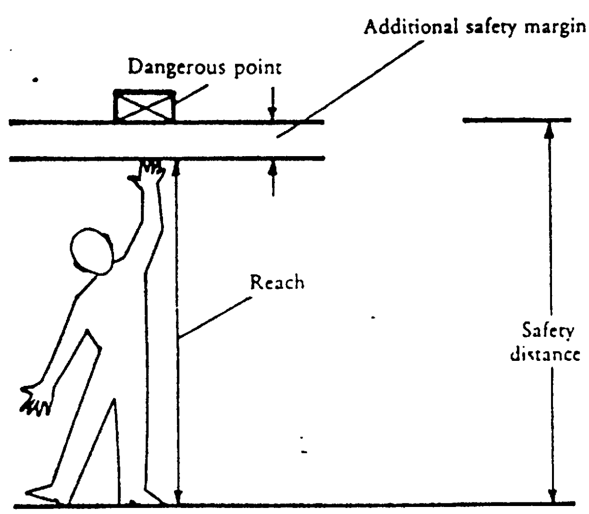


Figure 1

2.3.2.2. Downwards, above

The safety margin for reaching above a barrier is:

a = from ground level up to the dangerous point;

b = height of barrier or protective device;

c = horizontal distance between dangerous point and barrier (see Figure 2).

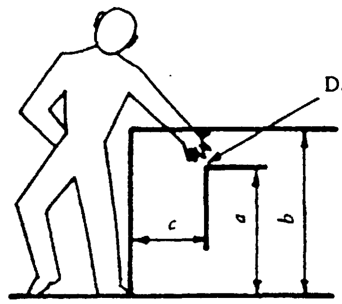


Figure 2

When reaching both downwards and above the safety distances set out in Table 1 must be maintained.

TABLE 1

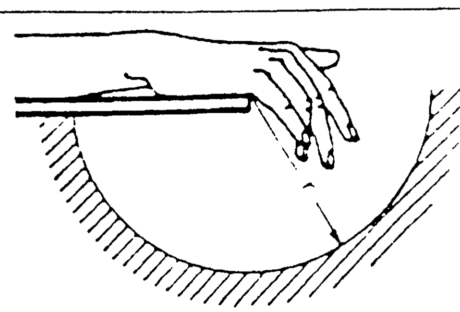
(mm)

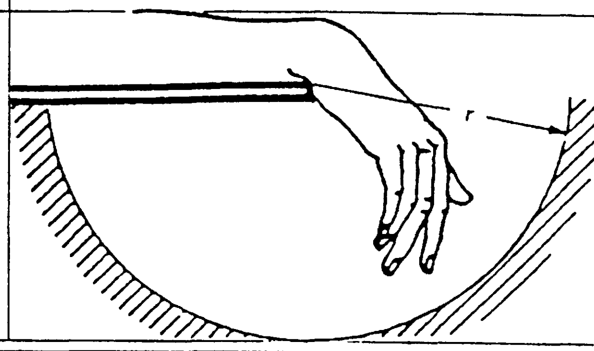
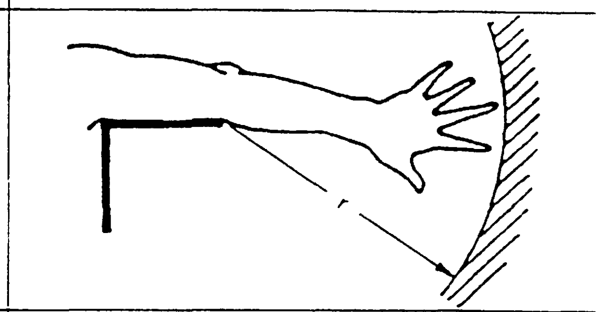
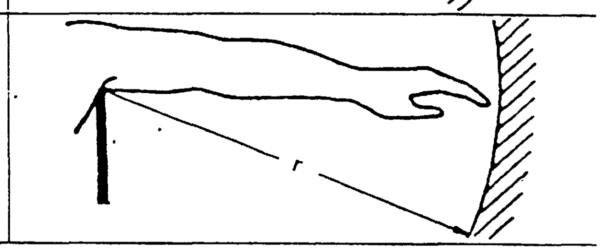
a: Distance from ground of dangerous point	Height between barrier and protective device b							
	2 400	2 200	2 000	1 800	1 600	1 400	1 200	1 000
	Horizontal distance c from dangerous point							
2 400	—	100	100	100	100	100	100	100
2 200	—	250	350	400	500	500	600	600
2 000	—	—	350	500	600	700	900	1 100
1 800	—	—	—	600	900	900	1 000	1 100
1 600	—	—	—	500	900	900	1 000	1 300
1 400	—	—	—	100	800	900	1 000	1 300
1 200	—	—	—	—	500	900	1 000	1 400
1 000	—	—	—	—	300	900	1 000	1 400
800	—	—	—	—	—	600	900	1 300
600	—	—	—	—	—	—	500	1 200
400	—	—	—	—	—	—	300	1 200
200	—	—	—	—	—	—	200	1 100

2.3.2.3. Reach around

The safety margin shown in Table 2 below must, at the minimum, be maintained if the part of the body concerned is not to reach a dangerous point. In applying the safety margin it is assumed that the main body joint concerned is pushed firmly against the edge of the protective device. The safety margins are not considered to have been maintained until one is satisfied that part of the body may quite definitely not advance or penetrate further.

TABLE 2

Part of the body	Safety distance	Figure
Hand From the first knuckle to the fingertips	≥ 120	

Part of the body	Safety distance	Figure
Hand From the wrist to the fingertips	≥ 230	
Limb	**Safety distance**	**Illustration**
Arm From the elbow to the fingertips	≥ 550	
Arm From the shoulder to the fingertips	≥ 850	

2.3.2.4. **Penetration and reach across**

If penetration is possible into or across openings and up to dangerous parts, the minimum safety distances set out in Tables 3 and 4 must be maintained.

Parts which move in relation to one another or moving parts set alongside fixed parts are not regarded as risk factors provided they are no more than 8 mm apart.

TABLE 3

Safety distances for elongated and parallel openings

a is the smaller dimension of the aperture.
b is the safety distance from danger point.

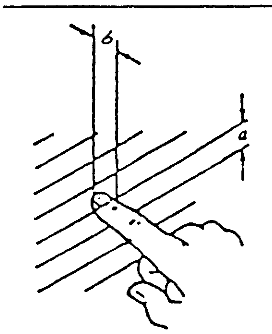
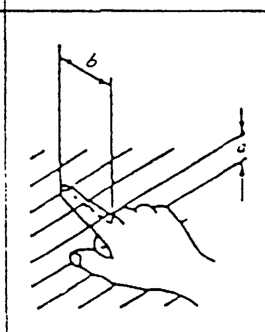
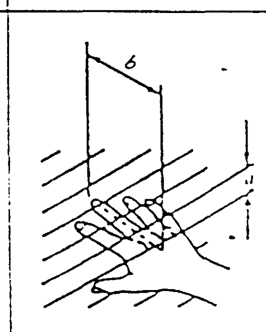
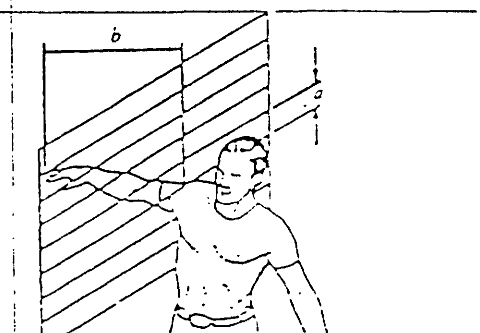
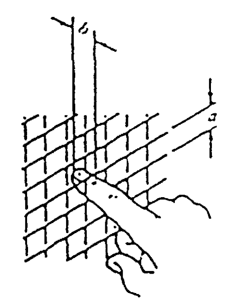
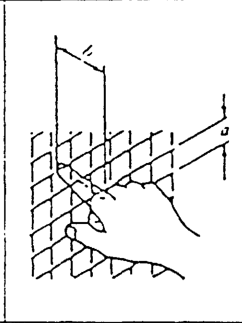
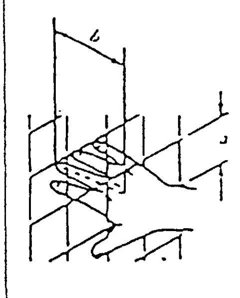
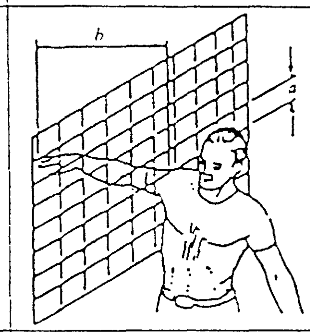
Fingertip	Finger		Hand to ball of thumb	Arm to armpit	—
					
$4 < a \leqslant 8$	$8 < a \leqslant 12$	$12 < a \leqslant 20$	$20 < a \leqslant 30$	$30 < a \leqslant 135$ maximum	> 135
$b \geqslant 15$	$b \geqslant 80$	$b \geqslant 120$	$b \geqslant 200$	$b \geqslant 850$	—

TABLE 4

Safety distances for square or circular apertures

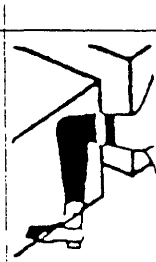
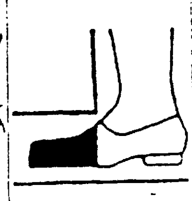
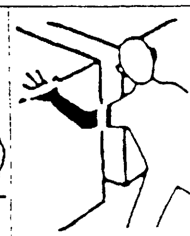
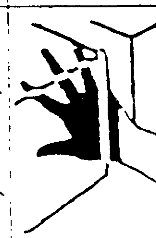
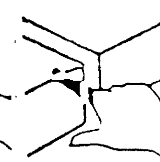
a is the aperture/diameter or length of side.
b is the safety distance from danger point.

Fingertip	Finger		Hand to thumb root	Arm to armpit	—
					
$4 < a \leqslant 8$	$8 < a \leqslant 12$	$12 < a \leqslant 25$	$25 < a \leqslant 40$	$40 < a \leqslant 250$ maximum	250
$b \geqslant 15$	$b \geqslant 80$	$b \geqslant 120$	$b \geqslant 200$	$b \geqslant 850$	—

2.3.2.5. Safety distances at pinching points

A pinching point is not considered dangerous for the part of the body shown if the safety distances are not less than those set out in Table 5, and if it is ensured that the adjacent, wider part of the body cannot be introduced.

TABLE 5

Limb	Body	Leg	Foot	Arm	Hand, joint, first	Finger
Safety distances	500	180	120		100	25
Illustration						

2.3.2.6. Controls

The gap between two pedals and the holes through which controls pass are not regarded as [illegible] pinching or shearing points.

2.3.2.7. Rear three-point coupling

2.3.2.7.1. Behind a plane passing through the median plane of the pivot points of the lifting rods in a three-point coupling system a minimum safety margin of 25 mm must be maintained between the moving parts for each point or of the lifting device's travel, — but not for the extreme upper and lower positions 0,1 n, together with a distance of 25 mm or a minimum angle of 30° for the parts in shear which cause a change in angularity (see Figure 3). Travel n', reduced by 0,1 n at both its upper and lower ends is defined as follows (see Figure 4):

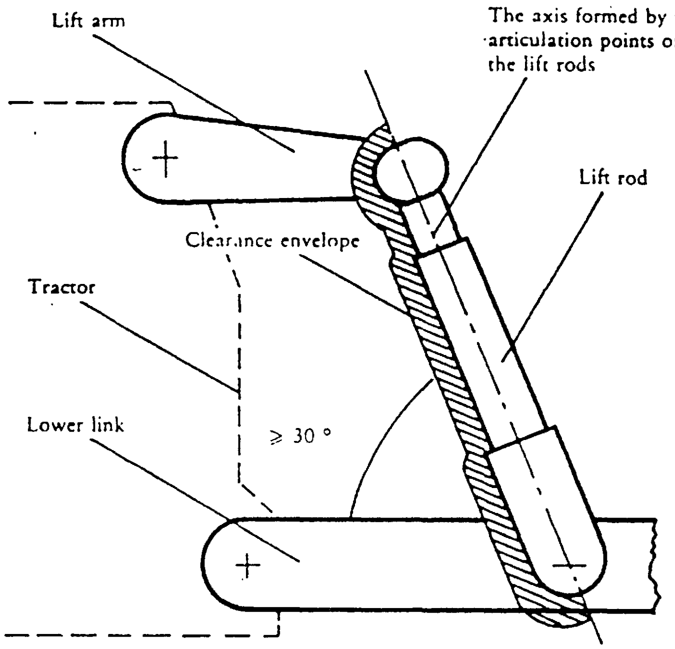


Figure 3

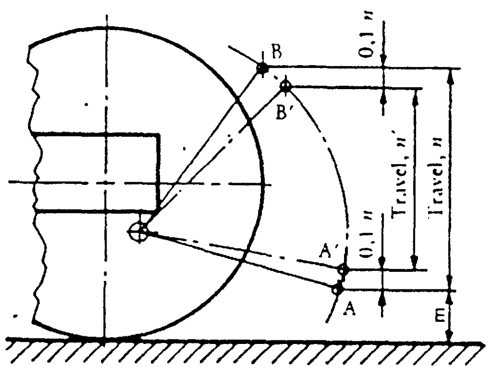


Figure 4

2.3.2.7.2. For travel n of the hydraulic lifting unit, lower position A of the coupling point of the lower link is limited by dimension '14' in accordance with ISO Standard 730, Part 1, while upper position B is limited by the maximum hydraulic travel. Travel n' corresponds to travel n reduced upwards and downwards by 0,1 n, and constitutes the vertical distance between A' and B'.

2.3.2.7.3. Moreover, within travel n' a minimum safety margin of 25 mm in relation to the adjacent parts must be maintained around the profile of the lifting rods.

2.3.2.7.4. If, in the case of a three-point coupling, coupling devices are used which do not require the presence of an operator between the tractor and the implement carried (for example, in the case of a quick coupling), the provisions of point 2.3.2.7.3 do not apply.

2.3.2.7.5. The operating manual should contain specific information on the dangerous points located at the front of the plane defined in the first sentence of point 2.3.2.7.1.

2.3.2.8 Front three-point coupling

2.3.2.8.1. At each point of the lifting unit's travel n — but not for the extreme upper and lower reaches 0,1 n — a minimum safety margin of 25 mm must be maintained between the moving parts together with a minimum angle of 30° or a safety margin of 25 mm in the case of the change of angularity caused by the parts in shear with each other. Travel n' reduced by 0,1 n at both its upper and lower ends, is defined as follows (see also Figure 4).

2.3.2.8.2. For travel n of the hydraulic lifting unit, extreme lower position A of the coupling point of the lower link is limited by dimension '14' in accordance with ISO Standard 8759, Part 2, while extreme upper position B is limited by the maximum hydraulic travel. Traven n' reduced upwards and downwards by 0,1 n and the vertical distance between A' and B'. 89/173/EEC

2.3.2.8.3. If, for the lower links of a front three-point coupling, coupling devices (such as a rapid-action coupling) are used which do not require the presence of a person between the tractor and the implement attached during coupling, the requirements under point 2.3.2.8.1 do not apply within the reach of a radius of 250 mm from the points at which the lower links are coupled to the tractor. However, a minimum safety margin of 25 mm from neighbouring parts within the defined travel n' must in any case be maintained around the outside of the travel rods/cylinders.

2.3.2.9. **Driving seat and environment**

When he is in a sitting position, all pinching of shearing points must be out of range of the driver's hands or feet. This requirement is considered to have been met if the following conditions are fulfilled:

2.3.2.9.1. The driver's seat is at the mid-point in its longitudinal and vertical adjustment range. The driver's reach limit is divided into zones A and B. A central spherical point of these zones is 60 mm in front of and 580 mm above the seat reference point (see Figure 5). Zone A consists of a sphere having a diameter of 550 mm while zone B is located between that sphere and a sphere having a radius of 1 000 mm.

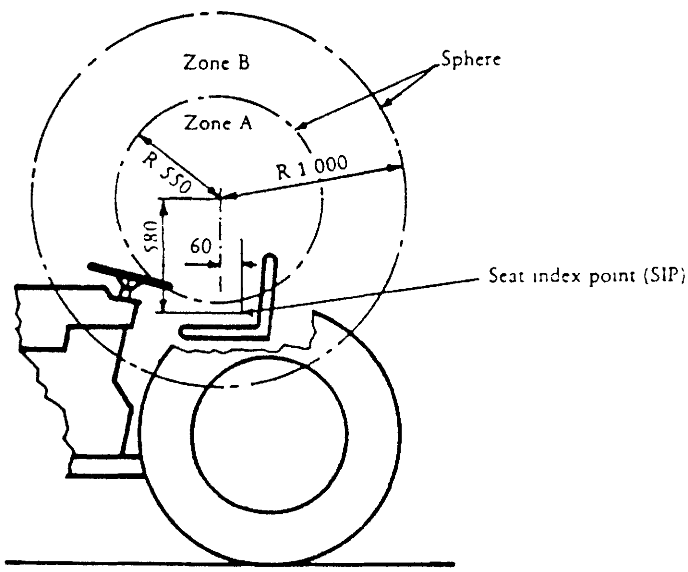


Figure 5

2.3.2.9.2. A safety distance of 120 mm in zone A and 25 mm in zone B is maintained near the pinching and shearing points, whilst a minimum angle of 30° is maintained in the case of shearing parts causing a change in angularity.

2.3.2.9.3. In zone A, only the pinching and shearing points caused by parts set in motion by an outside energy source must be taken into account.

2.3.2.9.4. If a dangerous point is due to the presence of structural parts adjacent to the seat, a safety distance of a least 25 mm is maintained between that structural part and the seat. There is no dangerous point between the seat backrest and the adjacent structural parts located behind that backrest if the adjacent structural parts are smooth and the seat backrest itself is rounded in the surrounding area and has no sharp points.

2.3.2.10. Passenger seat (if any)

2.3.2.10.1. If parts may constitute a danger for the feet, provision must be made for protective devices within a hemispherical radius of 800 mm starting from the forward edge of the seat cushion and pointing downwards.

2.3.2.10.2. As described in point 2.3.2.9 (see Figure 5) the dangerous points in zones A and B must be protected within a sphere whose centre is 670 mm above the centre of the front edge of the passenger seat.

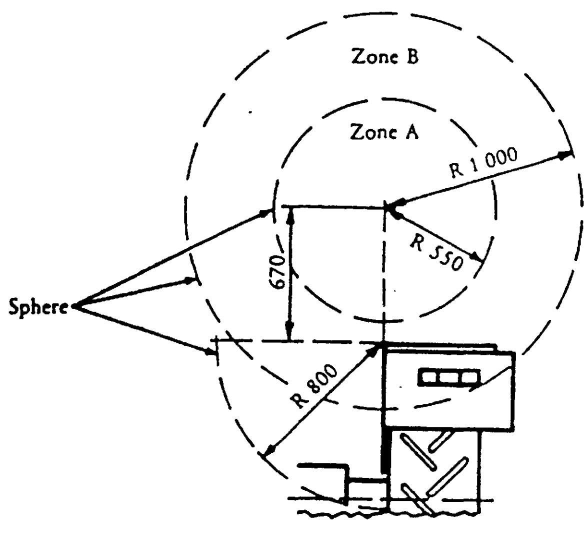


Figure 6

2.3.2.11. Narrow-track tractors (tractors with a track as defined in the second indent of Article 63 of this Directive.

2.3.2.11.1. In the case of narrow-track tractors, the requirements of point 2.3.2.9 do not apply to the zone situated below a plane inclined at 45° to the rear and transverse to the direction of travel, and passing through a point located 230 mm behind the seat index point (see Figure 7). If there are any dangerous points in this zone, corresponding warnings must be affixed to the tractor.

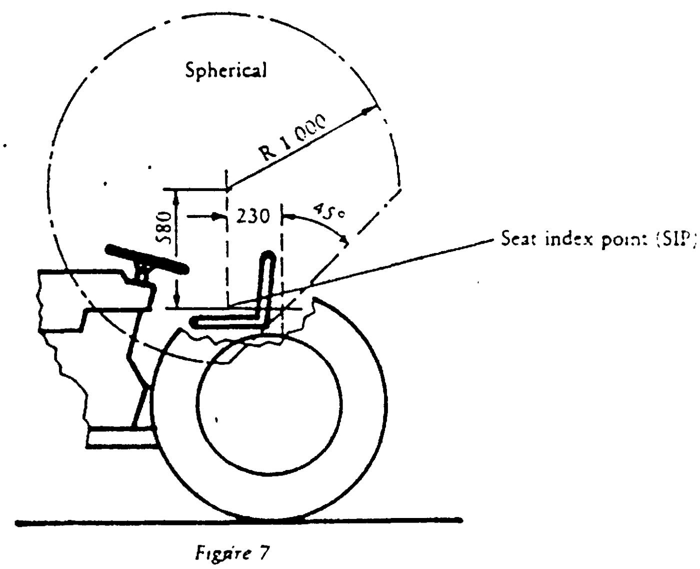


Figure 7

2.3.2.11.2. Points II.1 and II.2 of Part 1 of Annex XIX apply to access to the driver's seat.

2.3.2.11.3. Points 1.6 of Part 1 of Annex XIX apply to control devices.

2.3.2.11.4. In front of a reference plane which passes at right angles to the longitudinal axis of the vehicle and through the centre of the load-free pedal (clutch and/or service brake), very hot exhaust components must be protected if located within 300 mm in the upper zone (700 mm above ground level) and within 150 mm in the lower zone (see Figure 8). Laterally, the area to be protected is limited by the external outline of the tractor and the external outline of the exhaust system.

Very hot exhaust system components passing beneath the entry step must be covered in their vertical projection or otherwise thermally protected.

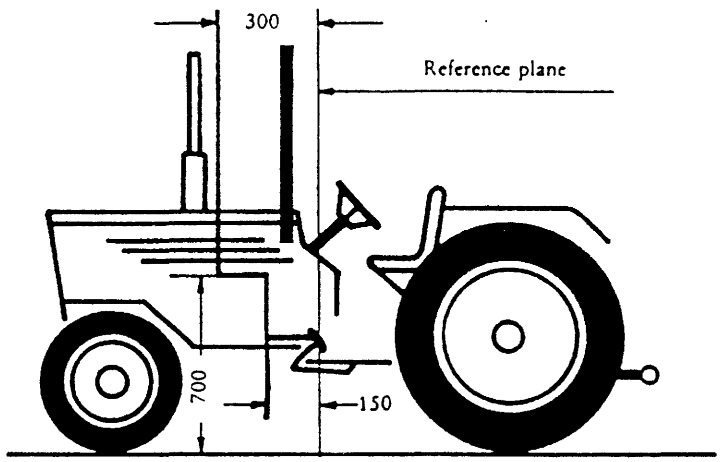


Figure 8

2.3.2.12. Layout and marking of flexible hydraulic hoses

2.3.2.12.1. Flexible hydraulic hoses must be arranged in such a way as to prevent mechanical and thermal damage

2.3.2.12.2. Flexible hydraulic hoses must be clearly identifiable and indelibly marked with the following information:

— the flexible hose manufacturer's mark,

— manufacturing date (year and month of manufacture),

— maximum permissible dynamic excess pressure in operation.

2.3.2.12.3. Flexible hydraulic hoses in the vicinity of the driver's or the passenger's seat must be arranged or protected in such a way that in the event of their failure there can be no danger to any person

2.3.2.13. Steering and swing axle

Parts moving in relation to each other or to fixed parts must be protected if they lie within the zone defined in points 2.3.2.9 and 2.3.2.10.

When articulated steering is fitted, there must be indelible and clear markings within the articulation range on both sides of the tractor, indicating by means of an illustrative sign or in words that remaining within the unprotected range of articulation is not permitted. The corresponding indications must be included in the operating manual.

2.3.2.14. Transmission shafts fixed on the tractor

Transmission shafts (for example, for four-wheel drive which can only rotate while the tractor is in motion, must be protected if they are located within the zone defined in points 2.3.2.9 and 2.3.2.10.

2.3.2.15. Clearance zone around the drive wheels

2.3.2.15.1. The clearance zones of the wheel guards must meet the following requirements.

2.3.2.15.2. 'Clearance zone' means the space which must remain clear around the tyres of the drive wheels in relation to the adjacent parts of the vehicle

The clearance zone of the drive wheels when fitted with largest-size tyres must correspond to the dimensions set out in the following Figure 9 and Table 6.

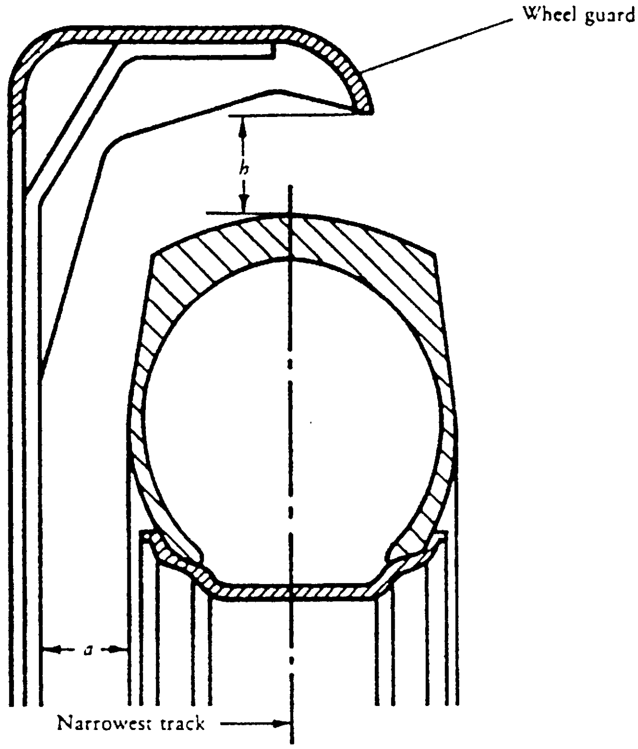


Figure 9

TABLE 6

Standard tractors		Narrow track tractors	
a mm	*h* mm	*a* mm	*h* mm
50	60	15	30

A clearance zone smaller than that illustrated in Figure 9 and Table 6 is permissible in addition to the zones referred to in points 2.3.2.9 and 2.3.2.10 in the case of narrow-track tractors where wheel guards are also used to scrape off earth stuck to the wheels.

2.4. Method of determining the seat index point

2.4.1. *General*

The method and device used in defining the index point for any type of upholstered seat are described below.

2.4.2. *Definitions*

Seat index point (SIP):

Point situated in the vertical median longitudinal plane of the SIP locating device represented in Figure 10 which is placed on the driving seat in accordance with points 2.4.4 and 2.4.6.

The seat index point is established in relation to the vehicle and does not move as a function of the seat adjustments and/or oscillations.

2.4.3. *Device for determining the seat index point SIP*

The device for determining the SIP must be as shown in Figure 10. The mass of that device is 6 ± 1 kg and its underside must be flat and polished.

2.4.4. *Seat setting for determination of index point SIP*

Where a seat and its suspension can be regulated, the seat is regulated as follows before the index point is determined:

(a) all of the adjustments — back/forth, height and rake — must be in their mid-position. If this is not the case, the closest adjustment either above or below the mid-position should be used;

(b) adjustable suspension must be adjusted in such a way that the suspension is at mid-travel with the locating device in position and loaded. The suspension may be locked mechanically in that position while the index point (SIP) is determined;

(c) non-adjustable suspension may be locked in the vertical position that is achieved with the locating device in place and loaded;

(d) if the adjustments mentioned above conflict with the manufacturer's specific instructions, these must be followed in such a way as to obtain the setting recommended for a 75-kg driver.

NB: A 75-kg driver offers an approximation of the locating device in position on the seat and loaded with a mass of 65 kg.

2.4.5. *Determination of the three reference axes x', y', and z' for the SIP*

The coordinates must be established as follows:

(a) location, on one side of the seat mounting, of the attachment hole that is in the most rear position;

(b) if the axis of this hole is parallel to the pivot axis defined on the device, it is taken as axis y', (pointing from left to right in relation to a seated driver — see Figure 11);

(c) if the axis of this hole is parallel to the vertical plane passing through the centre line of the seat, the straight line is taken as axis y' which runs parallel to the pivot axis referred to and passes through the point of intersection between the supporting plane of the seat and the hole axis referred to above (see Figure 12).

(d) in all other cases, axis y' is established in accordance with the parameters relating to the seat being measured;

(e) axes x' and z' are defined as intersections of the horizontal and vertical planes passing through y' with the vertical plane through the seat centre line. Axes x' and z' point forwards and upwards (see Figures 11 and 12).

2.4.6. *Method of determining the seat index point (SIP)*

The seat index point (SIP) is determined by using the device shown in Figure 10 and by proceeding in the following manner:

(a) the seat is covered with a piece of cloth in order to facilitate correct positioning of the device;

(b) the device is positioned on the seat cushion (without additional mass) by pushing it rearwards against the backrest;

(c) masses are added to bring the total mass of the device from 6 ± 1 kg to 26 ± 1 kg. The centre of vertical force must be 40 mm ahead of the seat index point mark on the horizontal part of the device (see Figure 10);

(d) a horizontal force of about 100 N is applied twice to the device on the seat index point, as set out in figure 10;

(e) other masses are added to bring the total mass of the device from 26 ± 1 kg to 65 ± 1 kg. The centre of the vertical force of the masses added must be 40 mm ahead of the seat index point mark on the horizontal part of the device (see Figure 10);

(f) on both sides of the seat in two vertical planes, equidistant from the median longitudinal line of the seat, the coordinates, as defined in point 2.4.5, of the intersections of those planes on the axis of the seat index point marked by the device must be measured to ± 1 mm.

The arithmetical mean values of the measurements taken in the two planes are recorded as SIP coordinates;

(g) the conditions resulting from the method of determination, and which diverge from the procedure set out in this Annex, or which may be the source of [illegible] may be noted, as may their causes.

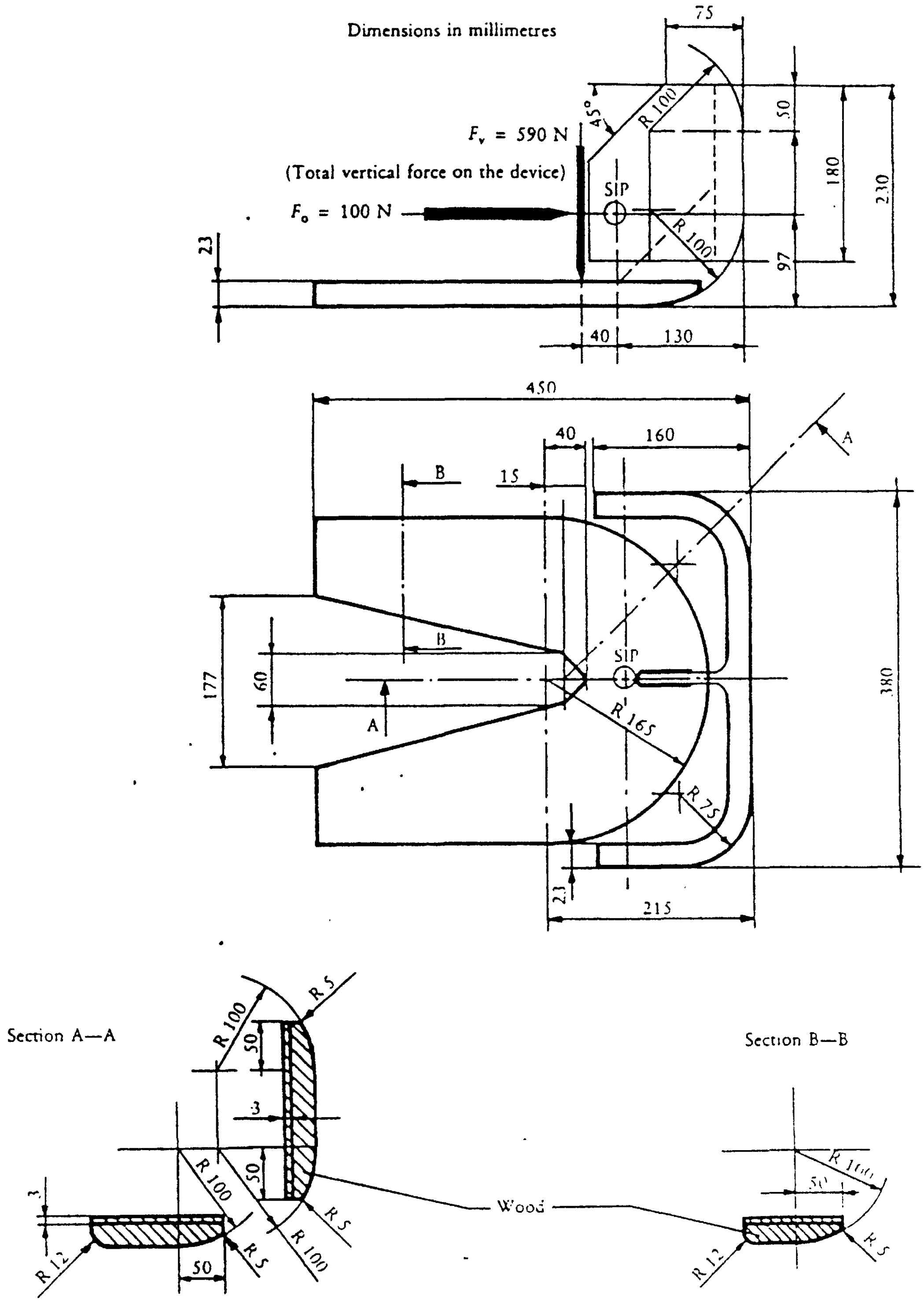


Figure 10

Device for determining the seat index point SIP

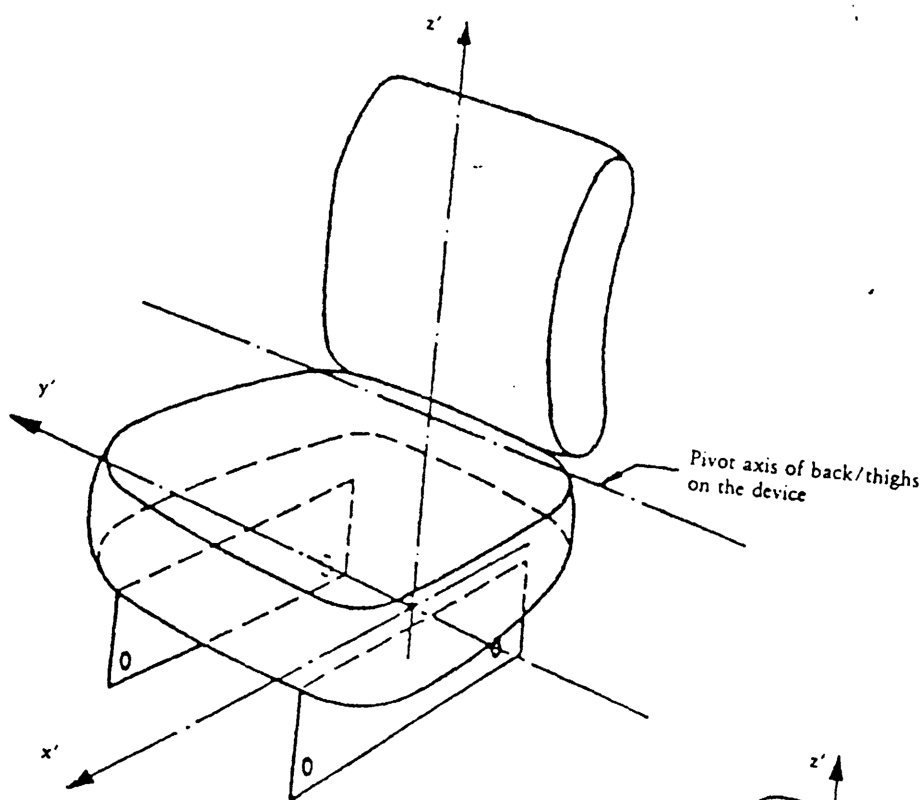


Figure 11

Determination of SIP reference axes

(Axis of attachment hole parallel to the pivot axis of the back/thighs)

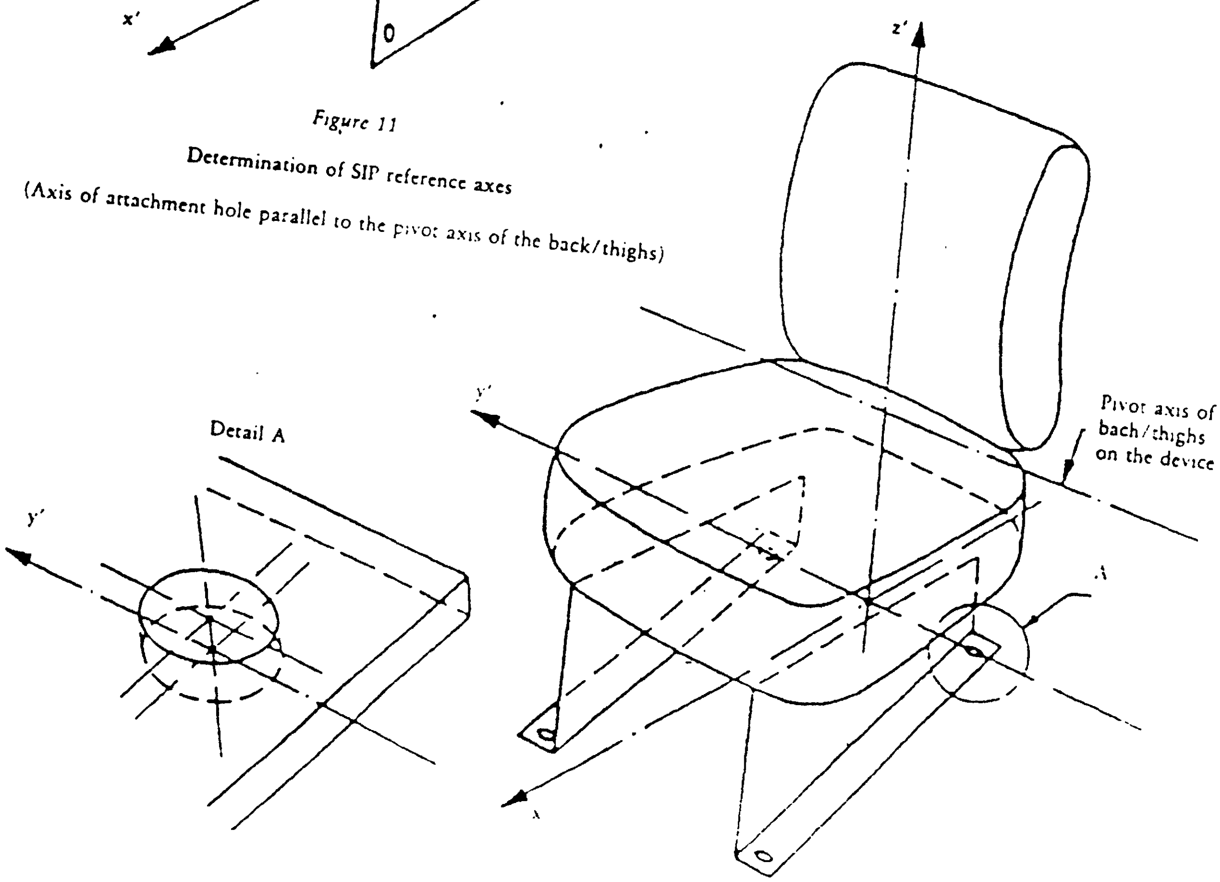


Figure 12

Determination of the three reference axes of the SIP

(Axis of attachment hole parallel to the vertical plane passing through the median line of the seat)

Appendix

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE SPEED GOVERNOR AND PROTECTION OF THE DRIVE COMPONENTS, PROJECTIONS AND WHEELS

(Article 4 (2))

EEC type-approval No: ....

1. Component(s) or characteristic(s):

1.1. speed governor (where present)

1.2. protection of the drive units, projection and wheels

2. Make of tractor (or business name of manufacturer): ....

....

3. Type and where appropriate commercial name of tractor: ....

....

4. Manufacturer's name and address: ....

....

5. If applicable, name and address of manufacturer's authorized representative: ....

....

6. Description of component(s) and/or characteristic(s) mentioned under 1 above:

....

7. Date of submission of tractor for EEC type-approval: ....

8. Technical service conducting the type-approval tests: ....

....

9. Date of report issued by that service: ....

10. Number of report issued by that service: ....

11. EEC type-approval for the speed governor and protection of the drive components, projections and wheels is granted/refused (¹)

12. Place: ....

13. Date: ....

14. Signature: ....

15. The following documents, bearing the EEC type-approval number indicated above, are attached to this certificate:

.... dimensioned drawing, -

.... drawing or photograph of the relevant parts of the tractor.

These data must be supplied to the component authorities of the other Member States if they so request.

16. Remarks. ....

....

....

(¹) Delete where inapplicable

PART 3 A

89/173/EEC

WINDSCREEN AND OTHER GLAZING

EQUIPMENT REQUIREMENTS, DEFINITIONS, APPLICATION FOR COMPONENT TYPE-APPROVAL, COMPONENT TYPE-APPROVAL, MARKINGS, GENERAL SPECIFICATIONS, TESTS AND CONFORMITY OF PRODUCTION

1. EQUIPMENT REQUIREMENTS

1.1. Agricultural and forestry tractors may be equipped as chosen by their manufacturer with:

1.1.1. windscreens and glass panes other than windscreens covered by the provisions of this Annex;

1.1.2. windscreens covered by the requirements for glass panes other than windscreens in this Annex, with the exception of the requirements of point 9.1.4.2 of Part 3 C (glass panes with a regular light transmittance of less than 70 %).

2. DEFINITIONS

For the purposes of this Directive:

2.1. 'toughened-glass pane' means a glass pane consisting of a single layer of glass which has been subjected to special treatment to increase its mechanical strength and condition its fragmentations after shattering;

2.2. 'laminated-glass pane' means a glass pane consisting of two or more layers of glass held together by one or more interlayers of plastic material; it may be:

2.2.1. 'ordinary', where none of the layers of glass of which it is composed have been treated, or

2.2.2. 'treated', where at least one of the layers of glass of which it is composed has been specially treated to increase its mechanical strength and to condition its fragmentation after shattering;

2.3. 'safety glazing coated with plastic material' means a glass pane as defined in point 2.1 or 2.2 with a layer of plastic material on its inner surface;

2.4. 'glass-plastic safety glazing' means a pane of laminated glass having one layer of glass and one or more layers of plastic material at least one of which acts as interlayer. The plastic layers shall be on the inner face when the glazing is fitted on the tractor;

2.5. 'group of windscreens' means a group comprising windscreens of differing sizes and shapes subjected to an examination of their mechanical properties, their mode of fragmentation and their behaviour in environmental resistance tests;

2.5.1. 'flat windscreen' means a windscreen exhibiting no nominal curvature resulting in a height of segment exceeding 10 mm per linear metre;

2.5.2. 'curved windscreen' means a windscreen exhibiting nominal curvature resulting in a height of segment exceeding 10 mm per linear metre;

2.6. 'double window' means a set of two panes installed separately in the same opening on the tractor;

2.7. 'double glazing' means a unit composed of two panes permanently assembled in the factory and separated by a uniform gap;

2.7.1. 'symmetrical double glazing' means double glazing in which the two constituent panes are of the same type (toughened or laminated glass, etc.), and exhibit identical principal and secondary characteristics;

2.7.2. 'asymmetrical double glazing' means double glazing in which the two constituent panes are of a different type (toughened or laminated glass, etc.) or exhibit different principal and/or secondary characteristics;

2.8. 'principal characteristic' means a characteristic which appreciably modifies the optical and/or mechanical properties of a pane of glass in a way not without significance to the function which the glass pane is to perform in a tractor. This term also covers the trade name or mark;

2.9. 'secondary characteristic' means a characteristic capable of modifying the optical and/or mechanical properties of a pane of glass in a way which is of significance to the function which the glass pane is intended to perform in a tractor. The extent of such modification is assessed in relation to the indices of difficulty;

2.10. 'indices of difficulty' covers a two-stage grading system applying to the variations observed in practice in each secondary characteristic. A change from index '1' to index '2' indicates the need for additional tests;

2.11. 'developed area of a windscreen' means the minimum rectangular area of glass from which a windscreen can be manufactured;

2.12. 'rake angle of a windscreen' means the angle included between a vertical line and a straight line passing through the top and bottom extremities of the windscreen, both lines lying in a vertical plane along the longitudinal axis of the tractor.

2.12.1. Measurement of the rake angle is performed on an unladen tractor standing on level ground.

2.12.2. Tractors equipped with hydropneumatic, hydraulic or pneumatic suspension or with a device for automatic adjustment of ground clearance according to load are tested in the normal running conditions specified by the manufacturer;

2.13. 'height of segment, h' means the maximum distance, measured at right angles approximately to the glass pane, separating the inner surface of the pane from a pane passing through the ends of the pane, (see Part 3 N, Figure 1);

2.14. 'type of glass pane' means a glass pane, as defined in points 2.1 to 2.4, not exhibiting any essential differences in respect, in particular, of the principal and secondary characteristics mentioned in Parts 3D and 3L.

2.14.1. Although a change in the principal characteristics implies that the product is of a new type, it is recognized that in certain cases a change in shape and dimension does not necessarily require a complete set of tests to be carried out. For certain of the tests prescribed in the individual Annexes, glass panes may be grouped together if it is evident that they have similar principal characteristics.

2.14.2. Glass panes exhibiting differences only as regards their secondary characteristics may be deemed to be of the same type; certain tests may, however, be carried out on samples of such panes if the performance of those tests is explicitly stipulated in the test conditions;

2.15. 'curvature, r' means the approximate value of the smallest radius of arc of the windscreen as measured in the area of maximum curvature.

3. APPLICATION FOR COMPONENT TYPE-APPROVAL

3.1. The application for EEC component type-approval for a type of glass pane is submitted by the manufacturer of the safety-glass pane or by his duly accredited representative for each type of safety glass. The application may be made in one Member State only.

3.2. For each type of safety glass, the application is accompanied by the undermentioned documents in triplicate and by the following particulars:

3.2.1. a technical description comprising all principal and secondary characteristics; and,

3.2.1.1. in the case of glazing other than windscreens, drawings in a format not exceeding A4 or folded to that format, showing:

— the maximum area,

— the smallest angle between two adjacent sides of the glass pane, and

— the maximum height of segment, if any;

3.2.1.2. In the case of windscreens:

3.2.1.2.1. a list of the models of windscreen for which component type-approval is sought, giving the name of the tractor manufacturers and the type(s) of tractor;

3.2.1.2.2. drawings on a scale 1:10 and diagrams of the windscreens and their installation in the tractor in sufficient detail to show:

3.2.1.2.2.1. the position of the windscreen relative to the R point as defined in point 1.2, "field of vision", of Annex V;

3.2.1.2.2.2. the rake angle of the windscreen;

3.2.1.2.2.2. the rake angle of the seat back-rest;

3.2.1.2.2.3. the position and size of the zone in which the optical qualities are verified and, where appropriate, the area subjected to differential toughening;

3.2.1.2.2.4. the developed area of the windscreen;

3.2.1.2.2.5. the maximum height of segment of the windscreen; and

3.2.1.2.2.6. the curvature of the windscreen (for windscreen-grouping purposes only);

3.2.1.3. in the case of double glazing, drawings in a format not exceeding A4 or folded to that format, showing, in addition to the information referred to in point 3.2.1.1:

— the type of each constituent glass pane,

— the type of bonding (organic, glass-glass or glass-metal),

— the nominal thickness of the gap between the two glass panes.

3.3 In addition, the applicant must submit a sufficient number of test pieces and samples of the finished glass panes of the models considered, the number being if necessary determined by agreement with the technical service for conducting the tests.

3.4. The competent authority must verify the existence of satisfactory arrangements for ensuring effective control of conformity of production before component type-approval is granted.

4. MARKINGS

4.1. Every safety-glass pane, including the samples and test-pieces submitted for component type-approval, must bear the trade name or mark of the manufacturer. The marking must be clearly legible and indelible.

5. COMPONENT TYPE-APPROVAL

5.1. If the samples submitted for component type-approval meet the requirements of points 5 to 7 below, approval of the pertinent type of safety-glass pane is granted.

5.2. A component type-approval number is assigned to each type as defined in Parts 3-E, 3-G, 3K, and 3-L, or, in the case of windscreens, to each group approved. Its first two digits (at present 00 for this Directive in its original form) indicate the series of amendments incorporating the most recent major technical amendments made to this Directive at the time of issue of the approval. A Member State may not assign the same number to another type or group of safety-glass panes.

5.3. Component type-approval or extension or refusal of approval for a type of safety-glass pane pursuant to this Directive is communicated to the Member States by means of a notice prepared in accordance with the model set out in Part 3 B to this Directive and its Appendices

5.3.1. In the case of windscreens, the EEC component type-approval notice must be accompanied by a document listing every windscreen model in the approved group, together with the characteristics of the group, in accordance with Appendix 8 to Part 3E.

5.4. In addition to the marking specified in point 4.1, an EEC component type-approval mark must be affixed conspicuously to all safety-glass panes, and double-glazed units conforming to a type approved under this Directive. Any special component type-approval mark assigned to each pane of a double-glazed unit may also be affixed.

This component type-approval mark consists of:

5.4.1. a rectangle surrounding the lower-case letter 'e' followed by the distinguishing number of the country which has granted the approval (¹);

5.4.2. the component type-approval number to the right of the rectangle prescribed in point 5.4.1.

5.5. The following additional symbols are affixed near the above EEC type-approval mark:

5.5.1. in the case of a windscreen:

I: for toughened glass (I/P if faced) (²),
II: for ordinary laminated glass (II/P if faced) (²),
III: for treated laminated glass (III/P if faced) (²),
IV: for glass-plastic glazing;

5.5.2. V: in the case of a glass pane other than a windscreen covered by the provisions of point 9.1.4.2 of Part 3C ;

5.5.3. VI: in the case of a double-glazed unit;

5.5.4. T: in the case of windscreens which comply with the requirements for glass panes other than windscreens, except those coming under the provisions of point 9.1.4.2 of Part 3-C to this Directive (glass panes with a regular light transmittance of less than 70 %). However, in the case of windscreens complying with the requirements for glass panes other than windscreens, the symbol 'T' may only be marked after the head-form test defined in point 3.3.2 of Part 3-G to this Directive, the height of drop being 4,0 m + 25/ − 0 mm.

5.6. The EEC component type-approval mark and the symbol must be clearly legible and indelible.

5.7. Appendix I to this Part gives examples of component type-approval marks.

6. GENERAL REQUIREMENTS

6.1. All glass panes, and particularly those intended for the manufacture of windscreens, must be of sufficient quality to reduce the risk of bodily injury as far as possible in the event of the glass shattering. The glass must be sufficiently resistant to the incidents likely to occur in normal traffic, and to atmospheric and temperature conditions, chemical action, combustion and abrasion.

6.2. Safety glass must in addition be sufficiently transparent, must not cause any noticeable distortions of objects as seen through the windscreen, and must not give rise to any confusion between the colours used in road-traffic signs and signals. In the event of the windscreen shattering, the driver must still be able to see the road clearly enough to be able to brake and stop his tractor safely.

7. PARTICULAR REQUIREMENTS

All types of safety glass must, depending on the category to which they belong, comply with the following particular requirements:

7.1. as regards toughened-glass windscreens, the requirements contained in Part 3-D;

7.2. as regards uniformly toughened glass panes other than windscreens, the requirements contained in Part 3-E;

7.3. as regards ordinary laminated-glass windscreens, the requirements contained in Part 3-F ;

7.4. as regards ordinary laminated-glass panes other than windscreens, the requirements contained in

7.5. as regards treated laminated-glass windscreens, the requirements contained in Part 3-H ;

7.6. as regards safety-glass panes faced with plastic material, in addition to the relevant requirements listed above, the requirements contained in Part 3-I ;

(¹) 1 for the Federal Republic of Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 6 for Belgium, 9 for Spain, 11 for the United Kingdom, 13 for Luxembourg, 18 for Denmark, 21 for Portugal, IRL for Ireland and EL for Greece.

(²) As defined in point 2.3.

7.7. as regards glass-plastic windscreens, the requirements contained in Part 3 – J

7.8. as regards glass-plastic panes other than windscreens, the requirements contained in Part 3K 89/173 /EE

7.9. as regards double-glazed units, the requirements contained in Part 3 L.

8. TESTS

8.1. The following tests are prescribed:

8.1.1. **Fragmentation**

The purpose of this test is:

8.1.1.1. to verify that the fragments and splinters produced by fracture of the pane of glass are such as to minimize the risk of injruy, and

8.1.1.2. in the case of windscreens, to check residual visibility after shattering.

8.1.2. **Mechanical strength**

8.1.2.1. *Ball-impact test*

This test takes two forms, one using a 227 g ball and the other a 2 260 g ball.

8.1.2.1.1. 227-g-ball test: the purpose of this test is to assess the adhesion of the interlayer in laminated glass and the mechanical strength of uniformly toughened glass.

8.1.2.1.2. 2 260-g-ball test: the purpose of this test is to assess the ball-penetration resistance of laminated glass.

8.1.2.2. *Headform test:*

The purpose of this test is to verify the glass pane's compliance with requirements relating to the limitation of injury in the event of impact of the head against the windscreen, laminated glass or glass-plastic panes other than windscreens, and also double-glazed units used as side windows.

8.1.3. **Resistance to the environment**

8.1.3.1. *Abrasion test*

The purpose of this test is to determine whether the resistance of a safety-glass pane to abrasion exceeds a specified value.

8.1.3.2. *High-temperature test*

The purpose of this test is to verify that no bubbles or other defects occur in the interlayer in a laminated glass or glass-plastic pane when the latter is exposed to high temperatures over an extended period of time.

8.1.3.3. *Resistance-to-radiation test*

The purpose of this test is to determine whether the light transmittance of laminated-glass, glass-plastic or plastic-coated glass panes exposed to radiation over an extended period of time is significantly reduced thereby or whether the glazing is significantly discoloured

8.1.3.4. *Resistance-to-humidity test*

The purpose of this test is to determine whether a laminated-glass, glass-plastic or plastic-coated glass pane will withstand, without significant deterioration, the effects of prolonged exposure to atmosphere humidity.

8.1.3.5. *Resistance to temperature change*

The purpose of this test is to determine whether the plastic materials [illegible] defined in points 2.3 and 2.4 will withstand, without significant deterioration, the effects of prolonged exposure to extreme temperatures.

8.1.4. Optical qualities

8.1.4.1. *Light-transmission test*

The purpose of this test is to determine whether the regular transmittance of safety-glass panes exceeds a specified value.

8.1.4.2. *Optical-distortion test*

The purpose of this test is to verify that the distortion of objects as seen through the windscreen is not such as to be likely to confuse the driver.

8.1.4.3. *Secondary-image-separation test*

The purpose of this test is to verify that the angular separation of the secondary image from the primary image does not exceed a specified value.

8.1.4.4. *Identification-of-colours test*

The purpose of this test is to verify that there is no risk of confusion of colours as seen through a windscreen.

8.1.5. Fire-resistance test

The purpose of this test is to verify that the inner face of a safety-glass pane as defined in points 2.3 and 2.4 has a sufficiently low burn rate.

8.1.6. Resistance to chemical agents

The purpose of this test is to determine that the inner face of a safety-glass pane as defined in points 2.3 and 2.4 will withstand the effects of exposure to chemicals likely to be present or used within the tractor (e.g. cleaning compounds) without deterioration.

8.2. Tests prescribed for glass panes of the categories defined in points 2.1 to 2.4

8.2.1. Safety-glass panes are subject to the tests listed in the following table:

	WINDSCREENS							GLASS PANES OTHER THAN WINDSCREENS		
	Toughened glass		Ordinary laminated glass		Treated laminated glass		Glass-plastic	Toughened glass	Laminated glass	Glass-plastic
	I	I/P	II	II/P	III	III/P	IV			
Fragmentation	D/2	D/2	—	—	H/4	H/4	—	E/2	—	—
Mechanical strength:										
— 227 g ball	—	—	F/4.3.	F/4.3.	F/4.3.	F/4.3.	F/4.3.	E/3.1.	G/4	G/4
— 2 260 g ball	—	—	F/4.2.	F/4.2.	F/4.2.	F/4.2.	—	—	—	—
Headform test (¹)	D/3	D/3	F/3	F/3	F/3	F/3	J/3	—	G/3 (³)	K/3 (³)
Abrasion:										
— outer face	—	—	F/5.1.	F/5.1.	F/5.1.	F/5.1.	F/5.1.	—	F/5.1.	F/5.1.
— inner face	—	I/2	—	I/2	—	I/2	I/2	I/2 (²)	I/2 (²)	I/2
High temperature	—	—	C/5	C/5	C/5	C/5	C/5	—	C/5	C/5
Radiation	—	C/6	C/6	C/6	C/6	C/6	C/6	—	C/6	C/6
Humidity	—	C/7	C/7	C/7	C/7	C/7	C/7	C/7 (²)	C/7	C/7
Light transmission	C/9.1.	C/9.1.	C/9.1.	C/9.1.	C/9.1.	C/9.1.	C/9.1.	C/9.1.	C/9.1.	C/9.1.
Optical distortion	C/9.2.	C/9.2.	C/9.2.	C/9.2.	C/9.2.	C/9.2.	C/9.2.	—	—	—
Secondary image	C/9.3.	C/9.3.	C/9.3.	C/9.3.	C/9.3.	C/9.3.	C/9.3.	—	—	—
Identification of colours	C/9.4.	C/9.4.	C/9.4.	C/9.4.	C/9.4.	C/9.4.	C/9.4.	—	—	—
Resistance to temperature changes	—	C/8	—	C/8	—	C/8	C/8	C/8 (²)	C/8 (²)	C/8
Fire resistance	—	C/10	—	C/10	—	C/10	C/10	C/10 (²)	C/10 (²)	C/10
Resistance to chemicals	—	C/11	—	C/11	—	C/11	C/11	C/11	C/11 (²)	C/11

(¹) Furthermore this test must be carried out on double-glazed units pursuant to point 3 of Part [illegible].
(²) If coated on the inner side with plastic material.
(³) This list must be performed with a drop of 4 m – 25/–0 mm instead of [illegible] m – 25/–0 mm when the panes are used as tractor windscreens.
NB: A reference such as K/3 in the table indicates Part 3-K and point 3 of that Part, where the relevant test is described and the acceptance requirements specified.

8.2.2. A safety-glass pane is granted component type-approval if it meets all the requirements prescribed in the relevant provisions referred to in the above table.

9. MODIFICATION OR EXTENSION OF APPROVAL FOR A TYPE OF SAFETY-GLASS PANE

9.1. All modifications to a type of safety-glass pane, or, in the case of windscreens, all additions of windscreens to a group, must be notified to the administrative department which approved the type of safety-glass pane. The department may then either:

9.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect and, in the case of windscreens, that the new type comes within the approved group of windscreens, and that at all events the safety-glass pane still complies with the requirements, or

9.1.2. require a further test report from the technical service responsible for conducting the tests.

9.2. Communication

9.2.1. Confirmation, refusal or extension of component type-approval are communicated to the Member States in accordance with the procedure specified in point 5.3.

9.2.2. The competent authority which has granted an extension of component type-approval must place a serial number on each communication relating to the extension.

10. CONFORMITY OF PRODUCTION

10.1. Safety glazing granted type-approval under this and the following Parts must be so manufactured as to conform to the approved type and meet the requirements set out in points 6, 7 and 8.

10.2. To verify that the requirements of 10.1 have been met, constant checks must be carried out on production.

10.3. The holder of the component type-approval must in particular:

10.3.1. ensure that procedures exist for controlling the quality of the product,

10.3.2. have access to the equipment necessary for checking conformity to each approved type,

10.3.3. record data of test results and make the ancillary documents (1) available for a period to be determined in agreement with the administrative department,

10.3.4. analyze the results of each type of test to verify and ensure consistency of the product characteristics, allowing for the permissible variations in industrial production,

10.3.5. ensure that, for each type of product, at least the tests prescribed in Part 3 O are carried out, and

10.3.6. ensure that where any samples or test-pieces show non-conformity with the type of test concerned, further samples are taken and tested.

All necessary steps must be taken to re-establish conformity in the production concerned.

10.4. The competent authority may at any time verify the methods for checking conformity applicable to each production unit (see point 1.3 of Part 3 O).

10.4.1. At every inspection, the test data and production records must be presented to the inspector.

10.4.2. The inspector may take samples at random to be tested in the manufacturer's laboratory. The minimum number of samples may be determined in the light of the results of the manufacturer's own checks.

10.4.3. Where the quality standard appears unsatisfactory or where it appears necessary to verify the validity of the tests carried out under point 10.4.2, the inspector may select samples to be sent to the technical service which conducted the component type-approval test.

(1) Fragmentation test results must be recorded even if no photographic print is required

10.4.4. The competent authority may carry out any test prescribed in this Annex.

10.4.5. The normal frequency of inspection is two per year. If unsatisfactory results are found during any of these inspections, the competent authority must ensure that all necessary steps are taken to re-establish the conformity of production as quickly as possible.

11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

11.1. Component type-approval granted in respect of a type of safety-glass pane pursuant to this Annex may be withdrawn if the requirement laid down in point 10.1 is not complied with.

11.2. If a Member State withdraws an approval it has previously granted, it must forthwith notify the other Member States thereof by means of a copy of the component type-approval certificate with 'COMPONENT TYPE-APPROVAL WITHDRAWN' added in large letters at the bottom of the certificate, and signed and dated.

12. PRODUCTION DEFINITELY DICSONTINUED

If the holder of component type-approval completely ceases to manufacture a type of safety-glass pane approved in accordance with this Annex, he must inform thereof the authority which granted the approval. That authority must in turn notify the other Member States thereof, by means of a copy of the compound type-approval notice conforming to the model shown in Part 3-B to this Annex.

13. NAMES AND ADDRESSES OF THE TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING COMPONENT TYPE-APPROVAL TESTS AND OF THE ADMINISTRATIVE DEPARTMENTS GRANTING SUCH APPROVAL

Each Member State must communicate to the other Member States and the Commission the names and addresses of the technical services responsible for conducting component type-approval tests and of the administrative departments granting EEC component type-approval, to which the component type-approval certificate and certificates indicating refusal or withdrawal of component type-approval issued in the other Member States are to be sent.

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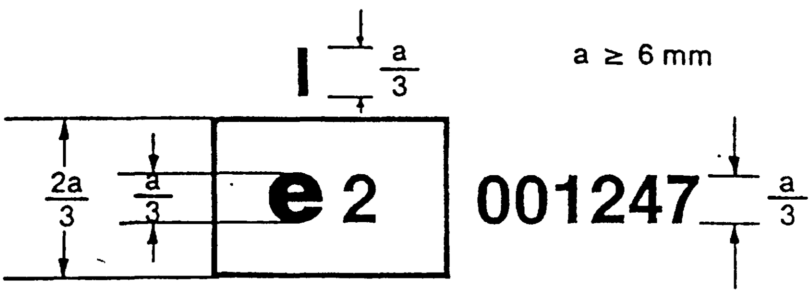
Appendix

EXAMPLES OF COMPONENT TYPE-APPROVAL MARKS

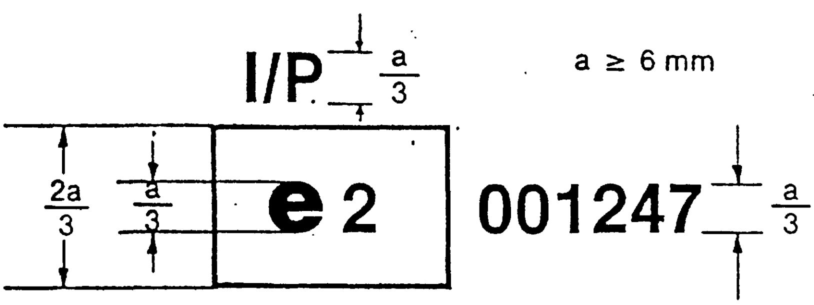
(See point 5.5 of Part 3-A)

Toughened-glass windscreens:



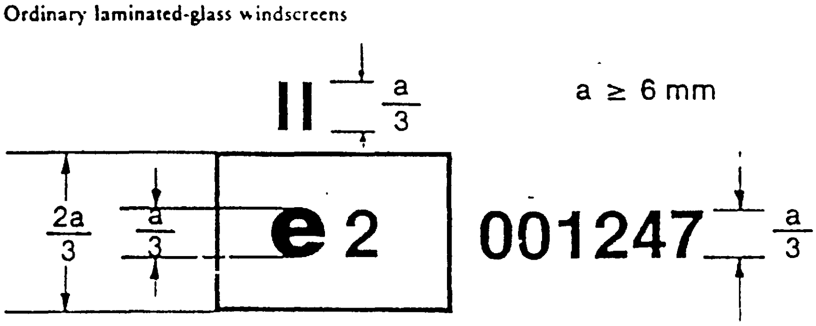
The above component type-approval mark, affixed to a toughened-glass windscreen, shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Toughened-glass windscreens faced with plastic material



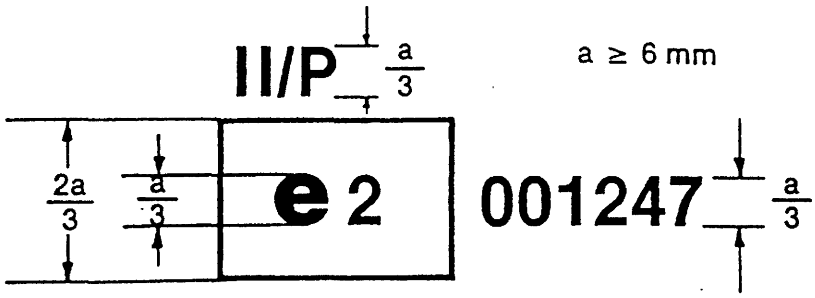
The above component type-approval mark affixed to a toughened-glass windscreen faced with plastic material shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Ordinary laminated-glass windscreens



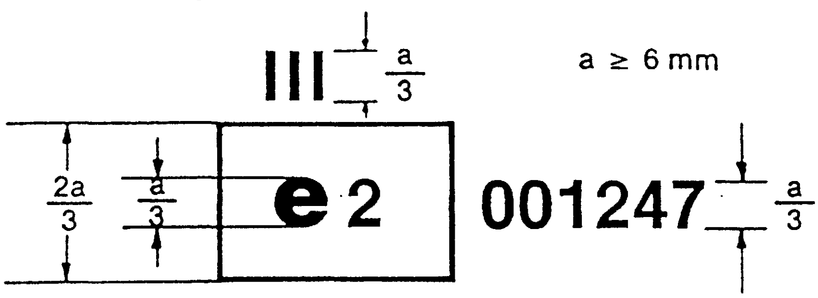
The above component type-approval mark affixed to an ordinary laminated-glass windscreen shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Ordinary laminated-glass windscreens faced with plastic material



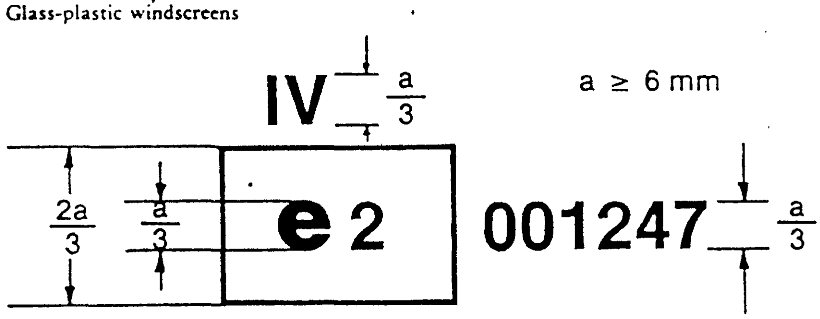
The above component type-approval mark affixed to an ordinary laminated-glass windscreen faced with plastic material shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Threated laminated-glass windscreens



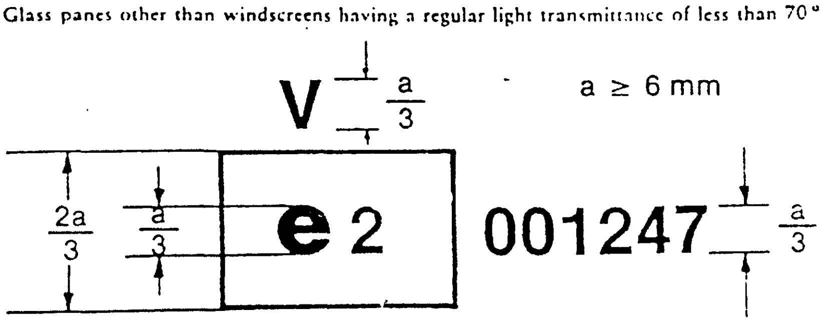
The above component type-approval mark affixed to a treated laminated-glass windscreen shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Glass-plastic windscreens



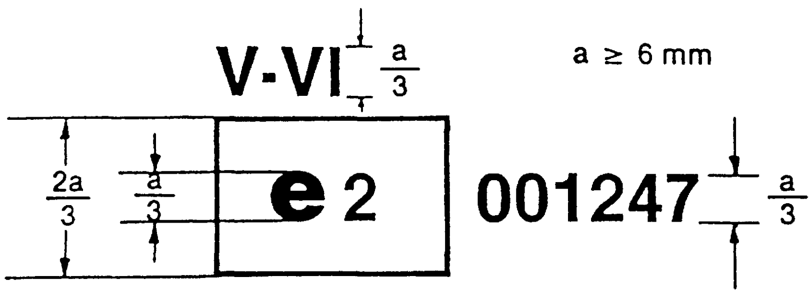
The above component type-approval mark affixed to a glass-plastic windscreen shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Glass panes other than windscreens having a regular light transmittance of less than 70 %:



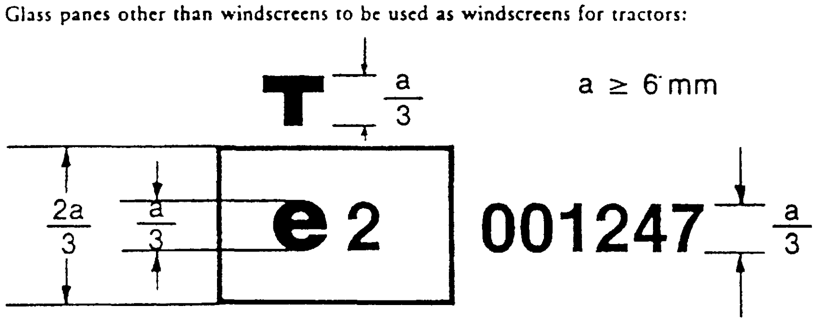
The above component type-approval mark affixed to a glass pane other than a windscreen to which the requirements of Part 3-C point 9.1.4.2., are applicable shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Double-glazed units having a regular light transmittance of less than 70 %



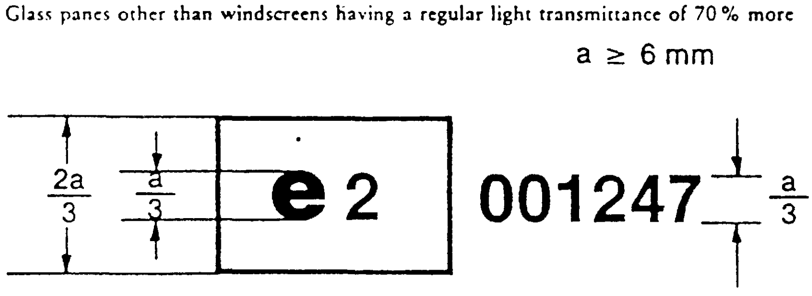
The above component type-approval mark affixed to a double-glazed unit shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Glass panes other than windscreens to be used as windscreens for tractors:



The above component type-approval mark affixed to a glass pane shows that the component concerned intended to be used as a windscreen on a tractor was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

Glass panes other than windscreens having a regular light transmittance of 70 % more



The above component type-approval mark affixed to a glass pane other than a windscreen to which the requirements of point 9.1.4.1 of Part 3C are applicable shows that the component concerned was approved in France (e2) pursuant to this Annex under component type-approval number 001247.

PART 3-B

Name of administration

(Maximum format: A 4 (210 × 297 mm))

Communication on — **EEC component type-approval,**
— **refusal of component type-approval,**
— **extension of component type-approval,**
— **withdrawal of component type-approval** (¹)

for a type of safety-glass pane pursuant to this Annex

EEC component type-approval No: .... Extension No: ....

1. Category of safety-glass pane: ....
2. Description of glass pane (see Appendices 1, 2, 3, 4, 5, 6, 7 (¹) and, in the case of windscreens, the list conforming with Appendix 8 ....
....
3. Trade name or mark: ....
4. Manufacturer's name and address: ....
....
5. Name and address of manufacturer's representative where applicable: ....
....
6. Submitted for component type-approval on: ....
7. Technical service responsible for conducting component type-approval tests: ....
8. Date of test report: ....
9. Number of test report: ....
10. Component type-approval granted/refused/extended/withdrawn (¹): ....
11. Ground(s) for extending type approval: ....
....
....
....
12. Remarks: ....
....
....
....
13. Place: ....
14. Date: ....
15. Signature: ....
16. A list is attached of the documents comprising the component type-approval file lodged with the administrative department granting the approval; these documents are available on request.

(¹) Delete as inapplicable.

Appendix 1

TOUGHENED-GLASS WINDSCREENS

(Principal and secondary characteristics as defined in Part 3 D or Part 3-I of this Annex

Component type-approval No: .... Extension No: ....

Principal characteristics

— Shape category: ....

— Thickness category: ....

— Nominal thickness of the windscreen: ....

— Nature and type of plastic coating(s): ....

— Thickness of plastic coating(s): ....

Secondary characteristics

— Nature of the material (plate, float, sheet glass): ....

— Colouring of glass: ....

— Colouring of plastic coating(s): ....

— Conductors incorporated (yes/no):

- Anti-glare strips incorporated (yes-no)

Remarks:

....

....

....

....

....

Documents attached: list of windscreens (see Appendix 8).

Appendix 2

UNIFORMLY TOUGHENED-GLASS PANES OTHER THAN WINDSCREENS

(Principal and secondary characteristics as defined in Part 3-E or Part 3 - I

Component type-approval No: .... Extension No: ....

Principal characteristics

— Other than windscreens (yes/no):

— Windscreen for tractor(s): ....

— Shape category: ....

— Nature of toughening process: ....

— Thickness category: ....

— Nature and type of plastic coating(s): ....

Secondary characteristics

— Nature of the material (plate, float, sheet glass): ....

— Colouring of glass: ....

— Colouring of plastic coating(s): ....

— Conductors incorporated (yes/no):

— Anti-glare strips incorporated (yes/no):

Approved criteria

— Greatest area (flat glass): ....

— Smallest angle: ....

— Greatest developed area (curved glass): ....

— Greatest height of segment: ....

Remarks:

....

....

....

....

....

Documents attached: list of windscreens (if applicable) (see Appendix [illegible]

Appendix 3

LAMINATED-GLASS WINDSCREENS

(ordinary, treated or plastic-coated)

(Principal and secondary characteristics as defined in Part 3-F or Part 3-H or Part 3-I

Component type-approval No: .... Extension No: ....

Principal characteristics

— Number of layers of glass: ....

— Number of layers of interlayer: ....

— Nominal thickness of the windscreen: ....

— Nominal thickness of interlayer(s): ....

— Special treatment of glass: ....

— Nature and type of interlayer(s): ....

— Nature and type of plastic coating(s): ....

Secondary characteristics

— Nature of the material (plate, float, sheet glass): ....

— Colouring of glass (colourless/tinted): ....

— Colouring of plastic coating(s) (total/partial): ....

— Conductors incorporated (yes/no):

— Anti-glare strips incorporated (yes/no):

Remarks:

....

....

....

....

....

Documents attached: list of windscreens (see Appendix 8).

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Appendix 4

LAMINATED-GLASS PANES OTHER THAN WINDSCREENS

(Principal and secondary characteristics as defined in Part 3-G or Part 3-I

Component type-approval No: .... Extension No: ....

Principal characteristics

— Other than windscreens (yes/no):

— Windscreens for tractor(s): ....

— Number of layers of glass: ....

— Number of layers of interlayer: ....

— Thickness category: ....

— Nominal thickness of interlayer(s): ....

— Special treatment of glass: ....

— Nature and type of interlayer(s): ....

— Nature and type of plastic coating(s): ....

— Thickness of plastic coating(s): ....

Secondary characteristics

— Nature of the material (plate, float, sheet glass): ....

— Colouring of interlayer (total/partial): ....

— Colouring of glass: ....

— Colouring of plastic coating(s): ....

— Conductors incorporated (yes/no):

— Anti-glare strips incorporated (yes/no):

Remarks:

....

....

....

....

....

Documents attached: list of windscreens (if applicable) (see Appendix 5).

89/173/EEC

Appendix 5

GLASS-PLASTIC WINDSCREENS

(Principal and secondary characteristics as defined in Part 3-J

Component type-approval No: .... Extension No: ....

Principal characteristics

— Shape category: ....

— Number of layers of plastic: ....

— Nominal thickness of glass: ....

— Treatment of the glass (yes/no):

— Nominal thickness of the windscreen: ....

— Nominal thickness of the layer(s) of plastic acting as interlayer: ....

— Nature and type of layer(s) of plastic acting as interlayer: ....

— Nature and type of the outer layer of plastic: ....

Secondary characteristics

— Nature of the material (plate, float, sheet glass): ....

— Colouring of glass: ....

— Colouring of the layer(s) of plastic (total/partial): ....

— Conductors incorporated (yes/no):

— Anti-glare strips incorporated (yes/no):

Remarks:

....

....

....

....

....

Documents attached: list of windscreens (see Appendix 8).

Appendix 6

GLASS-PLASTIC PANES OTHER THAN WINDSCREENS

(Principal and secondary characteristics as defined in Part 3-K

Component type-approval No: .... Extension No: ....

Principal characteristics

— Other than windscreens (yes/no):

— Windscreens for tractor(s): ....

— Number of layers of plastic: ....

— Thickness of the glass component: ....

— Treatment of the glass component (yes/no):

— Nominal thickness of the pane: ....

— Nominal thickness of the layer(s) of plastic acting as interlayer: ....

— Nature and type of layer(s) of plastic acting as interlayer: ....

— Nature and type of the outer layer of plastic: ....

Secondary characteristics

— Nature of the material (plate, float, sheet glass): ....

— Colouring of glass (colourless/tinted): ....

— Colouring of the layer(s) of plastic (total/partial): ....

— Conductors incorporated (yes/no):

— Anti-glare strips incorporated (yes/no):

Remarks:

....

....

....

....

....

Documents attached: list of windscreens (if applicable) (see Appendix 8).

Appendix 7

DOUBLE-GLAZED UNITS

(Principal and secondary characteristics as defined in Part 3-L

Component type-approval No: .... Extension No: ....

Principal characteristics

— Composition of double-glazed units (symmetrical/asymmetrical): ....

— Nominal thickness of the gap: ....

— Method of assembly: ....

— Type of each glass as defined in Parts 3-E, 3-G, 3-I, 3-K ....

Document attached

One form for the two panes of a symmetrical double-glazed unit in accordance with the Annex under which the panes have been tested or approved.

One form for each glass pane of an asymmetrical double-glazed unit in accordance with the Annexes under which these panes have been tested or approved.

Remarks:

....

....

....

....

....

89/173 /EEC

Appendix 8

CONTENTS OF THE LIST OF WINDSCREENS (1)

For each of the windscreens covered by this component type-approval, at least the following particulars shall be provided:

— Tractor manufacturer: ....

— Type of tractor: ....

— Developed area (*F*): ....

— Height of segment (*h*): ....

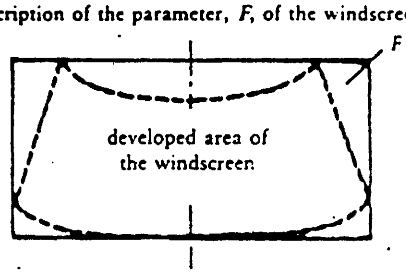
— Curvature (*r*): ....

— Installation angle (α): ....

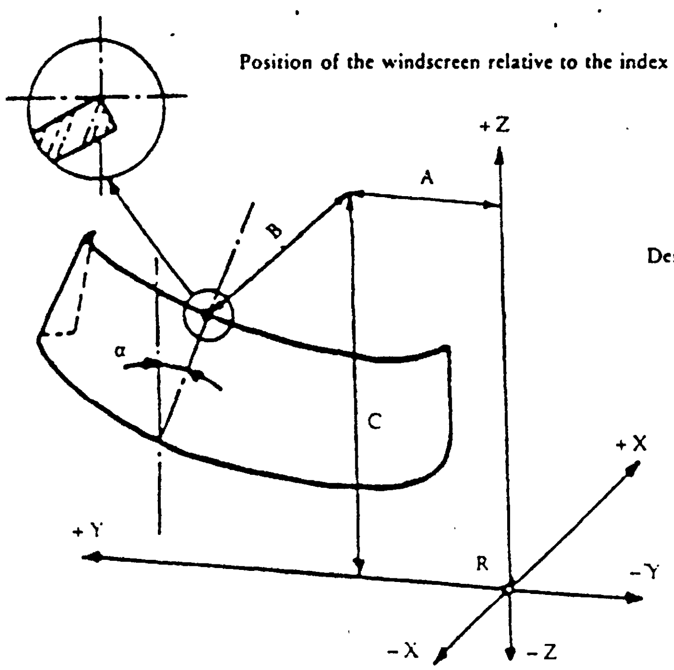
— Index point coordinates (*A*, *B*, *C*) relative to the centre of the upper edge of the windscreen:

....

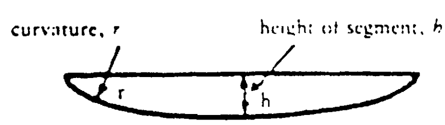
Description of the parameter, *F*, of the windscreen



Position of the windscreen relative to the index point



Description of the parameters, *r* and *h*, of the windscreen



(1) This list must be attached to Appendices 1, 2 (if applicable), 3 and 5 to this Part.

89/173/EEC

PART 3-C
GENERAL TEST CONDITIONS

1. FRAGMENTATION TESTS

1.1 The pane of glass to be tested must not be rigidly secured; it may however be fastened on an indentical glass pane by means of adhesive tape applied all round the edge.

1.2. To obtain fragmentation, a hammer of about 75 g or some other appliance giving equivalent results is used. The radius of curvature of the point is 0,2 ± 0,05 mm.

1.3. One test must be carried out at each prescribed point of impact.

1.4. An examination must be made of the fragments on photographic contact paper, exposure commencing not more than 10 seconds and terminating not more than three minutes after impact. Only the darkest lines, representing the initial fracture, are taken into consideration. The laboratory must keep photographic reproductions of the fragmentation obtained.

2. BALL-IMPACT TESTS

2.1. **227-g-ball test**

2.1.1. ***Apparatus***

2.1.1.1. Hardened-steel ball with a mass of 227 ± 2 g and a diameter of approximately 38 mm.

2.1.1.2. Device for dropping the ball freely from a height to be specified, or a device for giving the ball a velocity equivalent to that obtained by the free fall. When a device to project the ball is used, the tolerance on velocity must be ± 1 % of the velocity equivalent to that obtained by the free fall.

2.1.1.3. Supporting fixture, such as that shown in Figure 1, composed of steel frames, with machined borders 15 mm wide, fitting one over the other and faced with rubber gaskets about 3 mm thick and 15 mm wide and of hardness 50 IRHD.

The lower frame rests on a steel box about 150 mm high. The test-piece is held in place by the upper frame, the mass of which is about 3 kg. The supporting frame is welded on to a sheet of steel about 12 mm thick resting on the floor with an interposed sheet of rubber about 3 mm thick and of hardness 50 IRHD.

Dimensions in millimetres

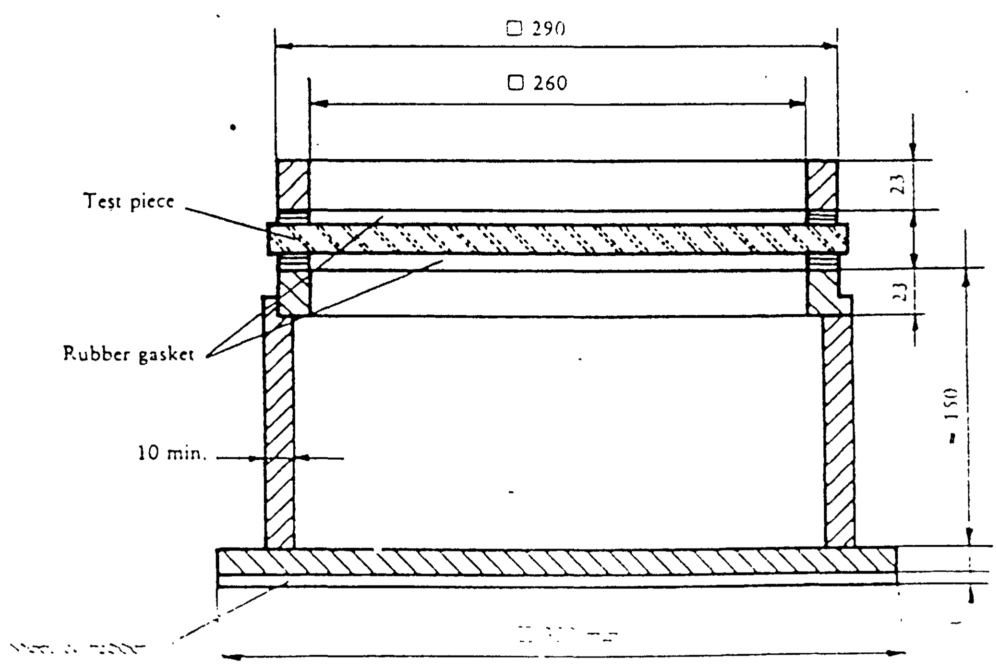


Figure 1

Support for ball tests

2.1.2. Test conditions

- Temperature 20 ± 5 °C
- Pressure: 860 to 1 060 mbar.
- Relative humidity: 60 ± 20 %.

89/173/EEC

2.1.3. *Test piece*

The test piece must be a flat square of side 300 + 10/ – 0 mm.

2.1.4. *Procedure*

Condition the test piece at the specified temperature for at least four hours immediately proceding the test.

Place the test piece in the fixture (point 2.1.1.3). The plane of the test piece must be perpendicular, within 3°, to the incident direction of the ball.

The point of impact must be within 25 mm of the geometric centre of the test piece for a drop height of 6 m or less, and within 50 mm of the centre of the test piece for a drop height greater than 6 m. The ball must strike that face of the test piece which represents the outside face of the safety-glass pane when mounted on the vehicle. The ball is allowed to make only one impact.

2.2. **2 260-g-ball test**

2.2.1. *Apparatus*

2.2.1.1. Hardened-steel ball with a mass of 2 260 ± 20 g and a diameter of approximately 82 mm.

2.2.1.2. Device for dropping the ball freely from a height to be specified, or a device for giving the ball a velocity equivalent to that obtained by the free fall. When a device to project the ball is used, the tolerance on velocity must be ± 1 % of the velocity equivalent to that obtained by the free fall.

2.2.1.3. The supporting fixture is as shown in Figure 1 and identical with that described in point 2.1.1.3.

2.2.2. *Test conditions*

- Temperature: 20 ± 5 °C.
- Pressure: 860 to 1 060 mbar.
- Relative humidity: 60 ± 20 %.

2.2.3. *Test piece*

The test piece must be a flat square of side 300 + 10/ – 0 mm or cut out from the flattest part of a windscreen or other curved pane of safety glass.

Alternatively, the whole windscreen or other curved pane of safety glass may be tested. In this case care must be taken to ensure adequate contact between the safety-glass pane and the support.

2.2.4. *Procedure*

Condition the test piece at the specified temperature for at least four hours immediately proceding the test.

Place the test piece in the fixture (point 2.1.1.3). The plane of the test piece must be perpendicular, within 3°, to the incident direction of the ball.

In the case of glass-plastic glazing the test piece is clamped to the support.

The point of impact must be within 25 mm of the geometric centre of the test piece. The ball must strike that face of the test piece which represents the inward face of the safety-glass pane when the latter is mounted on the vehicle. The ball is allowed to make only one impact.

3. HEADFORM TEST

3.1. Apparatus

3.1.1. Headform weight with a spherical or semi-spherical headform made of laminated hardwood covered with replaceable felt and with or without a cross-beam made of wood. There is a neck-shaped intermediate piece between the spherical part and the cross-beam and a mounting rod on the other side of the cross-beam.

The dimensions are in accordance with Figure 2.

The total mass of the apparatus is 10 ± 0,2 kg.

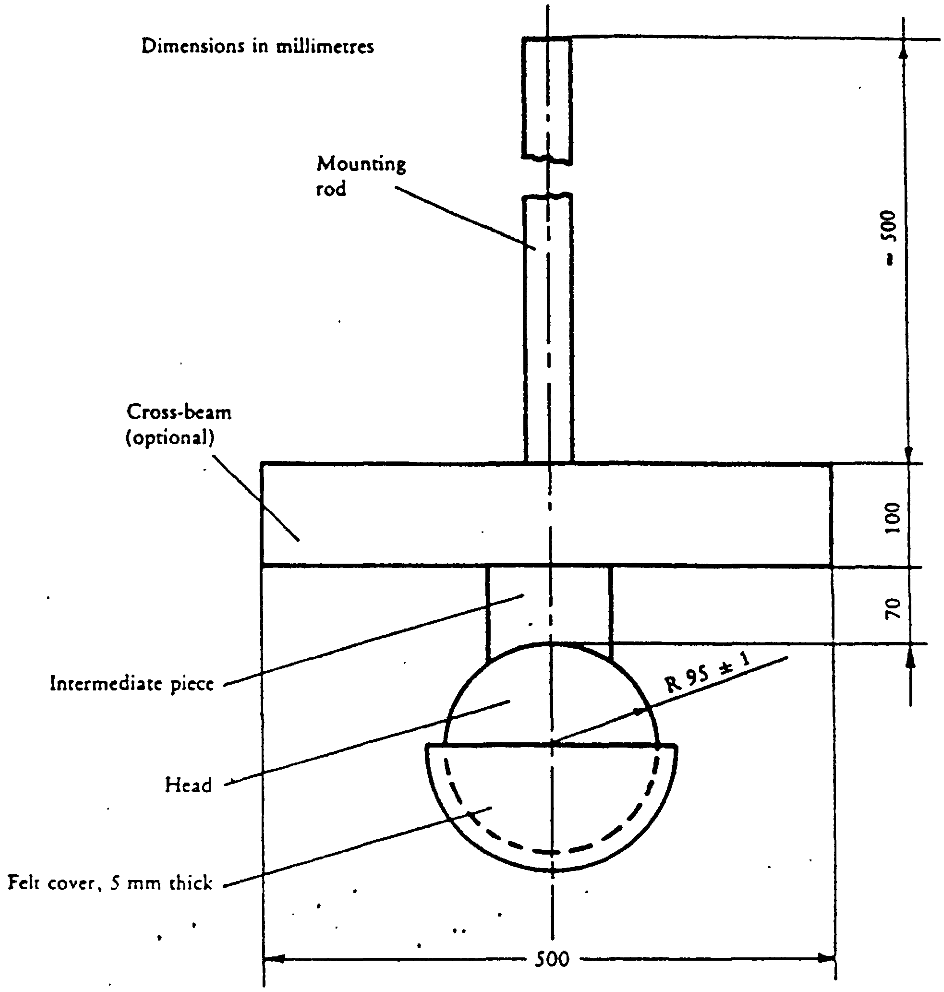


Figure 2

Headform weight

3.1.2. Device for dropping the headform weight freely from a height to be specified, or device for giving the weight a velocity equivalent to that obtained by the free fall.

When a device to project the headform weight is used, the tolerance on velocity must be ± 1 % of the velocity equivalent to that obtained by the free fall.

3.1.3. Supporting fixture, as shown in Figure 3, for testing flat test pieces. The fixture is composed of two steel frames, with machined borders 50 mm wide, fitting one over the other and faced with rubber gaskets about 3 mm thick and 15 ± 1 mm wide and a hardness 70 IRHD.

The upper frame is held pressed against the lower frame by at least eight bolts.

3.2. Test conditions

3.2.1. — Temperature: 20 ± 5 °C.

3.2.2. — Pressure: 860 to 1 060 mbar.

3.2.3. — Relative humidity: 60 ± 20 %.

Dimensions in millimetres

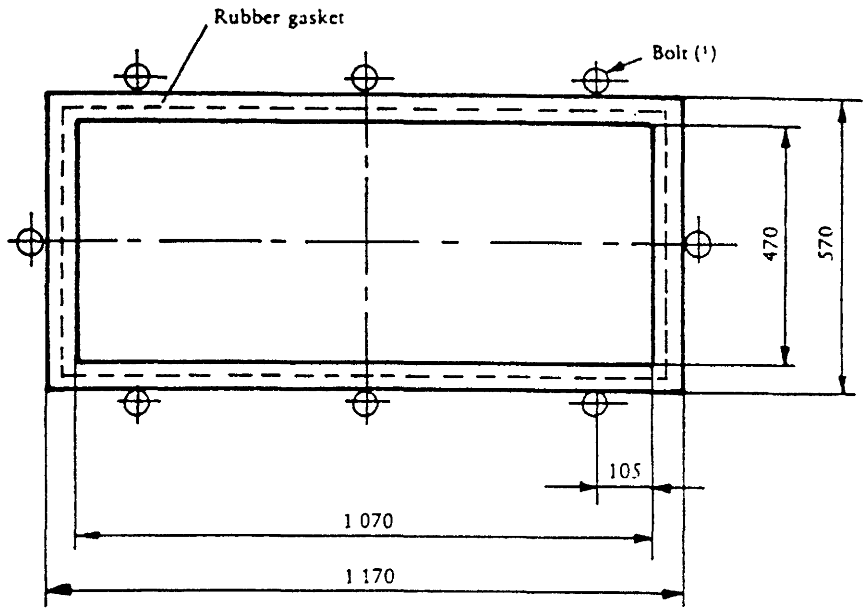


Figure 3

Support for headform tests

3.3. Procedure

3.3.1. *Test on a flat test piece*

The flat test piece, having a length of 1 100 + 5/ − 2 mm and a width of 500 + 5 / − 2 mm is kept at a constant temperature of 20 ± 5 °C for at least four hours immediately preceding the test. Fix the test piece in the supporting frames (3.1.3); tighten the bolts so as to ensure that the movement of the test piece during the test does not exceed 2 mm. The plane of the test piece must be substantially perpendicular to the incident direction of the weight. The weight must strike the test piece within 40 mm of its geometric centre on that face which represents the inward face of the safety-glass pane when the latter is mounted on the vehicle, and be allowed to make only one impact.

The impact surface of the felt cover is to be replaced after 12 tests.

3.3.3. *Tests on a complete windscreen* (used only for a drop height of less than or equal to 1,5 m)

Place the windscreen freely on a support with an interposed strip of rubber of hardness 70 IRHD and thickness about 3 mm, the width of contact over the whole perimeter being about 15 mm. The support consists of a rigid piece corresponding to the shape of the windscreen so that the headform weight strikes the internal surface. If necessary, the support must rest on a rigid stand with an interposed sheet of rubber of hardness 70 IRHD and thickness about 3 mm.

The surface of the windscreen must be substantially perpendicular to the incident direction of the headform weight.

The headform weight must strike the windscreen at a point within 40 mm of its geometric centre on that face which represents the inward face of the safety glass pane when the latter is mounted on the vehicle, and be allowed to make only one impact.

The impact surface of the felt cover is to be replaced after 12 tests

4. ABRASION TEST

4.1. Apparatus

4.1.1. Abrading instrument (2), shown diagrammatically in Figure 4 and consisting of

— a horizontal turntable, with centre clamp, which revolves counter-clockwise at 65 to 75 rev/min, and

(1) The minimum recommended torque for M 20 is 30 Nm.
(2) A suitable abrading instrument is supplied by Teledyne Taber (United States of America).

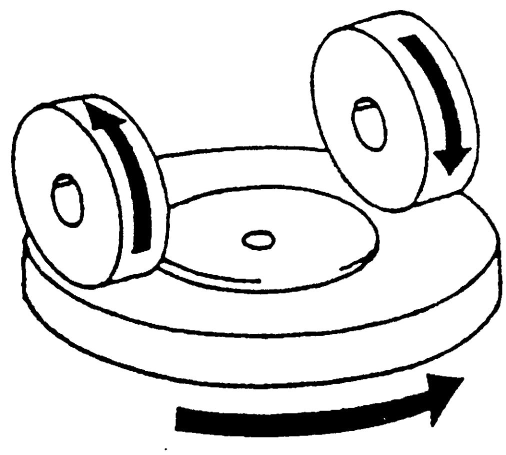


Figure 4

Diagram of abrading instrument

— two weighted parallel arms each carrying a special abrasive wheel freely relating on a ball-bearing horizontal spindle; each wheel rests on the test specimen under the pressure exerted by a mass of 500 g.

The turntable of the abrading instrument must rotate regularly, substantially in one plane (the deviation from this plane must not be greater than ± 0,05 mm at a distance of 1,6 mm from turntable periphery). The wheels must be mounted in such a way that when they are in contact with the rotating test piece they rotate in opposite directions so as to exert, twice during each rotation of the test piece, a compressive and abrasive action along curved lines over an annular area of about 30 cm^2.

4.1.2. Abrasive wheels ([1]), each 45 to 50 mm in diameter and 12,5 mm thick, composed of a special finely streened abrasive embedded in a medium-hard rubber. The wheels must have a hardness of 72 ± 5 IRHD, as measured at four points equally spaced on the centre line of the abrading surface, the pressure being applied vertically along a diameter of the wheel and the readings being taken 10 seconds after full application of the pressure.

The abrasive wheels must be prepared for use by very slow rotation against a sheet of flat glass to ensure that their surface is completely even.

4.1.3. Light source consisting of an incandescent lamp with its filament contained within a parallel pipe measuring 1,5 mm × 1,5 mm × 3 mm. The voltage must be stabilized within ± 1/1 000. The instrument used to check the voltage must be of appropriate accuracy.

4.1.4. Optical system consisting of a lens with a focal length, *f*, of at least 500 mm and corrected for chromatic aberrations. The full aperture of the lens must not exceed *f*/20. The distance between the lens and the light source is adjusted in order to obtain a light beam which is substantially parallel. A diaphragm is inserted to limit the diameter of the light beam to 7 mm ± 1 mm. This diaphragm must be situated at a distance of 100 ± 50 mm from the lens on the side remote from the light source.

4.1.5. Equipment for measuring scattered light (see Figure 5), consisting of a photoelectric cell with an integrating sphere 200 to 250 mm in diameter. The sphere is equipped with entrance and exit ports for the light. The entrance port must be circular and have a diameter at least twice that of the light beam. The exit port of the sphere is provided with either a light trap or a reflectance standard, according to the procedure as described in point 4.4.3 below. The light trap absorbs all the light when no test piece is inserted in the light beam.

The axis of the light beam must pass through the centre of the entrance and exit ports. The diameter, *b*, of the light-exit port must be equal to $2a \cdot \tan 4°$, where *a* is the diameter of the sphere. The photoelectric cell must be mounted in such a way that it cannot be reached by light coming directly from the entrance port or from the reflectance standard

The surfaces of the interior of the integrating sphere and the reflectance standard must be of substantially equal reflectance and matt and non-selective. The output of the photoelectric cell must be linear within ± 2 % over the range of luminous intensities used.

([1]) Suitable abrasive wheels may be obtained from Teledyne Taber (United States of America).

The design of the instrument must be such that there is no galvanometer deflection when the sphere is dark. The whole apparatus must be checked at regular intervals by means of calibration standards of defined haze. If haze measurements are made using equipment or methods differing from those defined above, the results must be corrected, if necessary, to bring them into agreement with those obtained by the apparatus described above. 89/173/EEC

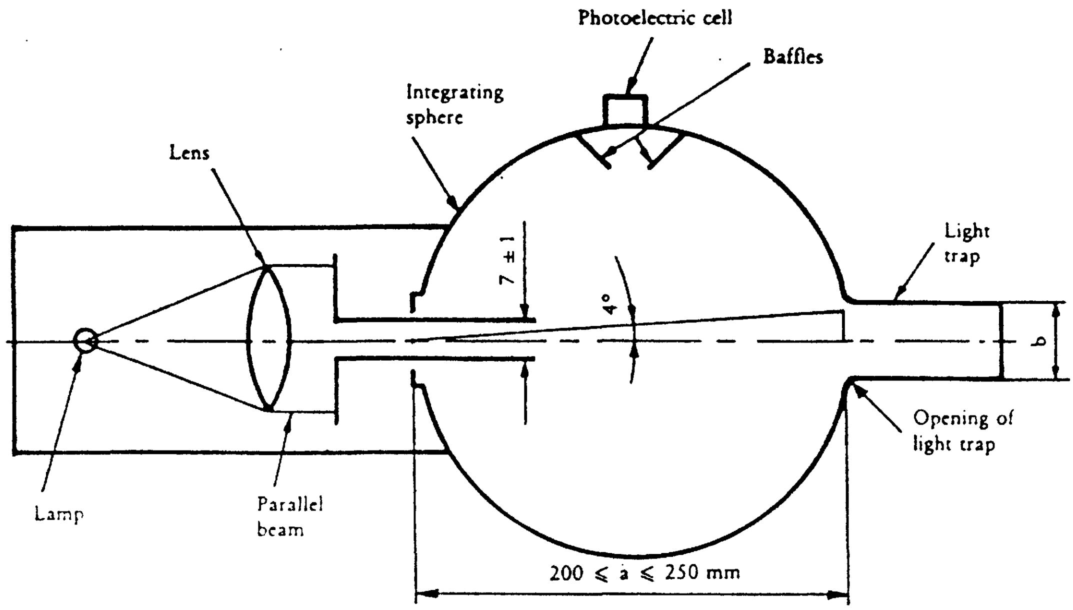


Figure 5

Hazamenter

4.2. Test conditions

4.2.1. Temperature: 20 ± 5 °C.

4.2.2. Pressure: 860 to 1 060 mbar.

4.2.3. Relative humidity: 60 ± 20 %.

4.3. Test pieces

The test pieces must be flat squares whose sides measure 100 mm having both surfaces substantially plane and parallel and if necessary having a fixing hole 6,4 + 0,2/ – 0 mm in diameter drilled in the centre.

4.4. Procedure

The abrasion test is carried out on that surface of the test piece which represents the outside face of the safety-glass pane when the latter is mounted on the vehicle and also on the inward-face in the case of a glass pane with a plastic coating.

4.4.1. Immediately before and after the abrasion, clean the test pieces in the following manner:

(a) wipe with a linen cloth under clean running water;

(b) rinse with distilled or demineralized water;

(c) blow dry with oxygen or nitrogen;

(d) remove possible traces of water by dabbing softly with a damp linen cloth. If necessary, dry by pressing lightly between two linen cloths.

Any treatment with ultrasonic equipment must be avoided. After cleaning, the test pieces must be handled only by their edges and stored to prevent damage to, or contamination of, their surfaces.

4.4.2. Condition the test pieces for a minimum time of 48 hours at a temperature of 20 ± 5 °C and a relative humidity of 60 ± 20 %.

4.4.3. Immediately place the test piece against the entrance port of the integrating sphere. The angle between the normal (perpendicular) to the surface of the test piece and the axis of the beam must not exceed 8°.

Take four readings as indicated in the following table:

Reading	With test piece	With light trap	With reflectance standard	Quantity represented
T_1	No	No	Yes	Incident light
T_2	Yes	No	Yes	Total light transmitted by test piece
T_3	No	Yes	No	Light scattered by instrument
T_4	Yes	Yes	No	Light scattered by instrument and test piece

Repeat readings T_1, T_2, T_3 and T_4 with other specified positions of the test piece to determine uniformity.

Calculate the total transmittance $T_t = T_2/T_1$.

Calculate the diffuse transmittance T_d as follows:

$$T_d = \frac{T_4 - T_3 (T_2/T_1)}{T_1}$$

Calculate the percentage haze, or light, or both, scattered, as follows:

$$\frac{T_d}{T_t} \times 100\%$$

Measure the initial haze of the test piece at a minimum of four equally spaced points in the unabraded area in accordance with the formula above. Average the results for each test piece. In lieu of the four measurements, an average value may be obtained by rotating the piece uniformly at 3 rev/sec or more.

For each safety-glass pane, carry out three tests with the same kind. Use the haze as a measure of the subsurface abrasion, after the test piece has been subjected to the abrasion test.

Measure the light scattered by the abraded track at a minimum of four equally spaced points along the track in accordance with the formula above. Average the results for each test piece. In lieu of the four measurements, an average value may be obtained by rotating the piece uniformly at 3 rev/sec or more.

4.5 The abrasion test to be carried out only at the discretion of the laboratory conducting the test with due regard to the information already at its disposal, e.g. changes in the interlayer or material thickness will not normally necessitate further testing.

4.6. Indices of difficulty of the secondary characteristics.

No secondary characteristics are involved.

5. HIGH-TEMPERATURE TEST

5.1. Procedure

Heat to 100 °C three test samples or three test pieces of at least 300 mm × 300 mm taken by the laboratory from three windscreens or three glass panes other than windscreens, as appropriate, one of whose dimensions corresponds to the upper edge of the pane

Maintain this temperature for a period of two hours, then allow the test sample(s) to cool to room temperature. If the safety-glass pane has both external surfaces of inorganic material, the test may be carried out by immersing the test sample vertically in boiling water for the specified period of time, care being taken to avoid undue thermal shock. If specimens are cut from windscreens, one edge of each such test specimen shall be part of an edge of the windscreen.

5.2. **Indices of difficulty of the secondary characteristics**

	Colourless	Tinted
Colouring of the interlayer:	1	2

The other secondary characteristics are not involved.

5.3. **Interpretation of results**

5.3.1. The test for resistance to high temperature is considered to give a positive result if bubbles or other defects are not formed more than 15 mm from an uncut edge or 25 mm from a cut edge of the test piece or sample or more than 10 mm from any cracks which may occur during the test.

5.3.2. A set of test pieces or samples submitted for component type-approval are considered satisfactory from the point of view of the high-temperature resistance test if either of the following conditions is fulfilled:

5.3.2.1. all the tests give a satisfactory result, or

5.3.2.2. one test having given an unsatisfactory result, a further series of tests carried out on a new set of test pieces or samples give satisfactory results.

6. RESISTANCE-TO-RADIATION TEST

6.1. **Test method**

6.1.1. *Apparatus*

6.1.1.1. Radiation source consisting of a medium-pressure mercury-vapour arc lamp with a tubular quartz bulb of ozone-free type; the bulb axis is vertical. The nominal dimensions of the lamp are 360 mm in length by 9,5 mm in diameter. The arc length is 300 ± 4 mm. The lamp must be operated at 750 ± 50 W.

Any other source of radiation which produces the same effects as the lamp specified above may be used. To check that the effects of another source are the same, a comparison is made by measuring the amount of energy emitted within a wavelength range of 300 to 450 mm, all other wavelengths being removed by the use of suitable filters. The alternative source is then used with these filters.

In the case of safety-glass panes for which there is no satisfactory correlation between this test and the conditions of use it will be necessary to review the test conditions

6.1.1.2. Power supply transformer and capacitor capable of supplying to the lamp (point 6.1.1.1) a starting peak-voltage of 1 100 V minimum and an operating voltage of 500 ± 50 V.

6.1.1.3. Device for mounting and rotating the test specimens at 1 to 5 rev/min about the centrally located radiation source in order to ensure even exposure.

6.1.2. *Test pieces*

6.1.2.1. The size of the test pieces is 76 mm × 300 mm.

6.1.2.2. The test pieces are cut by the laboratory from the upper part of the panes in such a way that:

- in the case of glass panes other than windscreens the upper edge of the test pieces coincides with the upper edge of the panes,
- in the case of windscreens the upper edge of the test pieces coincides with the upper limit of the zone in which regular transmittance is to be checked and determined in accordance with point 9.1.2.2 of this Part.

6.1.3. *Procedure*

Check the regular light transmittance, determined in accordance with points 9.1.1 to 9.1.2 of this Part, of three test samples before exposure. Protect a portion of each sample from the radiation, and then place the sample in the test apparatus 230 mm from and parallel lengthwise to the lamp axis. Maintain the temperature of the samples at 45 ± 5 °C throughout the test. That face of each test sample which would constitute a grazed exterior part of the tractor must face the lamp. For the type of lamp specified in point 6.1.1.1 the exposure time is 100 hours. After exposure, measure the regular light transmittance again in the exposed area of each sample.

6.1.4. Each test piece or sample (three in total) is subjected, in accordance with the procedure above, to radiation such that the radiation on each point of the test piece or sample produces on the interlayer used the same effect as that which would be produced by solar radiation of 1 400 W/m² for 100 hours.

6.2. Indices of difficulty of the secondary characteristics

	Colourless	*Tinted*
Colouring of glass	2	1
Colouring of interlayer	1	2

The other secondary characteristics are not involved.

6.3. Interpretation of results

6.3.1. The test for resistance to radiation is deemed to have given a positive result if the following conditions are fulfilled:

6.3.1.1. the total light transmittance measured in accordance with sections 9.1.1 to 9.1.2 of this Part does not fall below 95 % of the original value before irradiation and, in any case does not fall below:

6.3.1.1.1. 70 % in the case of glass panes other than windscreens which must meet the requirements concerning the driver's field of vision in all directions;

6.3.1.1.2. 75 % in the case of windscreens, within the zone in which regular transmittance is to be checked, as defined in point 9.1.2.2 below.

6.3.1.2. The test piece or sample may however show a slight coloration after irradiation when examined against a white background, but no other defect may be apparent.

6.3.2. A set of test pieces or samples submitted for component type-approval is considered satisfactory from the point of view of the resistance to radiation test if one of the following conditions is fulfilled:

6.3.2.1. all tests give a satisfactory result, or

6.3.2.2. one test having given an unsatisfactory result, a further series of tests carried out on a new set of test pieces or samples give satisfactory results.

7. RESISTANCE-TO-HUMIDITY TEST

7.1. Procedure

Keep three test samples or three test pieces at least 300 mm × 300 mm square vertically for two weeks in a closed container in which the temperature is maintained at 50 ± 2 °C and the relative humidity at 95 % ± 4 % (1).

Test pieces are prepared in such a way that:

— one edge of each test piece is part of an original edge of the windscreen,

— should several test pieces be tested at the same time, adequate spacing must be provided between them.

Precautions must be taken to prevent condensation from the walls or ceiling of the test chamber from falling on the test specimens.

7.2. Indices of difficulty of the secondary characteristics

	Colourless	*Tinted*
Colouring of interlayer	1	2

The other secondary characteristics are not involved.

(1) These test conditions exclude any condensation on the test pieces.

7.3. **Interpretation of results**

7.3.1. Safety-glass panes are deemed to be satisfactory from the point of view of resistance to humidity if no significant change is observed more than 10 mm from the uncut edges or more than 15 mm from the cut edges, following a stay of two hours in the ambient atmosphere by ordinary and treated laminated glass, and of 48 hours in the ambient atmosphere by plastic-coated glass panes and plastic glazing.

7.3.2. A set of test pieces or samples submitted for component type-approval is considered satisfactory from the point of view of the resistance to humidity test if one of the following conditions is fulfilled:

7.3.2.1. all the tests give a satisfactory result;

7.3.2.2. one test having given an unsatisfactory result, a further series of tests carried out on a new set of samples give satisfactory results.

8. TESTING OF RESISTANCE TO CHANGES IN TEMPERATURE

8.1. Test method

Two 300 × 300 mm test pieces are placed in an enclosed chamber for six hours at a temperature of − 40 ± 5 °C; they are then placed in the ambient air at a temperature of 23 ± 2 °C for an hour, or until the test piece has reached a stable temperature. They are then placed in an air flow at a temperature of 72 ± 2 °C for three hours. The test pieces are then examined after they have been returned to the ambient air at 23 ± 2 °C and cooled to that temperature.

8.2. Index of difficulty of the secondary characteristics

	Colourless	*Tinted*
Colouring of plastic interlayer or coating	1	2

No other secondary characteristics are involved.

8.3. Interpretation of results

The test of resistance to changes in temperature is considered to have given a positive result if the test pieces display no cracking, opacification, exfoliation or other obvious deterioration.

9. OPTICAL QUALITIES

9.1. Light transmission test

9.1.1. *Apparatus*

9.1.1.1. Light source consisting of an incandescent lamp having its filament contained within a parallelepiped measuring 1,5 mm × 1,5 mm × 3 mm The voltage at the lamp filament must be such that the colour temperature is 2 856 K ± 50 K. This voltage is stabilized within ± $^{1}/_{1000}$. The instrument used to check the voltage must be of appropriate accuracy.

9.1.1.2. Optical system consisting of a lens with a focal length of at least 500 mm and corrected for chromatic aberrations. The full aperture of the lens must not exceed f/20. The distance between the lens and the light source must be so adjusted as to obtain a light beam which is substantially parallel.

A diaphragm is inserted to limit the diameter of the light beam to 7 ± 1 mm. This diaphragm is situated at a distance of 100 ± 50 mm from the lens on the side remote from the light source. The point of measurement is taken at the centre of the light beam.

9.1.1.3. Measuring equipment. The receiver must have a relative spectral sensitivity in substantial agreement with the relative spectral luminous efficiency for the ICI [1] standard photometric observer for photopic vision. The sensitive surface of the receiver is covered with a diffusing medium and must have at least twice the cross-section of the light beam emitted by the optical system. If an integrating sphere is used, the aperture of the sphere must have a cross-sectional area at least twice that of the parallel portion of the beam.

The linearity of the receiver and the associated indicated instrument must be better than 2 % of the effective part of the scale.

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[1] International Commission on Illumination.

9.1.2. *Procedure*

So adjust the instrument indicating the response of the receiver that it indicates 100 divisions when the safety-glass pane is not inserted in the light path. When no light is falling on the receiver, the instrument must read zero.

Place the safety-glass pane at a distance from the receiver equal to approximately five times the diameter of the receiver. Insert the safety-glass pane between the diaphragm and the receiver and adjust its orientation in such a way that the angle of incidence of the light beam is equal to 0° ± 5°. The regular transmittance is measured on the safety-glass pane, and for every point measured the number of divisions, n, shown on the indicating instrument, are read. The regular transmittance τ_r is equal to $n/100$.

9.1.2.1. In the case of windscreens, alternative test methods may be applied using either a test sample cut from the flattest part of a windscreen or a specially prepared flat square with material and thickness characteristics identical to those of the actual windscreen, the measurements being taken normal (perpendicular) to the glass pane.

9.1.2.2. The test is carried out in the zone I specified in point 9.2.5.2.

9.1.2.3. In the case of tractors for which it is not possible to determine zone I, the test is carried out in zone I' as defined in point 9.2.5.3.

9.1.3. *Indices of difficulty of the secondary characteristics*

	Colourless	*Tinted*
Colouring of the glass	1	2
Colouring of the interlayer (in the case of laminated windscreens)	1	2
	not included	*included*
Shade and/or obscuration bands	1	2

The other secondary characteristics are not involved.

9.1.4. *Interpretation of results*

9.1.4.1. The regular transmittance measured according to point 9.1.2 in the case of windscreens must not be less than 75 %, and in the case of windows other than windscreens not less than 70 %.

9.1.4.2. In the case of windows situated at points which are not essential to the driver's field of vision (glazed roof, for example) the regular transmittance factor of the light from the pane may be less than 70 %. Windows having a regular light transmittance factor of less than 70 % must be marked with an appropriate symbol.

9.2. Optical-distortion test

9.2.1. *Scope*

The method specified is a projection method which permits evaluation of the optical distortion of a safety-glass pane.

9.2.1.1. Definitions

9.2.1.1.1. Optical deviation: the angle between the true and the apparent direction of a point viewed through the safety-glass pane, the magnitude of the angle being a function of the angle of incidence of the line of sight, the thickness and inclination of the glass pane, and the radius of curvature at the point of incidence.

9.2.1.1.2. Optical distortion in a direction MM': the algebraic difference in angular deviation $\Delta\alpha$ measured between two points M and M' on the surface of the safety-glass pane, the distance between the two points being such that their projections in a plane at right angles to the direction of vision are separated by a given distance Δx (see Figure 6).

Anti-clockwise deviation is to be regarded as positive and clockwise deviation as negative.

9.2.1.1.3. Optical distortion at a point M: the optical distortion maximum for all directions MM' from the point M.

9.2.1.2. **Apparatus**

This method entails the projection of an appropriate slide (raster) on to the display screen through the safety-glass pane being tested. The change caused in the shape of the projected image by the insertion of the safety-glass pane in the line of light provides a measures of the distortion. The apparatus comprises the following items, arranged as shown in Figure 9.

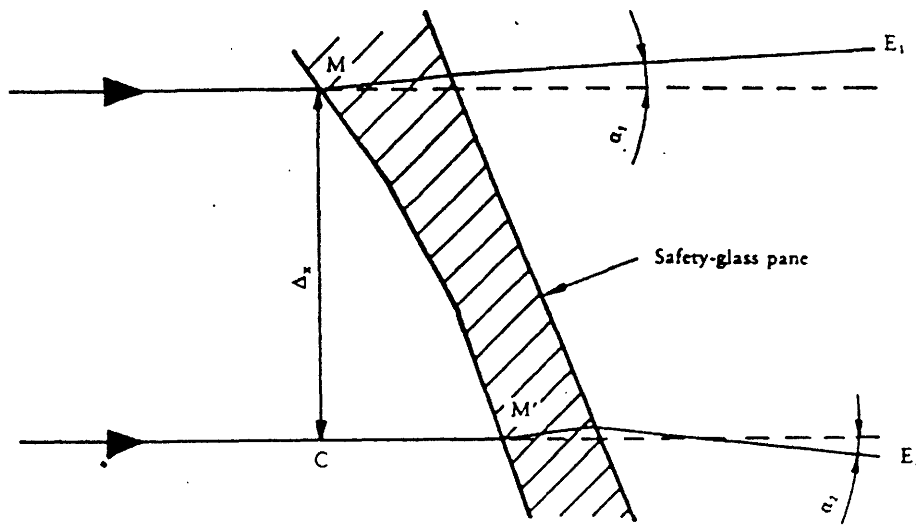


Figure 6

Diagrammatic representation of optical distortion

Notes: $\Delta_\alpha = \alpha_1 - \alpha_2$, i.e. the optical distortion in the direction MM'.

Δ_x = MC i.e. the distance between two straight lines parallel to the direction of vision and passing through the points M and M'.

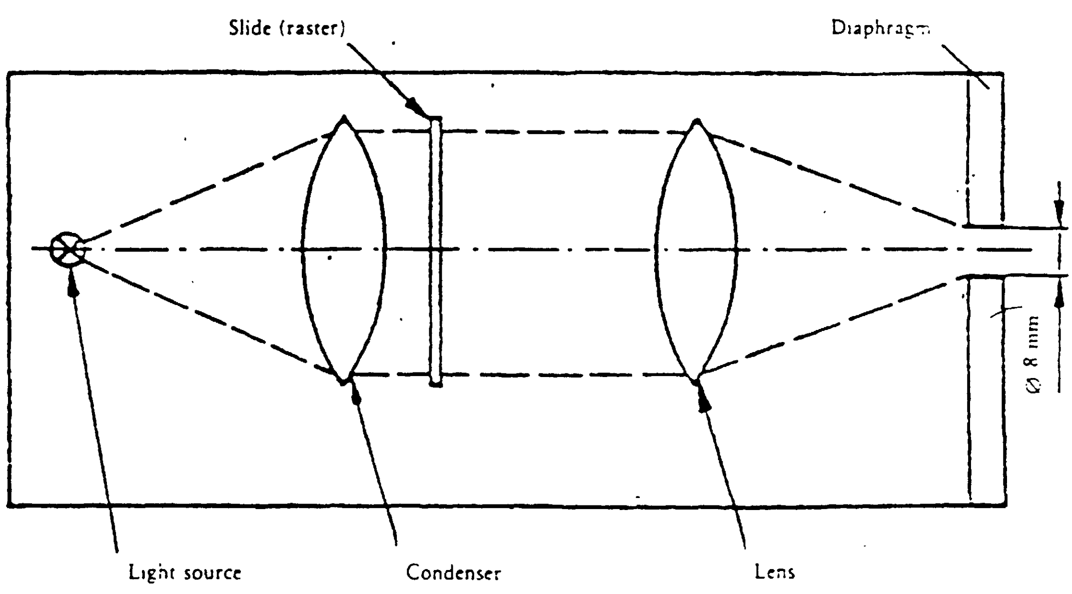


Figure 7

Optical arrangement of the projector

9.2.1.2.1. Projector, of good quality, with a high-intensity point light source, having for example the following characteristics.

— focal length at least 90 mm,

— aperture approximately 1/2.5,

— 150 W quartz halogen lamp (if used without a filter),

— 250 W quartz halogen lamp (if a green filter is used).

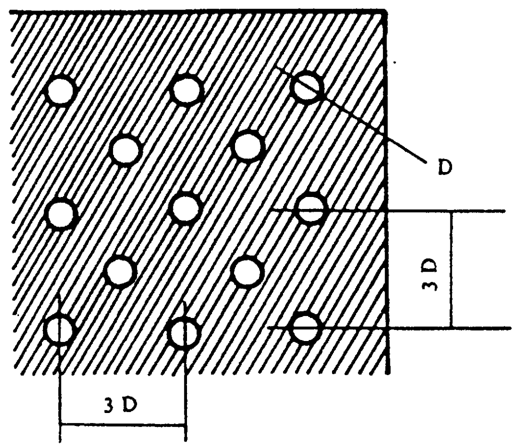


Figure 8

Enlarged section of the slide

The projector is shown schematically in Figure 7. A diaphragm of 8 mm diameter is positioned approximately 10 mm from the front lens.

9.2.1.2.2. Slides (rasters) consisting, for example, of an array of bright circular shapes on a dark background (see Figure 8). The slide must be of sufficiently high quality and contrast to enable measurement to be carried out with an error of less than 5 %. In the absence of the safety-glass pane to be examined, the dimensions of the circular shapes must be such that when the circular shapes are projected they form an array of circles of diameter $\frac{R_1 + R_2}{R_1} \Delta x$ where Δx = 4 mm (see Figures 6 and 9).

R_1 = 4 m

R_2 = 2 to 4 m (4 m preferred).

Figure 9

Arrangement of the apparatus for the optical-distortion test

9.2.1.2.3. Support stand, preferably one permitting vertical and horizontal scanning, as well as rotation of the safety-glass pane.

9.2.1.2.4. Checking template, for measuring changes in dimensions where a rapid assessment is required. A suitable design is shown in Figure 10.

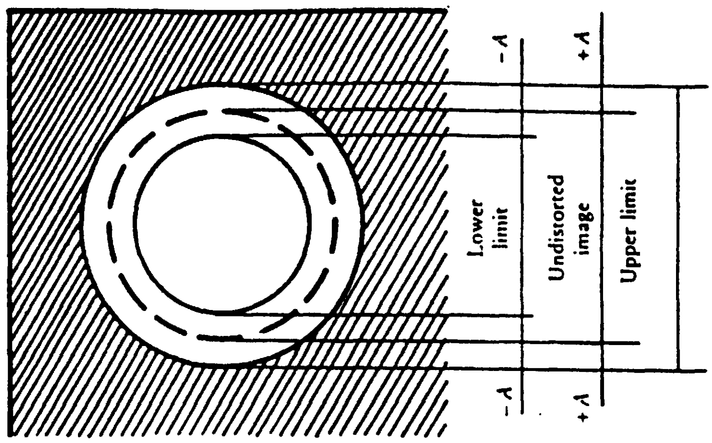


Figure 10

Design for a suitable checking template

9.2.1.3. Procedure

9.2.1.3.1. General

Mount the safety-glass pane on the support stand (point 9.2.1.2.3) at the designated rake angle. Project the test image through the area being examined. Rotate the safety-glass pane or move it either horizontally or vertically in order to examine the whole of the specified area.

9.2.1.3.2. Assessment using a checking template

Where a rapid assessment with a possible margin of error of up to 20 % is sufficient, calculate the value of A (see Figure 10) from the limit value $\Delta\alpha_L$ for the change in deviation and the value of R_2, the distance from the safety-glass pane to the display screen:

$$A = 0{,}145\ \Delta\alpha_L \cdot R_2$$

The relationship between the change in diameter of the projected image Δd and the change in angular deviation $\Delta\alpha$ is given by:

$$\Delta d = 0{,}29\ \Delta\alpha \cdot R_2$$

where:

Δd is expressed in millimetres,

A is expressed in millimetres,

$\Delta\alpha_L$ is expressed in minutes of arc,

$\Delta\alpha$ is expressed in minutes of arc, and

R_2 is expressed in metres.

9.2.1.3.3. Measurement using a photoelectric device

Where a precise measurement with a possible margin of error of less than 10 % of the limit value is required, measure Δd on the projection axis, the value of the spot width being taken at the point where the luminance is 0,5 times the maximum spot luminance value.

9.2.1.4. Expression of results

Evaluate the optical distortion of the safety-glass panes by measuring Δd at any point of the surface and in all directions in order to find Δd max.

9.2.1.5. Alternative method

In addition, a strioscopic technique is permitted as an alternative to the projection techniques, provided that the accuracy of the measurements given in points 9.2.1.3.2 and 9.2.1.3.3 is maintained.

9.2.1.6. The distance Δx must be 4 mm.

9.2.1.7. The windscreen must be mounted at the same rake angle as on the tractor.

9.2.1.8. The projection axis in the horizontal plane must be maintained approximately normal to the trace of the windscreen in that plane.

9.2.2. The measurements are performed in zone I as prescribed in point 9.2.5.2.

9.2.2.1. In the case of tractors for which it is not possible to determine zone I as defined in point 9.2.5.3, the test is carried out in zone I', as defined in point 9.2.5.3.

9.2.2.2. Tractor type

The test must be repeated if the windscreen is to be mounted on a tractor of a type which has a different forward field of vision from that of the tractor type for which the windscreen has already been approved.

9.2.3. *Indices of difficulty of the secondary characteristics*

9.2.3.1. Nature of the material

Polished (plate) glass	*Float glass*	*Sheet glass*
1	1	2

9.2.3.2. Other secondary characteristics

No other secondary characteristics are involved.

9.2.4. *Number of samples*

Four samples must be submitted for testing.

9.2.5. *Definition of the zone of vision of tractor windscreens.*

9.2.5.1. The zone of vision is defined on the basis of:

9.2.5.1.1. the reference point as defined in point 1.2 'field of vision' of Annex V. This point is designated as O below;

9.2.5.1.2. the straight line OQ which is the horizontal straight line passing through the reference point and perpendicular to the median longitudinal plane of the tractor;

9.2.5.2. zone I is the windscreen zone determined by the intersection of the windscreen with the four planes defined below:

P_1 — a vertical plane passing through O and forming an angle of 15° to the left of the median longitudinal plane of the tractor,

P_2 — a vertical plane symmetrical to P_1 about the median longitudinal plane of the tractor.

If this is not possible (in the absence of a symmetrical median longitudinal plane, for instance) P_2 is the plane symmetrical to P_1 about the longitudinal plane of the tractor passing through the reference point,

P_3 — a plane passing through the straight line OQ and forming an angle of 10° above the horizontal plane,

P_4 — a plane passing through the straight line QQ and forming an angle of 8° below the horizontal plane.

9.2.5.3. In the case of tractors for which it is not possible to determine zone I, as defined in point 9.2.5.2, zone I' consists of the whole surface of the windscreen.

9.2.6. *Interpretation of results*

A type of windscreen is considered satisfactory as regards optical distortion if, in the four samples submitted for testing, optical distortion does not exceed a maximum value of 2' of an arc in either zone I or zone I'.

9.2.6.1. No measurement must be performed within a 100-mm-wide peripheral zone.

9.2.6.2. In the case of divided windscreens, no measurement is performed within a band 35 mm in width, starting from the edge of the pane, which may be adjacent to the screen divider.

9.3. **Secondary-image separation test**

9.3.1. *Scope*

Two test methods are recognized:

— target test, and

— collimation telescope test.

These test methods may be used for component type-approval, quality-control or product-evaluation purposes, as appropriate.

9.3.1.1. Target test

9.3.1.1.1. Apparatus

This method involves viewing an illuminated target through the safety-glass pane. The target may be designed in such a way that the test can be carried out on a simple go/no go basis.

The target must preferably be of one of the following types:

(a) an illuminated ring target whose outer diameter, D, subtends an angle of .. minutes of arc at a point situated at x metres (Figure 11a); or

(b) an illuminated ring and spot target whose dimensions are such that the distance, D, from a point on the edge of the spot to the nearest point on the inside of the circle subtends an angle of n minutes of arc at a point situated at x metres (Figure 11b);

where:

n is the limit value of secondary-image separation,

x is the distance from the safety-glass pane to the target (not less than 7 m),

D is given by the formula:

$$D = x \cdot \tan n$$

The illuminated target consists of a light box, approximately 300 mm × 300 mm × 150 mm, whose front is most conveniently constructed of glass masked with opaque black paper or coated with matt black paint. The box is illuminated by a suitable light source. The inside of the box is coated with matt white paint. It may be convenient to use other forms of target, such as that shown in Figure 14. It is also acceptable to replace the target system by a projection system and to view the resulting images on a screen.

9.3.1.1.2. Procedure

Mount the safety-glass pane at the specified rake angle on a suitable stand in such a way that the observation is carried out in the horizontal plane passing through the centre of the target.

The light box must be viewed, in a dark or semi-dark room, through each part of the area being examined, in order to detect the presence of any secondary image associated with the illuminated target. Rotate the safety-glass pane as necessary to ensure that the correct direction of view is maintained. A monocular may be used for viewing.

9.3.1.1.3. Expression of results

Determine whether:

— when target (a) (see figure 11a) is used, the primary and secondary image of the circle separate, i.e. whether the limit value of n is exceeded, or

— when target (b) (see figure 11b) is used, the secondary image of the spot shifts beyond the point of tangency with the inside edge of the circle, i.e. whether the limit value of n is exceeded

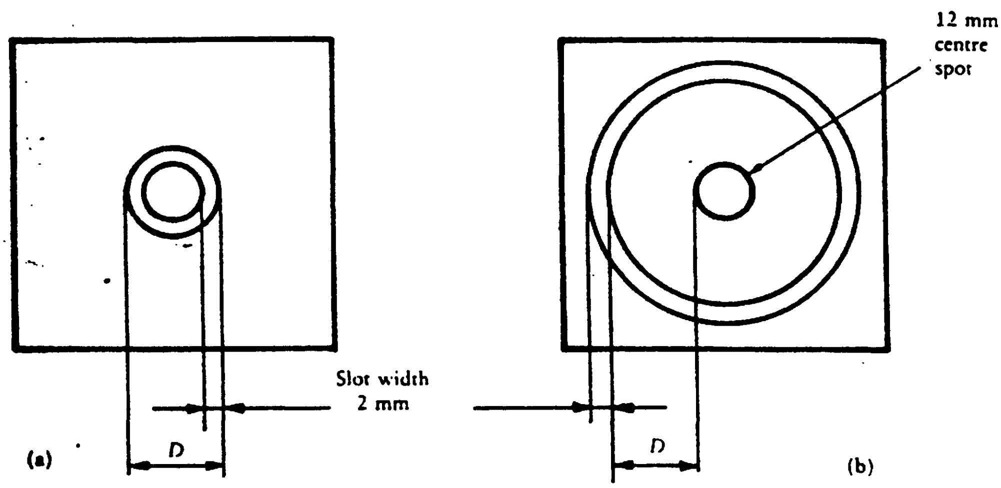


Figure 11

Dimensions of targets

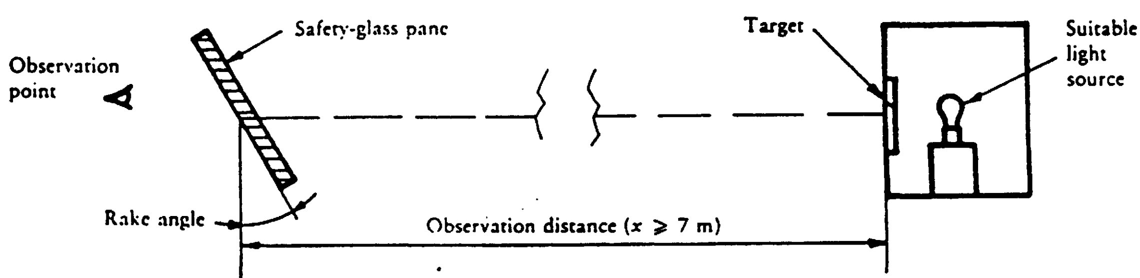
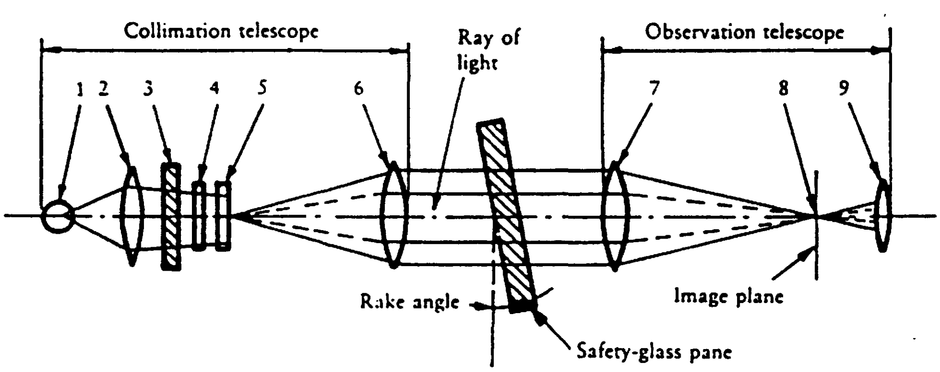


Figure 12

Arrangement of apparatus



1. Lamp bulb.
2. Condenser aperture > 8,6 mm.
3. Ground-glass screen aperture > condenser aperture.
4. Colour filter with central hole approximately 0,3 mm in diameter; diameter > 8,6 mm.
5. Polar-coordinate plate, diameter > 8,6 mm.
6. Achromatic lens, f ⩾ 86 mm, aperture 10 mm.
7. Achromatic lens, f ⩾ 86 mm, aperture 10 mm.
8. Black spot, diameter approximately 0,3 mm.
9. Achromatic lens, f = 20 mm, aperture ⩽ 10 mm.

Figure 13

Apparatus for collimation telescope test

9.3.1.2. **Collimation telescope test**

If necessary, the procedure described in this section is applied.

9.3.1.2.1. **Apparatus**

The apparatus comprises a collimator and a telescope and may be set up in accordance with Figure 13. However, any equivalent optical system may be used.

9.3.1.2.2. **Procedure**

The collimation telescope forms at infinity the image of a polar-coordinate system with a bright point at its centre (see Figure 14). In the focal plane of the observation telescope, a small opaque spot with a diameter slightly larger than of the projected bright point is placed on the optical axis, thus obscuring the bright point.

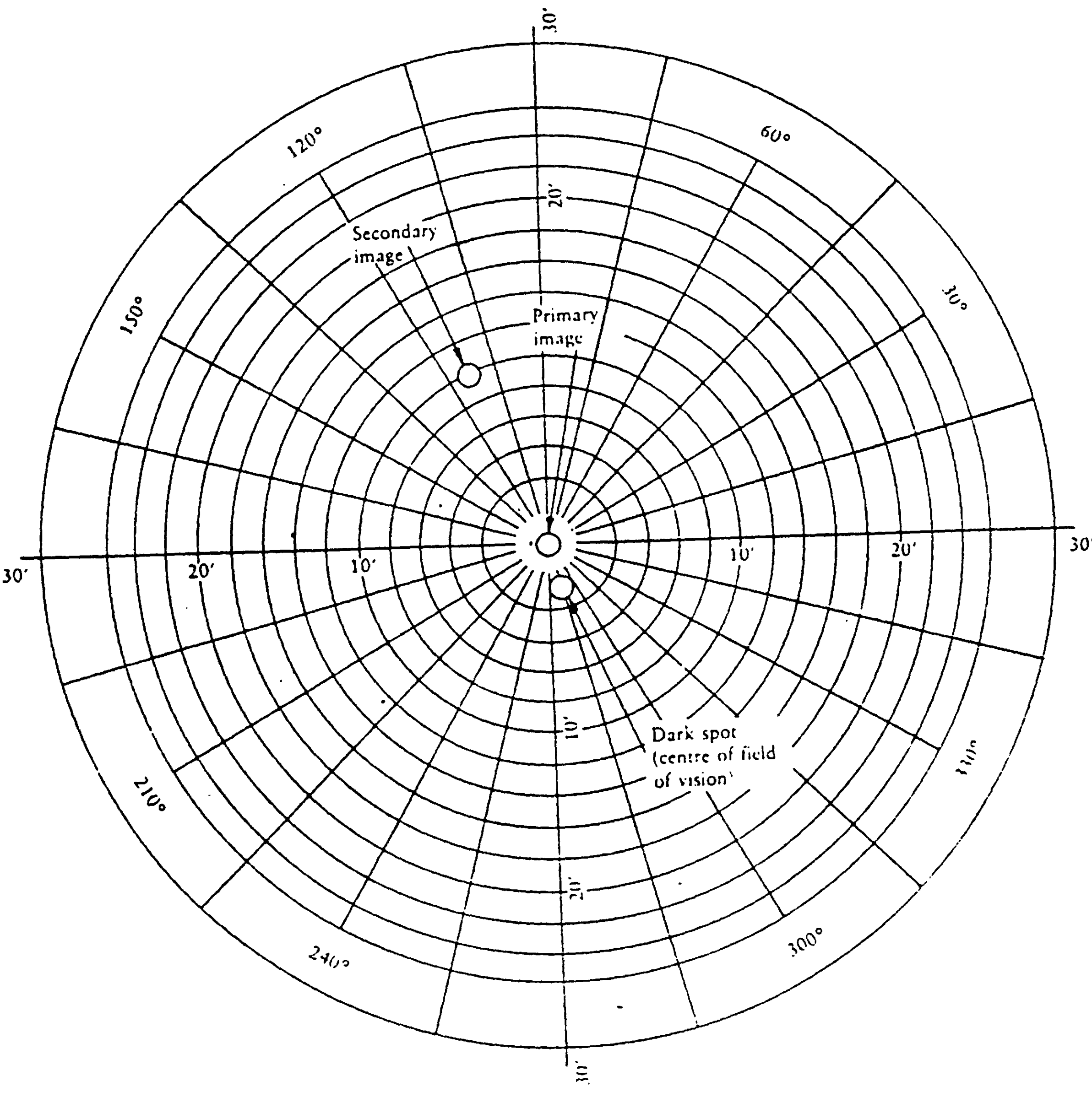


Figure 14

Example of observation by the collimation telescope test method

9.3.1.2.2. When a test piece which exhibits a secondary image is placed between the telescope and the collimator, a second, less bright point appears at a certain distance from the centre of the polar-coordinate system. The secondary-image separation can be read out as the distance between the points seen through the observation telescope (see Figure 14). (The distance between the dark spot and the bright point at the centre of the polar-coordinate system represents the optical deviation.)

9.3.1.2.3. Expression of results

The safety-glass pane is first examined by a simple scanning technique to establish the area giving the strongest secondary image. That area is then examined by the collimator telescope system at the appropriate angle of incidence. The maximum secondary-image separation is measured.

9.3.1.3. The direction of observation in the horizontal plane must be maintained approximately normal to the trace of the windscreen in that plane.

9.3.2. The measurements are performed according to tractor category in the zones defined in point 9.2.2.

9.3.2.1. Tractor type

The test must be repeated if the windscreen is to be mounted on a tractor of a type which has a forward field of vision different from that of the tractor for which the windscreen has already been approved.

9.3.3. *Indices of difficulty of the secondary characteristics*

9.3.3.1. Nature of the material

Polished (plate) glass	*Float glass*	*Sheet glass*
1	1	2

9.3.3.2. Other secondary characteristics

No other secondary characteristics are involved.

9.3.4. *Number of samples*

Four samples must be submitted for testing.

9.3.5. *Interpretation of results*

A type of windscreen is considered satisfactory as regards secondary-image separation if, in the four samples submitted for testing, separation of the primary and secondary image does not exceed a maximum value of 15′ of an arc.

9.3.5.1. No measurement must be carried out in a 100 mm-wide peripheral zone.

9.3.5.2. In the case of divided windscreens no measurement may be performed within a band 35 mm in width, starting from the edge of the pane, which may be adjacent to the screen divider.

9.4. Identification of colours test

When a windscreen is tinted in the zones defined in point 9.2.5.2 or 9.2.5.3, four windscreens are tested for identifiability of the following colours:

white,
selective yellow,
red,
green,
blue,
amber.

10. FIRE-RESISTANCE TEST

10.1. Purpose and scope of application

This method enables the horizontal burning rate of materials used in the occupant compartment of tractors after exposure to a small flame to be determined. This method permits testing of materials and components of a tractor's interior equipment individually or in combination up to a thickness of 15 mm. It is used to judge the uniformity of production lots of such materials with respect to their burning behaviour. Because of the many differences between the real-world situation (application and orientation within a tractor; conditions of use; ignition source, etc.) and the precise test conditions prescribed herein, this method cannot be considered as suitable for evaluation of all true in-tractor burning characteristics.

10.2. Definitions

10.2.1. Burning rate: the quotient of the burnt distance measured according to this method and the time taken to burn that distance.

It is expressed in millimetres per minute.

10.2.2. Composite material: a material composed of several layers of similar or different materials intimately held together at their surface by cementing, bonding, cladding, welding, etc. When different materials are connected together intermittently (for example, by sewing, high-frequency welding, riveting), then in order to permit the preparation of individual samples in accordance with section 10.5 such materials are not considered as composite materials.

10.2.3. Exposed side: the side which is facing towards the occupant compartment (passenger compartment) when the material is mounted in the tractor.

10.3. Principle

A sample is held horizontally in a U-shaped holder and is exposed to the action of a defined low-energy flame for 15 seconds in a combustion chamber, the flame acting on the free end of the sample. The test determines whether and when the flame is extinguished or the time which the flame requires to proceed over a measured distance.

10.4. Apparatus

10.4.1. Combustion chamber (Figure 15), preferably of stainless steel, having the dimensions given in Figure 16. The front of the chamber contains a flame-resistant observation window, which may cover the entire front and which can be constructed as an access panel.

The bottom of the chamber has vent holes, and the top has a vent slot all around. The combustion chamber is placed on four feet, 10 mm high.

The chamber may have a hole at one end for the introduction of the sample holder containing the sample; in the opposite end, a hole is provided for the gas supply line. Melted material is caught in a pan (see Figure 17) which is placed on the bottom of the chamber between vent holes without covering any vent hole area.

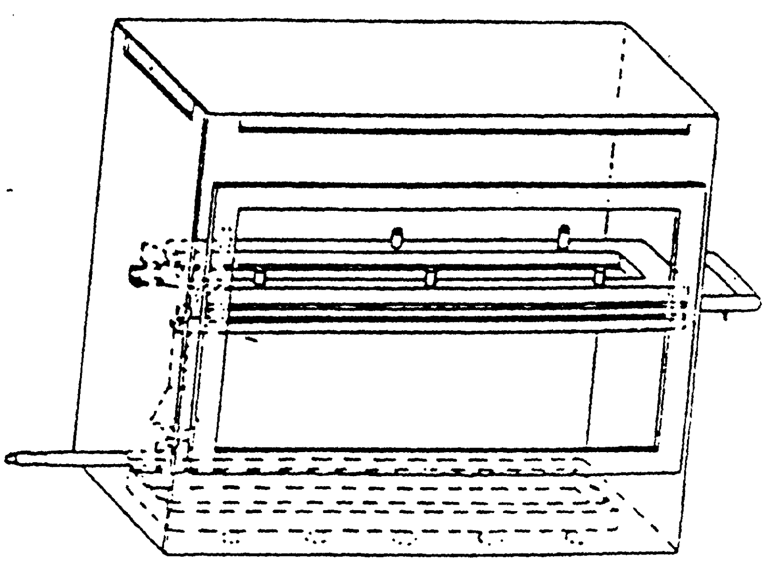


Figure 15

Example of combustion chamber with sample-holder and drip pan

89/173/EEC

Dimensions in millimetres — tolerances according to ISO 2768

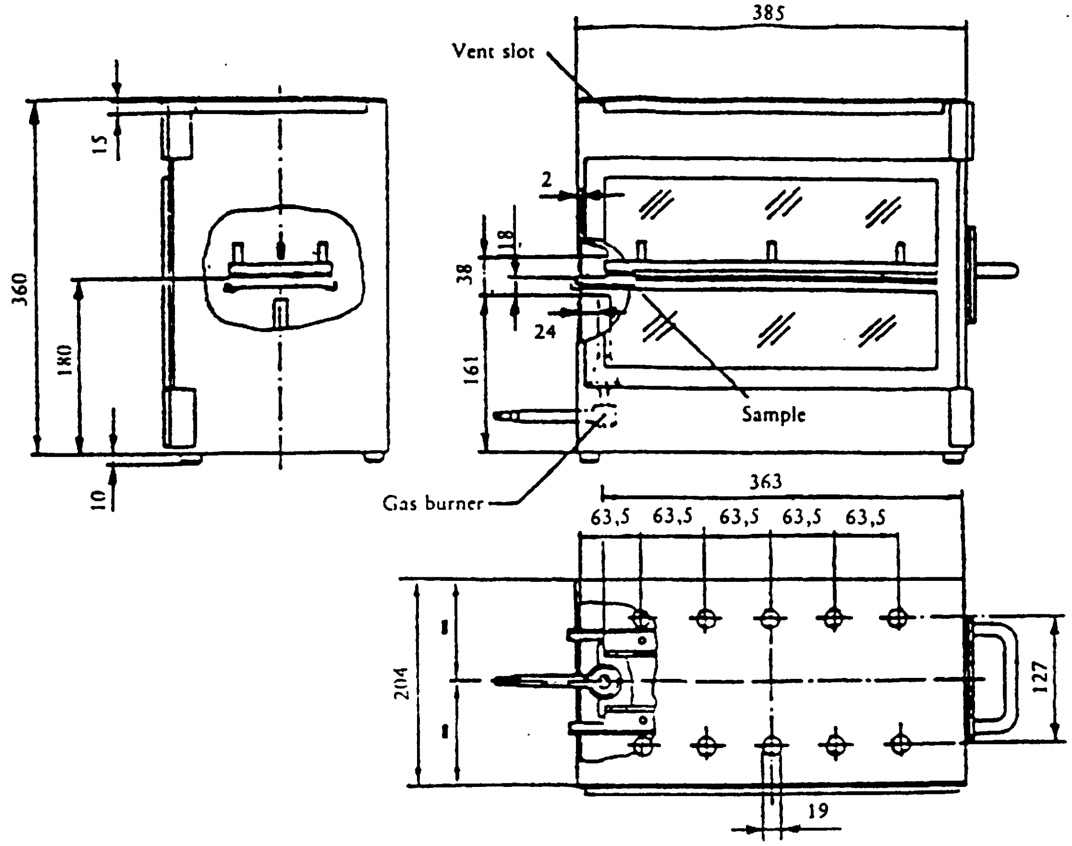


Figure 16

Example of combustion chamber

Dimensions in millimetres — tolerances according to ISO 2768

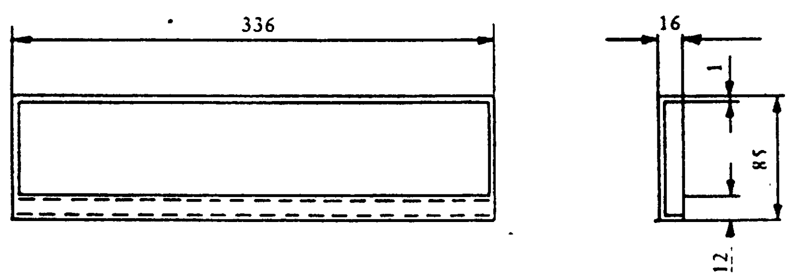


Figure 17

Typical drip pan

10.4.2. Sample holder, consisting of two U-shaped metal plates or frames of corrosion-proof material. Dimensions are given in Figure 18.

The lower plate is equipped with pins and the upper one with corresponding holes, in order to ensure a consistent holding of the sample. The pins also serve as measuring points at the beginning and end of the burning distance.

A support is provided in the form of heat-resistant wires 0,25 mm in diameter spanning the frame at 25 mm intervals over the bottom U-shaped frame (see Figure 19).

Dimensions in millimetres — tolerances according to ISO 2768

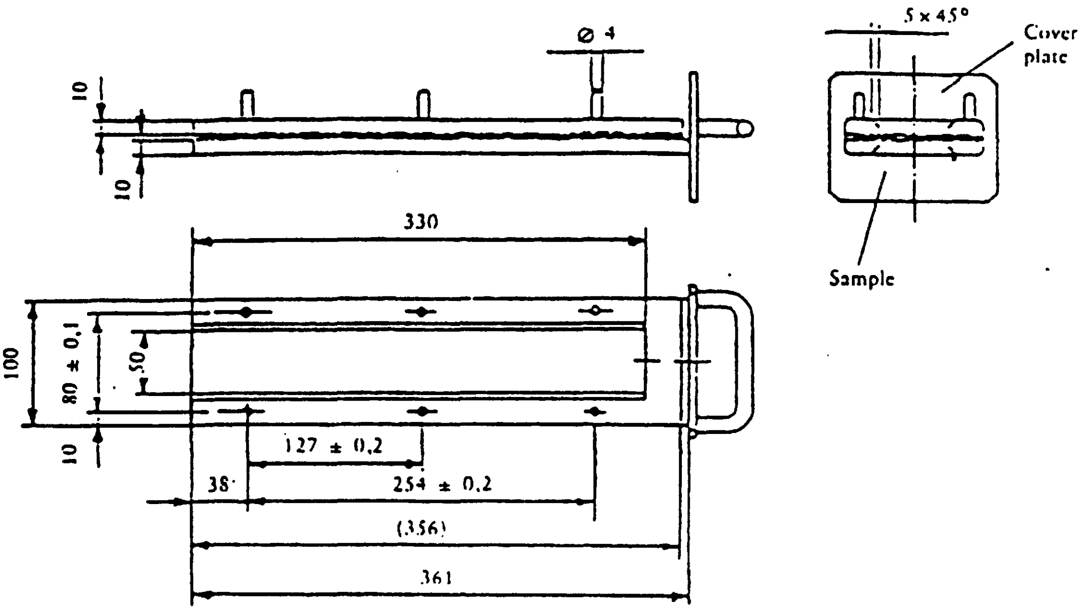


Figure 18

Example of sample holder

Dimensions in millimetres — tolerances according to ISO 2768

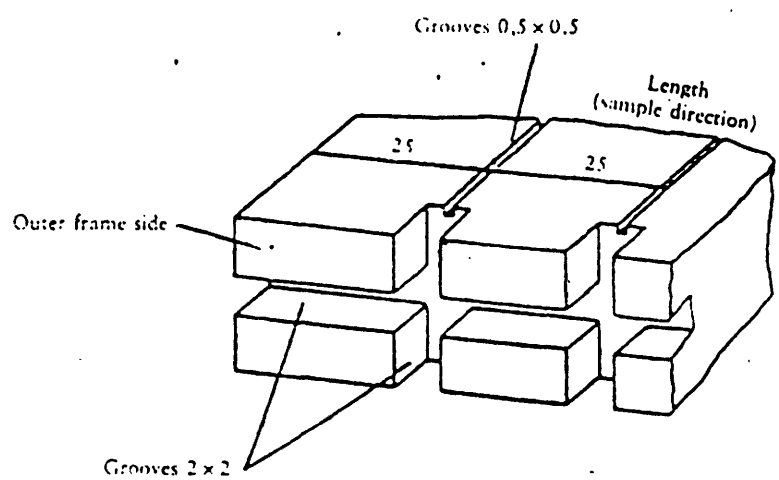


Figure 19

Example of section of lower U-frame design for wire support facility

The plane of the lower side of samples must be 178 mm above the floor plate. The distance of the front edge of the sample holder from the end of the chamber must be 22 mm, the distance of the longitudinal sides of the sample holder from the sides of the chamber must be 50 mm (all inside dimensions — See Figures 15 and 16

10.4.3. Gas burner. The small ignition source is provided by a Bunsen burner having an inside diameter of 9,5 mm. It is so located in the test cabinet that the centre of its nozzle is 19 mm below the centre of the bottom edge of the open end of the sample (see Figure 1*5*).

10.4.4. Test gas. The gas supplied to the burner must have a calorific value of about 38 MJ/m^3 (for example natural gas).

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

10.4.6. Stop-watch, accurate to 0,5 second.

10.4.7. Fume cupboard. The combustion chamber may be placed in a fume cupboard assembly provided that the latter's internal volume is at least 20 times, but not more than 110 times, greater than the volume of the combustion chamber and provided that no single height, width, or length dimension of the fume cupboard is greater than $2^1/_2$ times either of the other two dimensions.

Before the test, the vertical velocity of the air through the fume cupboard is measured 100 mm forward of and to the rear of the ultimate site of the combustion chamber. It must be between 0,10 and 0,30 m/s in order to avoid possible discomfort to the operator from combustion products. It is possible to use a fume cupboard with natural ventilation and an appropriate air velocity.

10.5. Samples

10.5.1. *Shape and dimensions*

The shape and dimensions of samples are given in Figure 20. The thickness of the sample corresponds to the thickness of the product to be tested. It must not be more than 13 mm. When sample taking so permits, the sample must have a constant section over its entire length. When the shape and dimensions of a product do not permit taking a sample of the given size, the following minimum dimensions must be observed:

(a) for samples having a width of 3 to 60 mm, the length must be 356 mm. In this case the material is tested over the product's width;

(b) for samples having a width of 60 to 100 mm, the length must be at least 138 mm. In this case the potential burning distance corresponds to the length of the sample, the measurement starting at the first measuring point;

(c) samples less than 60 mm wide and less than 356 mm long, and samples 60 to 100 mm wide and less than 138 mm long, cannot be tested according to the present method, nor can samples less than 3 mm wide.

10.5.2. *Sampling*

At least five samples are to be taken from the material under test. In materials having burning rates differing according to the direction of the material (this being established by preliminary tests) the five (or more) samples are to be taken and placed in the test apparatus in such a way that the highest burning rate will be measured. When the material is supplied in set widths, a length of at least 500 mm covering the entire width is cut. From the piece so cut, the samples are to be taken at not less than 100 mm from the edge of the material and at points equidistant from each other.

Samples are to be taken in the same way from finished products when the shape of the product so permits. If the thickness of the product is over 13 mm it must be reduced to 13 mm by a mechanical process applied to the side which does not face the passenger compartment.

Composite materials (see point 10.2.2) are to be tested as if they were homogeneous.

In the case of materials comprising superimposed layers of different composition which are not composite materials, all the layers of material included within a depth of 13 mm from the surface facing towards the passenger compartment are to be tested individually.

Dimensions in millimetres

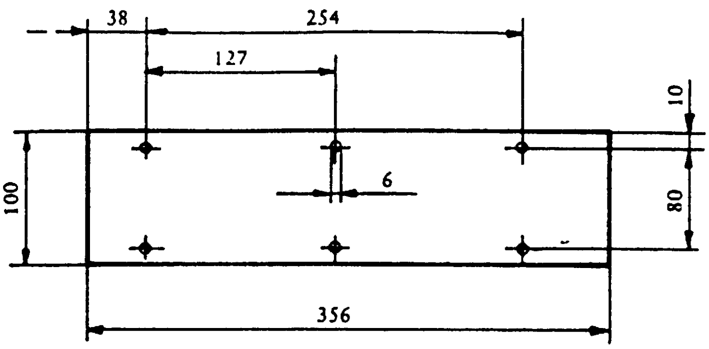


Figure 20

Sample

10.5.3. *Conditioning*

The samples are to be conditioned for at least 24 hours, but no more than 7 days, at a temperature of 23 ± 2 °C and a relative humidity of 50 ± 5 %, and maintained under these conditions until immediately prior to testing.

10.6. **Procedure**

10.6.1. Place samples with napped or tufted surfaces on a flat surface, and comb twice against the nap using the comb (point 10.4.5).

10.6.2. Place the sample in the sample holder (point 10.4.2) so that the exposed side faces downwards, towards the flame.

10.6.3. Adjust the gas flame to a height of 30 mm using the mark in the chamber, the air intake of the burner being closed. The flame must burn for at least one minute, for stabilization, before the first test is started.

10.6.4. Push the sample holder into the combustion chamber so that the end of the sample is exposed to the flame, and after 15 seconds cut off the gas flow.

10.6.5. Measurement of burning time starts at the moment when the foot of the flame passes the first measuring point. Observe the flame propagation on the side (upper or lower) which burns faster.

10.6.6. Measurement of burning time is completed when the flame has come to the last measuring point or when the flame is extinguished before reaching that point. If the flame does not reach the last measuring point, measure the burnt distance up to the point where the flame was extinguished. Burnt distance is the part of the sample destroyed, on the surface or inside, by burning.

10.6.7. If the sample does not ignite or does not continue burning after the burner has been extinguished, or the flame goes out before reaching the first measuring point, so that no burning time is measured, note in the test report that the burning is 0 mm/minute.

10.6.8. When running a series of tests or performing repeat tests, make sure before starting a test that the temperature of the combustion chamber and sample-holder does not exceed 30 °C.

10.7. **Calculation**

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

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

where:

s is the burnt distance, in millimetres,

t is the time, in seconds, taken to burn the distance s.

10.8. **Indices of difficulty of the secondary characteristics**

No secondary chararcteristics are involved.

10.9. **Interpretation of results**

Plastic-coated (2.3) and plastic safety glazing (2.4) are considered satisfactory from the point of view of burning behaviour (fire resistance) if the burn rate does not exceed 250 mm/minute.

11. TESTING OF RESISTANCE TO CHEMICAL AGENTS

11.1. **Chemical agents to be used**

11.1.1. Non-abrasive soapy solution: 1 % by weight of potassium oleate in de-ionized water.

11.1.2. Window-cleaning product: aqueous solution of isopropanol and dipropylene glycol monomethyl ether, each at a concentration of 5 to 10 % by weight, and of ammonium hydroxyde at a concentration of 1 to 5 % by weight.

11.1.3. Non-dilute denatured alcohol: one part by volume of methyl alcohol in 10 parts by volume of ethyl alcohol.

11.1.4. Reference gasoline mixture of 50 % by volume of toluene, 30 % by volume of 2,2,4-trimethylpentane, 15 % by volume of 2,4,4-trimethyl-1-pentane and 5 % by volume of ethyl alcohol.

11.1.5. Reference kerosene: mixture of 50 % by volume of n-octane and 50 % by volume of n-decane.

11.2. Test method

Two 180 × 25 mm test pieces are each to be tested with chemical agents as provided for in section 11.1, a new test piece being used for each test and product. After each test the pieces are to be cleaned in accordance with the manufacturer's instruction, and then conditioned for 48 hours at a temperature of 23 ± 2 °C and a relative humidity of 50 ± 5 %. These conditions are to be maintained during the tests. The test pieces are to be completely immersed in the test liquid for one minute, withdrawn and then immediately dried with a (clean) absorbent cotton cloth.

11.3. **Indices of difficulty of the secondary characteristics**

	Colourless	*Tinted*
Colouring of the plastic interlayer, or coating	1	2

No secondary characteristic is involved.

11.4. Interpretation of the results

11.4.1. The test for resistance to chemical agents is considered to be positive if the test pieces display no softening, stickiness, surface cracking or apparent loss of transparency.

11.4.2. A series of test pieces submitted for component type-approval are considered satisfactory as regards resistance to chemical agents if one of the following conditions has been met:

11.4.2.1. all the tests give satisfactory results;

11.4.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

PART 3-D

TOUGHENED-GLASS WINDSCREENS

89/173/EEC

1. DEFINITION OF TYPE

Toughened-glass windscreens are deemed to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. The principal characteristics are as follows:

1.1.1. the trade name or mark;

1.1.2. the shape and dimensions.

Toughened-glass windscreens are considered as belonging to one or other of two groups for the purposes of the fragmentation and mechanical-properties tests, i.e.:

1.1.2.1. flat windscreens, and

1.1.2.2. curved windscreens;

1.1.3. the thickness category in which the nominal thickness 'e' lies (a manufacturing tolerance of ± 0,2 mm being allowed):

— category I: $e \leq 4{,}5$ mm
— category II: $4{,}5 \text{ mm} < e \leq 5{,}5$ mm
— category III: $5{,}5 \text{ mm} < e \leq 6{,}5$ mm
— category IV: $6{,}5 \text{ mm} < e$

1.2. The secondary characteristics are as follows:

1.2.1. nature of the material (polished (plate) glass, float glass, sheet glass),

1.2.2. colouring (colourless or tinted),

1.2.3. the incorporation or absence of conductors,

1.2.4. the incorporation or absence of obscuration bands.

2. FRAGMENTATION TEST

2.1. Indices of difficulty of the secondary characteristics

2.1.1. Only the nature of the material is involved.

2.1.2. Float glass and sheet glass are considered to have the same index of difficulty.

2.1.3. The fragmentation tests must be repeated on transition from polished (plate) glass to float glass or sheet glass, and vice versa.

2.1.4. The tests must be repeated if obscuration bands other than painted bands are used.

2.2. Number of samples

Six samples from the smallest-developed-area series and six samples from the largest-developed-area series, selected as prescibed in Part 3-M, are to be tested.

2.3. Different zones of glass

A toughened-glass windscreen must comprise two main zones, FI and FII. It may also comprise an intermediate zone, FIII.

These zones are as defined below:

2.3.1. zone FI: peripheral zone of fine fragmentation, at least 7 cm wide, all round the edge of the windscreen and including an outer strip 2 cm wide not subjected to assessment;

2.3.2. zone FII: visibility zone of varying fragmentation, always including a rectangular part at least 20 cm high and 50 cm long.

2.3.2.1. The centre of the rectangle is inside a circle having a radius of 10 cm centred on the projection of the reference point.

2.3.2.2. In the case of tractors for which it is not possible to determine the reference point, the position of the visibility zone must be indicated in the test report.

2.3.2.3. The height of the above rectangle may be reduced to 15 cm for windscreens which are less than 44 cm high;

2.3.3. zone FIII: intermediate zone, not more than 5 cm wide, between zones FI and FII.

89/173/EEC

2.4. Test method

The method used is that described in point 1 of Part 3.

2.5. Points of impact (see Part 3N, Figure 2).

2.5.1. The points of impact are selected as follows:

point 1: in the central part of zone FII in an area of high or low strees;

point 2: in zone FIII, as near as possible to the vertical plane of symmetry of zone FII;

points 3 and 3′: 3 cm from the edges of one median of the sample; when there is a tong mark, one of the breakage points shall be near the edge bearing the tong mark and the other near the opposite edge;

point 4: at the place where the radius of curvature is smallest on the longest median;

point 5: 3 cm from the edge of the sample at the place where the radius of curvature of the edge is smallest, either to the left or to the right.

2.5.2. A fragmentation test is performed at each of the points 1, 2, 3, 3′, 4 and 5.

2.6. Interpretation of results

2.6.1. A test is deemed to have given a satisfactory result if fragmentation satisfies all the conditions given in points 2.6.1.1, 2.6.1.2 and 2.6.1.3 below.

2.6.1.1 *Zone FI*

2.6.1.1.1. The number of fragments in any 5 × 5 cm square is not less than 40 nor more than 350; however, in the case of a count of less than 40, if the number of fragments in any 10 × 10 cm square containing the 5 × 5 cm square is not less than 160, this is acceptable.

2.6.1.1.2. For the purposes of the above rule, a fragment extending across a side of a square counts as half a fragment.

2.6.1.1.3. Fragmentation is not checked in a strip 2 cm wide round the edge of the samples, this strip representing the frame of the glass, nor within a radius of 7,5 cm from the point of impact.

2.6.1.1.4. A maximum of three fragments of an area exceeding 3 cm^2 is allowed. No two of these fragments must be contained within the same 10 cm diameter circle.

2.6.1.1.5. Elongated fragments may be permitted provided that their ends are not knife-edged and that their length does not exceed 7,5 cm, except in the case provided for in point 2.6.2.2 below. If these elongated fragments extend to the edge of the glass, they must not form an angle of more than 45° with it.

2.6.1.2. *Zone FII*

2.6.1.2.1. The residual visibility after shattering is checked in the rectangular area defined in point 2.3.2. In that rectangle the aggregate surface area of the fragments of more than 2 cm^2 must represent not less than 15 % of the area of the rectangle; however, in the case of windscreens less than 44 cm high, or whose angle of installation is less than 15° from the vertical, the visibility percentage must be equal to 10 % at least of the surface of the corresponding rectangle.

2.6.1.2.2. No fragment must have an area of more than 16 cm^2 except in the case provided for in point 2.6.2.2.

2.6.1.2.3 Within a radius of 10 cm from the point of impact, but only in that part of the circle which is included in zone FII, three fragments having an area of more than 16 cm^2 but less than 25 cm^2 are allowed.

2.6.1.2.4. Fragments must be substantially regular in shape and free from points of the type described in point 2.6.1.2.4.1. However, not more than 10 irregular fragments are allowed in any 50 × 20 cm rectangle and not more than 25 over the whole surface of the windscreen.

No such fragment may present a point more than 35 mm long measured in accordance with point 2.6.1.2.4.1.

2.6.1.2.4.1. A fragment is considered as an irregular fragment if it cannot be inscribed in a circle of 40 mm in diameter, if it has at least one point more than 15 mm long when measured from the top of the point to the section whose width is equal to the glazing thickness, and if it has one or more points having a top angle smaller than 40°.

2.6.1.2.5. Fragments of elongated shape are allowed in zone FII as a whole, provided they do not exceed 10 cm in length, except in the case provided for in point 2.6.2.2.

2.6.1.3. *Zone FIII*

Fragmentation in this zone must have characteristics intermediate between those of the fragmentations respectively allowed for the two neighbouring zones (FI and FII). 89/173/EEC

2.6.2. A windscreen submitted for component type-approval is considered satisfactory from the point of view of fragmentation if at least one of the following conditions is fulfilled:

2.6.2.1. when all the tests carried out using the points of impact defined in point 2.5.1 have given a satisfactory result;

2.6.2.2. when one test among all those carried out using the points of impact prescribed in point 2.5.1 has given an unsatisfactory result, taking account of deviations which do not exceed the following limits:

zone FI: not more than five fragments between 7,5 and 15 cm long;

zone FII: not more than three fragments of between 16 and 20 cm^2 in area located outside the circle having a radius of 10 cm centred on the point of impact;

zone FIII: not more than four fragments between 10 and 17,5 cm long,

and is repeated on a new sample, which either conforms to the requirements of point 2.6.1 or presents deviations within the above specified limits.

2.6.2.3. when two tests among all the tests carried out using the points of impact prescribed in point 2.5.1 have given an unsatisfactory result for deviations not exceeding the limits specified in point 2.6.2.2 and a further series of tests carried out on a new set of samples conform to the requirements of point 2.6.1, or not more than two samples of the new set present deviations within the above specified limits of point 2.6.2.2.

2.6.3. If the abovementioned deviations are found, they must be noted in the test report and photographs of the relevant parts of the windscreen attached to the report.

3. HEADFORM TEST

3.1. Indices of difficulty of the secondary characteristics

No secondary characteristic is involved.

3.2. Number of samples

3.2.1. For each group of toughened-glass windscreens, four samples having approximately the smallest developed area and four samples having approximately the largest developed area, all eight samples being of the same types as those selected for the fragmentation tests (see section 2.2) are subjected to testing.

3.2.2. Alternatively, at the discretion of the laboratory conducting the tests, for each category of windscreen thickness, six test pieces of the dimension (1 100 × 500 mm) + 5/ − 2 mm are subjected to testing.

3.3. Test method

3.3.1. The method used is that described in section 3 of Part 3-C.

3.3.2. The height of drop is 1,50 m + 0/ − 5 mm.

3.4. Interpretation of results

3.4.1. The test is deemed to have given a satisfactory result if the windscreen or the test piece is fractured.

3.4.2. A set of samples submitted for component type-approval are considered satisfactory from the point of view of the headform test if either of the two following conditions is fulfilled:

3.4.2.1. all the tests have given a satisfactory result;

3.4.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of samples and give satisfactory results.

4. OPTICAL QUALITIES

The requirements concerning optical qualities set out in section 9 of Part 3-C apply to every type of windscreen.

89/173/EEC

PART 3-E

UNIFORMLY TOUGHENED-GLASS PANES OTHER THAN WINDSCREENS (1)

1. DEFINITION OF TYPE

Uniformly toughened glass panes, are deemed to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. The principal characteristics are as follows:

1.1.1. the trade name mark;

1.1.2. the nature of the toughening process (thermal or chemical);

1.1.3. the shape category; two categories are distinguished:

1.1.3.1. flat glass panes,

1.1.3.2. flat and curved glass panes.

1.1.4. The thickness category in which the nominal thickness 'e' lies (a manufacturing tolerance of ± 0,2 mm being allowed):

— category I: $e \leq 3.5$

— category II: $3,5 \text{ mm} < e \leq 4.5$

— category III: $4,5 \text{ mm} < e \leq 6.5$

— category IV: $6,5 \text{ mm} < e$

1.2. The secondary characteristics are as follows:

1.2.1. nature of the material (polished (plate) glass, float glass, sheet glass),

1.2.2. colouring (colourless or tinted),

1.2.3. the incorporation or absence of conductors.

2. FRAGMENTATION TEST

2.1. Indices of difficulty of the secondary characteristics

Material	Index of difficulty
Plate glass	2
Float glass	1
Sheet glass	1

No other secondary characteristics are involved.

2.2. Selection of samples

2.2.1. Samples of each shape category and of each thickness category difficult to produce are selected according to the following criteria for testing:

2.2.1.1. in the case of flat glass panes, two sets of samples are provided, corresponding to:

2.2.1.1.1. the largest developed area,

2.2.1.1.2. the smallest angle between two adjacent sides.

2.2.1.2. In the case of flat and curved glass panes, three sets of samples are provided, corresponding to:

2.2.1.2.1. the largest developed area,

2.2.1.2.2. the smallest angle between two adjacent sides,

2.2.1.2.3. the largest height of segment

(1) [illegible] of uniformly toughened-glass pane can also be used for windscreens for tractors

2.2.2. Tests carried out on samples corresponding to the largest area, S, are considered to be applicable to any other area smaller than S + 5 %.

2.2.3. If the samples submitted present an angle, γ, smaller than 30°, the tests are considered as applicable to all glass panes produced having an angle greater than γ − 5°.

If the samples submitted present an angle, γ, greater than or equal to 30°, the tests are considered as applicable to all glass panes produced having an angle equal to or greater than 30°.

2.2.4. If the height of segment, *h*, of the samples submitted is greater than 100 mm, the tests are considered as applicable to all glass panes produced having a height of segment smaller than h + 30 mm.

If the height of segment of the samples submitted is less than or equal to 100 mm, the tests are considered as applicable to all glass panes having a height of segment less than or equal to 100 mm.

2.3. **Number of samples per set**

The number of samples in each group shall be as follows, according to the shape category defined in point 1.1.3 above:

Kind of glass pane	Number of samples
Flat (two sets)	4
Flat and curved (three sets)	5

2.4. **Test method**

2.4.1. The method used is that described in 1 Part 3-C.

2.5. Points of impact (see Part 3 N, Figure 3)

2.5.1. For flat glass panes and curved glass panes the points of impact represented respectively in Part 3- N, Figures 3a and 3b on the one hand, and in Part 3 N, Figure 3c on the other hand, are as follows:

point 1: 3 cm from the edges of the glass pane in the part where the radius of curvature of the edge is smallest;

point 2: 3 cm from the edge of one of the medians, the side (if any) of the glass pane bearing tong marks being selected;

point 3: in the geometric centre of the glass;

point 4: for curved glass panes only; this point is selected on the largest median in that part of the pane where the radius of curvature is smallest.

2.5.2. Only one test is carried out at each prescribed point of impact.

2.6. **Interpretation of results**

2.6.1. A test is deemed to have given a satisfactory result if fragmentation satisfies the following conditions:

2.6.1.1. the number of fragments in any 5 × 5 cm² square is not less than 40 or more than 400, or, in the case of glazing not more than 3,5 mm thick, 450.

2.6.1.2. For the purpose of the above rule, a fragment extending across a side of a square counts as half a fragment.

2.6.1.3. Fragmentation is not checked in a strip 2 cm wide round the edge of the samples, this strip representing the frame of the glass; nor within a radius of 7,5 cm from the point of impact.

2.6.1.4. Fragments of an area exceeding 3 cm² are not allowed except in the parts defined in point 2.6.1.3.

2.6.1.5. A few fragments of elongated shape are allowed, provided that:

— their ends are not knife-edged,

— if they extend to the edge of the glass pane they do not form an angle of more than 45° with it,

and if, except in the case provided for in point 2.6.2.2. below if their length does not exceed 7,5 cm.

2.6.2. A set of samples submitted for component type-approval are considered satisfactory from the point of view of fragmentation if at least one of the following conditions is fulfilled.

2.6.2.1. when all tests carried out using the points of impact prescribed in point 2.5.1 have given a satisfactory result;

2.6.2.2. when one test among all those carried out using the points of impact prescribed in point 2.5.1. has given an unsatisfactory result, taking account of deviations which do not exceed the following limits:

— not more than five fragments between 6 and 7,5 cm long,

— not more than five fragments between 7,5 and 10 cm long,

and is repeated on a new sample which either conforms to the requirements of point 2.6.1 or presents deviations within the above specified limits.

2.6.2.3. When two tests among all the tests carried out using the points of impact prescribed in point 2.5.1 have given an unsatisfactory result, taking account of deviations not exceeding the limits specified in point 2.6.2.2, and a further series of tests carried out on a new set of samples conform to the prescriptions of point 2.6.1. or not more than two samples of the new set present deviations within the above specified limits of point 2.6.2.2.

2.6.3. If the abovementioned deviations are found, they must be noted in the test report and photographs of the relevant parts of the glass pane attached to the report.

3. MECHANICAL STRENGTH TEST

3.1. **227-g-ball test**

3.1.1. *Indices of difficulty of the secondary characteristics.*

Material	Index of difficulty	Colouring	Index of difficulty
Polished glass	2	colourless	1
Float glass	1	tinted	2
Sheet glass	1		

The other secondary characteristic (namely, incorporation or absence of conductors) is not involved.

3.1.2. *Number of test pieces*

Six test pieces are subjected to testing for each thickness category defined in point 1.1.4 above.

3.1.3. *Test method*

3.1.3.1. The test method used is that described in section 2.1 of Part 3-C.

3.1.3.2. The height of drop (from the underface of the ball to the upper surface of the test piece) is indicated in the following table, according to thickness of the glass pane:

Nominal thickness of glass pane (e)	Height of drop
e ≤ 3,5 mm	2,0 m + 5/ − 0 mm
3,5 mm < e	2,5 m + 5/ − 0 mm

3.1.4. *Interpretation of results*

3.1.4.1. The test is deemed to have given a satisfactory result if the test piece does not break.

3.1.4.2. A set of test pieces submitted for component type-approval are considered satisfactory from the point of view of mechanical strength if at least one of the following conditions is fulfilled

3.1.4.2.1. when not more than one test has given an unsatisfactory result,

3.1.4.2.2. when two tests having given unsatisfactory results, a further series of tests carried out on a new set of six test pieces give satisfactory results.

4. OPTICAL QUALITIES

4.1. The requirements concerning regular light transmittance set out in section 9.1 of Part 3-C apply to uniformly toughened glass panes or parts of glass panes located at places which are essential to the driver's vision.

89/173/EEC

PART 3-F

ORDINARY LAMINATED-GLASS WINDSCREENS

1. DEFINITION OF TYPE

Ordinary laminated-glass windscreens are deemed to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. The principal characteristics are as follows:

1.1.1. the trade name or mark;

1.1.2. the shape and dimensions.

Ordinary laminated-glass windscreens are deemed to belong to one group for the purposes of tests of mechanical properties and of resistance to the environment;

1.1.3. the number of layers of glass;

1.1.4. the nominal thickness 'e' of the windscreen, a manufacturing tolerance of 0,2 *n* mm (*n* being the number of layers of glass in the windscreen) above or below the nominal value being allowed;

1.1.5. the nominal thickness of the interlayer or interlayers;

1.1.6. the nature and type of the interlayer or interlayers (e.g. PVB or other plastic-material interlayer or interlayers).

1.2 The secondary characteristics are as follows:

1.2.1. the nature of the material (polished (plate) glass, float glass, sheet glass),

1.2.2. the colouring (total or partial) of the interlayer or interlayers (colourless or tinted),

1.2.3. the colouring of the glass (colourless or tinted),

1.2.4. the incorporation or absence of conductors,

1.2.5. the incorporation or absence of obscuration bands.

2. GENERAL

2.1. In the case of ordinary laminated-glass windscreens, tests other than headform tests (point 3.2) and tests of optical qualities are conducted on flat test pieces which are either cut from actual windscreens or are specially made for the purpose. In either case the test pieces must in all respects be rigorously representative of the production windscreens for which component type-approval is sought.

2.2. Before each test, the test pieces must be stored for not less than four hours at a temperature of 23 ± 2 °C. The tests must take place as soon as possible after the test pieces have been taken out of the receptacle in which they were stored.

3. HEADFORM TEST

3.1. Indices of difficulty of the secondary characteristics

No secondary characteristic is involved.

3.2.* Headform test on a complete windscreen

3.2.1. *Number of samples*

Four samples from the smallest-developed-area series and four samples from the largest-developed-area series, selected in accordance with the provisions of Part 3-M are tested.

3.2.2. *Test method*

3.2.2.1 The method used is that described in point 3.3.2 of Part 3-C.

3.2.2.2. The drop height is 1,5 m + 0/ − 5 mm.

89/173/EEC

3.2.3. *Interpretation of results*

3.2.3.1. This test is deemed to have given a satisfactory result if the following conditions are fulfilled:

3.2.3.1.1. the sample breaks displaying numerous circular cracks centred approximately on the point of impact, the cracks nearest to the point of impact being not more than 80 mm from it;

3.2.3.1.2. the layers of glass must remain adhering to the plastic-material interlayer. One or more partial separations from the interlayer with a distance of less than 4 mm in breadth, on either side of the crack, are permitted outside a circle of 60 mm in diameter centred on the point of impact.

3.2.3.1.3. On the impact side:

3.2.3.1.3.1. the interlayer must not be laid bare over an area of more than 20 cm²,

3.2.3.1.3.2. a tear in the interlayer up to a length of 35 mm is allowed.

3.2.3.2. A set of samples submitted for approval are considered satisfactory from the point of view of the headform test if one of the following two conditions is met:

3.2.3.2.1. all the tests give satisfactory results, or

3.2.3.2.2. one test having given an unsatisfactory result, a further series of tests carried out on a new set of samples give satisfactory results.

3.3. Head form test on flat test pieces

3.3.1. *Number of test pieces*

Six flat test pieces measuring (1 100 mm × 500 mm) + 5/ − 2 mm are subjected to testing.

3.3.2. *Test method*

3.3.2.1. The method used is that described in point 3.3.1 of Part 3-C.

3.3.2.2. The height of drop is 4 m + 25/ − 0 mm.

3.3.3. *Interpretation of results*

3.3.3.1. This test is deemed to have given a satisfactory result if the following conditions are fulfilled.

3.3.3.1.1. the test piece yields and breaks, displaying numerous circular cracks centred approximately on the point of impact;

3.3.3.1.2. tears in the interlayer are allowed provided that the manikin's head does not pass through the test piece;

3.3.3.1.3. no large fragments of glass become detached from the interlayer.

3.3.3.2. a set of test-pieces submitted for approval are considered satisfactory from the point of view of the headform test if one of the following two conditions is met:

3.3.3.2.1. all the tests give satisfactory results, or

3.3.3.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

4. MECHANICAL STRENGTH TEST

4.1. Indices of difficulty of the secondary characteristics

No secondary characteristic is involved.

4.2 2 260-g-ball test

4.2.1. *Number of test pieces*

Six square test pieces of [illegible] mm + 10/ − [illegible] mm side are subjected to testing.

4.2.2 *Test method*

4.2.2.1. The method used is that described in section 2.2 of Part 3-C.

4.2.2.2. The height of drop (from the underface of the ball to the upper face of the test piece) is 4 m + 25/ − 0 mm.

4.2.3. *Interpretation of results*

4.2.3.1. The test is deemed to have given a satisfactory result if the ball does not pass through the glazing within five seconds from the moment of impact.

4.2.3.2. A set of test pieces submitted for component type-approval is considered satisfactory from the point of view of the 2 260-g-ball test if one of the following two conditions is met:

4.2.3.2.1. all the tests give satisfactory results, or 89/173/EEC

4.2.3.2.2. one test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

4.3. 227-g-ball test

4.3.1. *Indices of difficulty of the secondary characteristics*

No secondary characteristic is involved.

4.3.2. *Number of test pieces*

20 square test pieces of 300 mm + 10/ − 0 mm side are subjected to testing.

4.3.3. *Test method*

4.3.3.1. The method used is that described in section 2.1 of Part 3-C. 10 specimens are tested at a temperature of + 40 ± 2 °C and 10 at a temperature of − 20 ± 2 °C.

4.3.3.2. The height of drop for the various thickness categories and the mass of the detached fragments are given in the table below:

Thickness of test piece	+ 40 °C		− 20 °C	
	Height of fall	Maximum permitted mass of the fragments	Height of fall	Maximum permitted mass of the fragments
mm	m (*)	g	m (*)	g
e ⩽ 4,5	9	12	8,5	12
4,5 < e ⩽ 5,5	10	15	9	15
5,5 < e ⩽ 6,5	11	20	9,5	20
e > 6,5	12	25	10	25

(*) A tolerance of + 25/ − 0 mm is allowed in height of fall.

4.3.4. *Interpretation of results*

4.3.4.1. the test is considered to have given a satisfactory result if the following conditions are met:

- the ball does not pass through the test piece,
- the test piece does not break into several pieces,
- if the interlayer ist not torn, the weight of fragments detached from the side of the glass opposite to the point of impact must not exceed the appropriate values specified in point 4.3.3.2.

4.3.4.2. A set of test pieces submitted for component type-approval are considered satisfactory from the point of view of the 227-g-ball test if one of the following conditions is met:

4.3.4.2.1. not less than eight tests at each test temperature give a satisfactory result, or

4.3.4.2.2. more than two tests at each test temperature having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

5 TEST OF RESISTANCE TO THE ENVIRONMENT

5.1. Test of resistance to abrasion

5.1.1. *Indices of difficulty and test method*

The requirements of section 4 of Part 3-C apply, the test being continued for 1 000 cycles.

5.1.2. *Interpretation of results*

The safety-glass pane is considered satisfactory with respect to abrasion resistance if the light scatter as a result of abrasion of the test piece does not exceed 2 %.

5.2. Test of resistance to high temperature

The requirements of section 5 pf Part 3-C apply. 89/173/EEC

5.3. Resistance-to-radiation test

5.3.1. *General requirement*

This test is performed only if the laboratory deems it useful in the light of the information in its possession concerning the interlayer.

5.3.2. The requirement of section 6 of part 3-C apply.

5.4. Resistance-to-humidity test

The requirement of section 7 of Part 3-C apply.

6. OPTICAL QUALITIES

The requirement concerning optical qualities set out in section 9 of Part 3-C apply to every type of windscreen.

PART 3-G

LAMINATED-GLASS PANES OTHER THAN WINDSCREENS (1)

89/173/EEC

1. DEFINITION OF TYPE

Laminated-glass panes other than windscreens are deemed to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. The principal characteristics are as follows:

1.1.1. the trade name or mark;

1.1.2. the thickness category of the pane in which the nominal thickness 'e' lies, a manufacturing tolerance of $\pm$ 0,2 *n* mm, (*n* being the number of layers of glass in the pane) being allowed:

— category I: $e \leq 5{,}5$ mm,

— category II: $5{,}5 \text{ mm} < e \leq 6{,}5$ mm,

— category III: $6{,}5 \text{ mm} < e$

1.1.3. the nominal thickness of the interlayer or interlayers;

1.1.4. the nature and type of the interlayer or interlayers, e.g. PVB or other plastic-material interlayer or interlayers;

1.1.5. any special treatment which one of the layers of glass may have undergone.

1.2. The secondary characteristics are as follows:

1.2.1. the nature of the material (polished (plate) glass, float glass, sheet glass),

1.2.2. the colouring (total or partial) of the interlayer or interlayers (colourless or tinted),

1.2.3. the colouring of the glass (colourless or tinted).

2. GENERAL

2.1. In the case of laminated-glass panes other than windscreens, the tests are conducted on flat test pieces which are either cut from actual glass panes or are specially made. In either case the test pieces must in all respects be rigorously representative of the glass panes for the production of which component type-approval is sought.

2.2. Before each test, the test pieces of laminated glass must be stored for not less than 4 hours at a temperature of 23 $\pm$ 2 °C. The tests are performed on the test pieces as soon as the pieces have been taken out of the receptacle in which they were stored.

2.3. The provisions of this Annex are considered to be met if the glazing submitted for component type-approval is of the same composition as a windscreen already approved under the provisions of Part 3-F, 3-H or 3-I.

3. HEADFORM TEST

3.1. Indices of difficulty of the secondary characteristics

No secondary characteristic is involved.

3.2. Number of test pieces

Six flat test pieces measuring 1 100 × 500 mm (+ 25/ − 0 mm) are subjected to testing.

3.3. Test method

3.3.1. The method used is that described in section 3 of Part 3-C.

3.3.2. The height of drop is 1,50 m + 0/ − 5 mm. This is increased to 4 m + 25/ − 0 mm for glass panes used as tractor windscreens.

3.4. Interpretation of results

3.4.1. This test is deemed to have given a satisfactory result if the following conditions are met:

3.4.1.1. the test piece yields and breaks, displaying numerous circular cracks centred approximately on the point of impact;

(1) This type of laminated-glass pane can also be used for windscreens for tractors.

3.4.1.2. tears in the interlayer are allowed, but the manikin's head must not pass through;

3.4.1.3. no large fragments of glass become detached from the interlayer.

3.4.2. A set of test pieces subjected to component type-approval testing are considered satisfactory from the point of view of the headform test if one of the following two conditions is met:

3.4.2.1. all the tests give satisfactory results, or

3.4.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

4. MECHANICAL STRENGTH TEST — 227-g-BALL TEST

4.1. **Indices of difficulty of the secondary characteristics**

No secondary characteristic is involved.

4.2. **Number of test pieces**

Four flat square test pieces of side 300 mm (+ 10/ − 0 mm) must be subjected to tests.

4.3. **Test method**

4.3.1. The method used is that described in section 2.1 of Part 3-C.

4.3.2. The height of drop (from the underface of the ball to the upper face of the test piece) is as indicated in the following table as a function of nominal thickness:

Nominal thickness	Height of drop	
$e \leq 5{,}5$ mm	5 m	+ 25 mm / − 0 mm
5,5 mm $\leq e \leq$ 6,5 mm	6 m	+ 25 mm / − 0 mm
6,5 mm $\leq e$	7 m	+ 25 mm / − 0 mm

4.4. **Interpretation of results**

4.4.1. The test is considered to have given a satisfactory result if the following conditions are met:

— the ball does not pass through the test piece,

— the test piece does not break into several fragments,

— the total weight of the few fragments which may be produced on the side opposite to the point of impact does not exceed 15 g.

4.4.2. A set of test pieces subjected to component type-approval testing are considered satisfactory from the point of view of mechanical strength if one of the following conditions is met.

4.4.2.1. all the tests have given a satisfactory result, or

4.4.2.2. not more than two tests having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results

5. TEST OF RESISTANCE TO THE ENVIRONMENT

5.1. Test of resistance to abrasion

5.1.1. *Indices of difficulty and test method*

The requirements of section 4 of Part 3-C apply, the test being continued for 1 000 cycles.

5.1.2. *Interpretation of results*

The safety-glass pane is considered satisfactory from the point of view of abrasion resistance if the light scatter as a result of abrasion of the test piece does not exceed 2 %.

5.2. Test of resistance to high temperature

The requirements of section 5 of Part 3-C apply.

5.3. **Resistance-to-radiation test**

5.3.1. *General requirement*

This test is performed only if the laboratory deems it useful in the light of the information in its possession concerning the interlayer. 89/173/EEC

5.3.2. The requirements of section 6 of Part 3-C apply.

5.4. **Resistance-to-humidity test**

5.4.1. The requirements of section 7 of Part 3-C apply.

6. OPTICAL QUALITIES

6.1. **Light transmittance**

The provisions concerning the regular light transmittance set out in section 9.1 of Part 3-C apply to glass panes other than windscreens, or parts of glass panes located at places which are essential to the driver's vision.

PART 3-H

TREATED LAMINATED-GLASS WINDSCREENS

89/173/EEC

1. DEFINITION OF TYPE

Treated laminated-glass windscreens are deemed to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. The principal characteristics are as follows:

1.1.1. the trade name or mark;

1.1.2. the shape and dimensions.

Treated laminated-glass windscreens are deemed to belong to one group for the purposes of the fragmentation, mechanical properties and resistance to the environment tests;

1.1.3. the number of layers of glass;

1.1.4. the nominal thickness 'e' of the windscreen, a manufacturing tolerance of 0,2 *n* mm, (*n* being the number of layers of glass in the windscrean) above and below the nominal value being allowed;

1.1.5. any special treatment which one or more layers of glass may have undergone;

1.1.6. the nominal thickness of the interlayer or interlayers;

1.1.7. the nature and type of the interlayer or interlayers (e.g. PVB or other plastic-material interlayer or interlayers).

1.2. The secondary characteristics are as follows:

1.2.1. the nature of the material (polished (plate) glass, float glass, sheet glass),

1.2.2. the colouring (total or partial) of the interlayer or interlayers (colourless or tinted),

1.2.3. the colouring of the glass (colourless or tinted),

1.2.4. the incorporation or absence of conductors,

1.2.5. the incorporation or absence of obscuration bands.

2. GENERAL

2.1. In the case of treated laminated-glass windscreens, tests other than the headform test on a complete windscreen and tests of optical qualities are conducted on samples and/or flat test pieces which are specially made for the purpose. However, the test pieces must in all respects be rigorously representative of the production windscreens for which component type-approval is sought.

2.2. Before each test, the test pieces or samples must be stored for not less than 4 hours at a temperature of 23 ± 2 °C. The tests must take place as soon as possible after the test pieces or samples have been taken out of the receptacle in which they were stored.

3. TESTS PRESCRIBED

Treated laminated-glass windscreans are to be subjected to:

3.1. the tests prescribed in Part 3-F for ordinary laminated-glass windscreens,

3.2. the fragmentation test described in section 4 below.

4. FRAGMENTATION TEST

4.1. Indices of difficulty of the secondary characteristics

Material	Index of difficulty
Plate glass	2
Float glass	1
Sheet glass	1

4.2. Number of test pieces or samples

One test piece measuring 1 100 × 500 mm (+ 5/ – 2 mm) or one sample for each point of impact is subjected to testing.

4.3. Test method

The method used is that described in section 1 of Part 3-C.

4.4. Impact point or points

The glass pane is struck on each of the outer treated sheets in the centre of the test piece or sample.

4.5. Interpretation of results

4.5.1. For each point of impact the fragmentation test is considered to have given a satisfactory result if the total surface of fragments having a surface area of more than 2 cm² comprised in a rectangle as defined in point 2.3.2 of Part 3-D represents not less than 15 % of the surface of that rectangle.

4.5.1.1. *In the case of a sample:*

4.5.1.1.1. the centre of the rectangle is situated within a circle having a radius of 10 cm centred on the projection of the reference point as defined in point 1.2 'field of vision' of Annex V.

4.5.1.1.2. In the case of tractors for which it is not possible to determine the reference point, the position of the visibility zone must be indicated in the test report.

4.5.1.1.3. The height of the rectangle may be reduced to 15 cm for windscreens which are less than 44 cm high or whose angle of installation is less than 15° from the vertical; the percentage of visibility must be equal to 10 % at least of the area of the corresponding rectangle.

4.5.1.2. In the case of a test piece, the centre of the rectangle must be situated on the greater axis of the test piece at 450 mm from one of its edges.

4.5.2. The test piece(s) or sample(s) submitted for component type-approval are considered satisfactory from the point of view of fragmentation if either of the following conditions is met:

4.5.2.1. the test gives a satisfactory result for each point of impact, or

4.5.2.2. the test having been repeated on a new set of four test pieces for each point of impact for which it had originally given an unsatisfactory result, the four new tests performed at the same impact points must all give a satisfactory result.

PART 3-I

SAFETY-GLASS PANES FACED WITH PLASTIC MATERIAL ON THE INSIDE

1. DEFINITION OF TYPE

Safety glazing materials, as defined in Part 3-D to 3-H, if coated on the inner face with a layer of plastic material, must conform not only to the requirements of the appropriate Parts but also to the following requirements.

2. TEST OF RESISTANCE TO ABRASION

2.1. **Indices of difficulty and test method**

The plastic coating is to be subjected to a test for 100 cycles in accordance with the requirements specified in section 4 of Part 3-C.

2.2. **Interpretation of results**

The plastic coating is considered satisfactory with respect to abrasion resistance if the light scatter as a result of abrasion of the test piece does not exceed 4 %.

3. RESISTANCE-TO-HUMIDITY TEST

3.1. In the case of plastic-coated toughened safety glazing material a restistance-to-humidity test is to be performed.

3.2. The requirements of section 7 of Part 3-C apply.

4. TEST OF RESISTANCE TO TEMPERATURE CHANGES

The requirements of section 8 of Part 3-C apply.

5. FIRE-RESISTANCE TEST

The requirements of section 10 of Part 3-C apply.

6. TEST OF RESISTANCE TO CHEMICALS

The requirements of section 11 of Part 3-C apply.

PART 3-J

GLASS – PLASTIC WINDSCREENS

1. DEFINITION OF TYPE

Glass-plastic windscreens are considered to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. **The principal characteristics are as follows:**

1.1.1. the trade name or mark;

1.1.2. the shape and dimensions.

Glass-plastic windscreens are deemed to belong to a group for the purposes of tests of mechanical strength, resistance to the environment, resistance to temperature changes and resistance to chemical agents;

1.1.3. the number of plastic layers;

1.1.4. the nominal thickness 'e' of the windscreen, a manufacturing tolerance of ± 0,2 mm being allowed;

1.1.5. the nominal thickness of the layer of glass;

1.1.6. the nominal thickness of the layer(s) of plastic acting as interlayer(s);

1.1.7. the nature and type of the layer(s) of plastic acting as interlayer(s) (e. g. PVB or other material) and of the plastic layer situated on the inner face;

1.1.8. any special treatment the glass pane may have undergone.

1.2. **The secondary characteristics are as follows:**

1.2.1. the nature of the material (plate glass, float glass, sheet glass),

1.2.2. the colouring (total or partial) of any layer(s) of plastic (colourless or tinted),

1.2.3. the colouring of the glass (colourless or tinted),

1.2.4. the incorporation or absence of conductors,

1.2.5. the incorporation or absence of obscuration bands.

2. GENERAL

2.1. In the case of glass-plastic windscreens, tests other than headform tests (point 3.2) and tests of optical qualities are conducted on flat test pieces which are either cut from actual windscreens or are specially made for the purpose. In either case the test pieces must in all respects be rigorously representative of the production windscreens for which component type-approval is sought.

2.2. Before each test, the test pieces must be stored for not less than 4 hours at a temperature of 23 ± 2 °C. The tests must take place as soon as possible after the test pieces have been taken out of the receptacle in which they were stored.

3. HEADFORM TEST

3.1. **Indices of difficulty of the secondary characteristics**

No secondary characteristic is involved.

3.2. **Headform test on a complete windscreen**

3.2.1 *Number of samples*

Four samples from the series having the smallest developed area and four samples from the series having the largest developed area, selected in accordance with the provisions of Part 3-M, are tested.

3.2.2. *Test method*

3.2.2.1. The method used is that described in point 3.3.2 of Part 3-C.

3.2.2.2. The height of drop is 1,50 m $^{+0}_{-5}$ mm.

3.2.3. *Interpretation of results*

3.2.3.1. This test is considered to have given a satisfactory result if the following conditions are met:

3.2.3.1.1. the layer of glass breaks, displaying numerous circular cracks centred approximately on the point of impact, the cracks nearest to the point of impact being not more than 80 mm from it;

3.2.3.1.2. the layer of glass remains adhering to the plastic material interlayer. One or more partial separations from the interlayer not more than 4 mm in breadth may be allowed on either side of the crack outside a circle 60 mm in diameter centred on the point of impact;

3.2.3.1.3. a tear in the interlayer of a length up to 35 mm is allowed on the impact side.

3.2.3.2. A set of test pieces submitted for component type-approval are considered satisfactory with respect to the headform test if one of the following two conditions is met:

3.2.3.2.1. all the tests give satisfactory results, or

3.2.3.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

3.3. Headform test on flat test pieces

3.3.1. *Number of test pieces*

Six flat test pieces measuring 1 100 × 500 mm (+ 5/ − 2 mm) are subjected to testing.

3.3.2. *Test method*

3.3.2.1. The method used is that described in point 3.3.1 of Part 3-C.

3.3.2.2. The height of drop is 4 m + 25/ − 0 mm.

3.3.3. *Interpretation of results*

3.3.3.1. This test is considered to have given a satisfactory result if the following conditions are met:

3.3.3.1.1. the layer of glass yields and breaks, displaying numerous circular cracks centred approximately on the point of impact;

3.3.3.1.2. tears in the interlayer are allowed, but the manikin's head must not pass through;

3.3.3.1.3. no large fragment of glass becomes detached from the interlayer.

3.3.3.2. A set of test pieces submitted for component type-approval are considered satisfactory with respect to the headform test if one of the following conditions is met:

3.3.3.2.1. all the tests give satisfactory results, or

3.3.3.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

4. MECHANICAL STRENGTH TEST

4.1. Indices of difficulty, test method and interpretation of results

The requirements of section 4 of Part 3-F apply.

4.2. However the third requirement set out in point 4.3.4.1 of Part 3-F is not relevant.

5. TEST OF RESISTANCE TO THE ENVIRONMENT

5.1. Test of resistance to abrasion

5.1.1. *Test of resistance to abrasion on the outer face*

5.1.1.1. The requirements of section 5.1 of Part 3-F apply.

5.1.2. *Test of resistance to abrasion on the inner face*

5.1.2.1. The requirements of section 2 of Part 3-I apply.

5.2. Test of resistance to high temperature

The requirements of section 5 of Part 3-C apply.

5.3. Resistance-to-radiation test

The requirements of section 6 of Part 3-C apply.

5.4. **Resistance-to-humidity test**

The requirements of section 7 of Part 3-C apply.

5.5. **Test of resistance to temperature changes**

The requirements of section 8 of Part 3-C apply.

6. OPTICAL QUALITIES

The requirements concerning optical qualities set out in section 9 of Part 3-C apply to each type of windscreen.

7. FIRE-RESISTANCE TEST

The requirements of section 10 of Part 3-C apply.

8. TEST OF RESISTANCE TO CHEMICALS

The requirements of section 11 of Part 3-C apply.

PART 3-K

GLASS-PLASTIC PANES OTHER THAN WINDSCREENS (1)

1. DEFINITION OF TYPE

Glass-plastic panes other than windscreens are considered to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. **The principal characteristics are as follows:**

1.1.1. the trade name or mark;

1.1.2. the thickness category applicable to the nominal thickness 'e', a manufacturing tolerance of ± 0,2 mm being allowed:

- category I: $e \leq 3,5$ mm
- category II: $3,5 \text{ mm} < e \leq 4,5$ mm
- category III: $4,5 \text{ mm} < e$

1.1.3. the nominal thickness of the layer(s) of plastic material acting as interlayer(s);

1.1.4. the nominal thickness of the glass pane;

1.1.5. the type of the layer(s) of plastic material acting as interlayer(s) (e.g. PVB or other material) and of the plastic layer on the inner face;

1.1.6. any special treatment which the layer of glass may have undergone.

1.2. The secondary characteristics are as follows:

1.2.1. the nature of the material (plate glass, float glass, sheet glass),

1.2.2. the colouring (total or partial) of any layer(s) of plastic (colourless or tinted),

1.2.3. the colouring of the glass (colourless or tinted).

2. GENERAL

2.1. In the case of glass-plastic panes other than windscreens the tests are conducted on flat test pieces which are either cut from normal glass panes or are specially made. In either case the test pieces must in all respects be rigorously representative of the production glass panes for which component type-approval is sought.

2.2. Before each test, the test pieces of glass-plastic panes must be stored for not less than 4 hours at a temperature of 23 ± 2 °C. The tests must take place as soon as possible after the test pieces have been taken out of the receptacle in which they were stored.

2.3. The provisions of this Annex are considered to be met if the glass pane submitted for component type-approval has the same composition as that of a windscreen already approved under the provisions of Part 3-J.

3. HEADFORM TEST

3.1 Indices of difficulty of the secondary characteristics

No secondary characteristic is involved.

3.2. Number of test pieces

Six flat test pieces measuring 1 100 × 500 mm (+ 5/ − 2 mm) are subjected to testing.

3.3 Test method

3.3.1. The method used is that described in section 3 of Part 3-C.

3.3.2. The height of drop is 1,5 m + 0 − 5 mm. This [illegible] 4 m + 25 − [illegible] panes used as tractor windscreens.

3.4 Interpretation of results

3.4.1. This test is considered to have given a satisfactory result if the following conditions are met.

(1) This type of glass-plastic pane can also be used for windscreens for tractors.

3.4.1.1. the layer of glass breaks, displaying numerous cracks;

3.4.1.2. tears in the interlayer are allowed, provided that the manikin's head does not pass through the test piece;

3.4.1.3. no large fragment of glass becomes detached from the interlayer.

3.4.2. A set of test pieces submitted for component type-approval are considered satisfactory with respect to the headform test if one of the following conditions is met:

3.4.2.1. all the tests give satisfactory results, or

3.4.2.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

4. MECHANICAL STRENGTH TEST — 227-g-BALL TEST

4.1. The provisions of section 4 of Part 3-G apply, with the exception of the table in point 4.3.2, which is replaced by:

Nominal thickness	Height of drop	
$e \leq 3{,}5$ mm	5 m	+ 25/ − 0 mm
3,5 mm $< e \leq 4{,}5$ mm	6 m	+ 25/ − 0 mm
$e > 4{,}5$ mm	7 m	+ 25/ − 0 mm

4.2. However the requirement in the third indent of point 4.4.1 of Part 3- G is not relevant.

5. TEST OF RESISTANCE TO THE ENVIRONMENT

5.1. **Test of resistance to abrasion**

5.1.1. *Test of resistance to abrasion on the outer face*

The requirements of section 5.1 of Part 3-G apply.

5.1.2. *Test of resistance to abrasion on the inner face*

The requirements of section 2.1 of Part 3-I apply.

5.2. **Test of resistance to high temperature**

The requirements of section 5 of Part 3-C apply.

5.3. **Resistance-to-radiation test**

The requirements of section 6 of Part 3-C apply.

5.4. **Resistance-to-humidity test**

The requirements of section 7 of Part 3-C apply.

5.5. **Test of resistance to temperature changes**

The requirements of section 8 of Part 3-C apply.

6. OPTICAL QUALITIES

The requirements concerning the regular light transmittance set out in section 9.1 of Part 3-C apply to glass panes or parts of glass panes located at places which are essential to the driver's vision.

7. FIRE-RESISTANCE TEST

The requirements of section 10 of Part 3-C apply.

8. TEST RESISTANCE TO CHEMICALS

The requirements of section 11 of Part 3-C apply.

PART 3 - L

DOUBLE-GLAZED UNITS

1. DEFINITION OF TYPE

Double-glazed units are considered to belong to different types if they differ in at least one of the following principal or secondary characteristics.

1.1. **The principal characteristics are as follows:**

1.1.1. the trade name or mark;

1.1.2. the composition of the double-glazed unit (symmetrical, asymmetrical);

1.1.3. the type of each component glass pane as defined in section 1 of Part 3-E, 3-G or 3-K;

1.1.4. the nominal width of the gap between the two glass panes;

1.1.5. the type of sealing (organic, or glass to glass/glass to metal).

1.2. **The secondary characteristics are:**

1.2.1. The secondary characteristics of each component glass pane, as defined in section 1.2 of Part 3-E, 3-G or 3-K.

2. GENERAL

2.1. Each component glass pane forming the double-glazed unit must either be type-approved or subjected to the requirements set out in the relevant Part 3-E, 3G or 3-K.

2.2. Tests carried out on double-glazed units having a nominal width of gap 'e' are considered to be applicable to all double-glazed units having the same characteristics and a nominal width of gap 'e' ± 3 mm. However, the applicant for component type-approval may submit for the tests the sample having the smallest gap and the sample having the largest gap.

2.3. In the case of double-glazed units having at least one laminated-glass pane or one glass-plastic pane, the test pieces are stored for at least 4 hours prior to the test at a temperature of 23 ± 2 °C. The tests must take place immediately after the test pieces are taken out of the receptacle in which they were stored.

3. HEADFORM TEST

3.1. Index of difficulty of the secondary characteristics

No secondary characteristic is involved.

3.2. Number of test pieces

Six test pieces measuring 1 100 mm × 500 mm (+ 5 / − 22 mm) subjected to testing for each thickness category of the component panes and each gap thickness as defined in point 1.1.4.

3.3. Test method

3.3.1. The method used is that described in section 3 of Part 3-C.

3.3.2. The height of drop is 1,5 m (+ 0 / − 5 mm).

3.3.3. In the case of asymmetrical double-glazing three tests on each side shall be carried out.

3.4. Interpretation of results

3.4.1. Double glazing comprising two panes of uniformly toughened glass.

The test is considered to have given a satisfactory result if both components break

3.4.2. Double glazing comprising two panes of laminated glass other than windscreens.

The test is considered to have given a satisfactory result if the following conditions are fulfilled

3.4.2.1. both components of the test piece yield and break, displaying numerous circular cracks centred approximately on the point of impact;

3.4.2.2. tears in the interlayers are allowed but the manikin's head must not pass through;

3.4.2.3. no large fragments of glass become detached from the interlayer.

3.4.3. Double glazing consisting of a uniformly toughened glass pane and of a laminated-glass pane or glass-plastic pane other than windscreens.

This test is considered to have given a satisfactory result if the following conditions are met:

3.4.3.1. the toughened-glass pane breaks;

3.4.3.2. the laminated-glass pane or glass-plastic pane yields and breaks, displaying numerous circular cracks centred approximately on the point of impact;

3.4.3.3. tears in the interlayer(s) are allowed provided that the manikin's head does not pass through the test piece;

3.4.3.4. no large fragment of glass becomes detached from the interlayer.

3.4.4. A set of test pieces submitted for component type-approval are considered satisfactory with respect to behaviour under head impact if one of the following two conditions is met:

3.4.4.1. all the tests give satisfactory results.

3.4.4.2. a test having given an unsatisfactory result, a further series of tests must be carried out on a new set of test pieces and give satisfactory results.

4. OPTICAL QUALITIES

The requirement concerning the regular light transmittance set out in section 9.1 of Part 3-C apply to double-glazed units or parts of double-glazed units located at places which are essential to the driver's vision.

PART 3-M

GROUPING OF WINDSCREENS FOR COMPONENT TYPE-APPROVAL TESTING

1. The features taken into account are:

1.1. the developed area of the windscreen;

1.2. the height of segment;

1.3. the curvature.

2. A group is made up of a thickness class.

3. Classification is performed in ascending order of developed area. The five largest and the five smallest developed areas are selected, and numbered as follows:

1 for the largest	1 for the smallest
2 for the next smallest after 1	2 for the next largest after 1
3 for the next smallest after 2	3 for the next largest after 2
4 for the next smallest after 3	4 for the next largest after 3
5 for the next smallest after 4	5 for the next largest after 4

4. Within each of the two series defined in point 3 above, the heights of segment are indicated as follows:

1 for the greatest height of segment,

2 for the next smallest,

3 for the next smallest, etc.

5. Within each of the two series defined in point 3 above, the radii of curvature are indicated as follows:

1 for the smallest radius of curvature,

2 for the next greatest,

3 for the next greatest, etc.

6. The numbers awarded to each windscreen in the two series defined in point 3 above are added together.

6.1. That windscreen among the five largest which has the smallest total and that windscreen among the five smallest which has the smallest total are selected for the full tests defined in Part 3D, 3F, 3M 3-I or 3J.

6.2 The other windscreens in the same series are tested to verify the optical qualities defined in section 9 Part 3-C.

7. A few windscreens having significantly different parameters of shape and/or radius of curvature from the extremes of the selected group may also be tested if the technical service conducting the tests considers that the parameters in question are likely to have appreciable adverse effects.

8. The limits of the group are determined by developed area of windscreen. Where a windscreen submitted for component type-approval has a developed area outside the approved limits and/or has a significantly greater height of segment or a significantly smaller radius of curvature, it is considered to be of a new type and subjected to additional tests if the technical service deems such tests technically necessary, having regard to the information already in its possession concerning the product and the material used.

9. Should any other windscreen model subsequently be manufactured by the holder of component type-approval in a thickness class already approved:

9.1. it must be ascertained whether that model can be included among the five largest or the five smallest selected for component type-approval of the group in question;

9.2. numbering by the procedures defined in points 3, 4 and 5 above is performed again.

9.3. if the sum of the numbers awarded to the windscreen newly incorporated among the five largest or the five smallest windscreens:

9.3.1. is found to be the smallest, the following tests are performed:

9.3.1.1. toughened-glass windscreen:

9.3.1.1.1. fragmentation,

9.3.1.1.2. headform impact,

9.3.1.1.3. optical distortion,

9.3.1.1.4. secondary-image separation,

9.3.1.1.5. light transmission;

9.3.1.2. Laminated-glass or glass-plastic windscreen:

9.3.1.2.1. headform impact,

9.3.1.2.2. optical distortion,

9.3.1.2.3. secondary-image separation,

9.3.1.2.4. light transmission;

9.3.1.3. Treated laminated-glass windscreen: the tests specified in points 9.3.1.1.1, 9.3.1.1.2 and 9.3.1.2;

9.3.1.4. Plastic-faced windscreen: the tests specified in point 9.3.1.1 or 9.3.1.2 as appropriate;

9.3.2. is found not to be the smallest, only the tests prescribed for verifying the optical qualities defined in section 9 of Part 3-C.

PART 3-N

MEASUREMENT OF THE HEIGHTS OF SEGMENT AND POSITION OF THE POINTS OF IMPACT

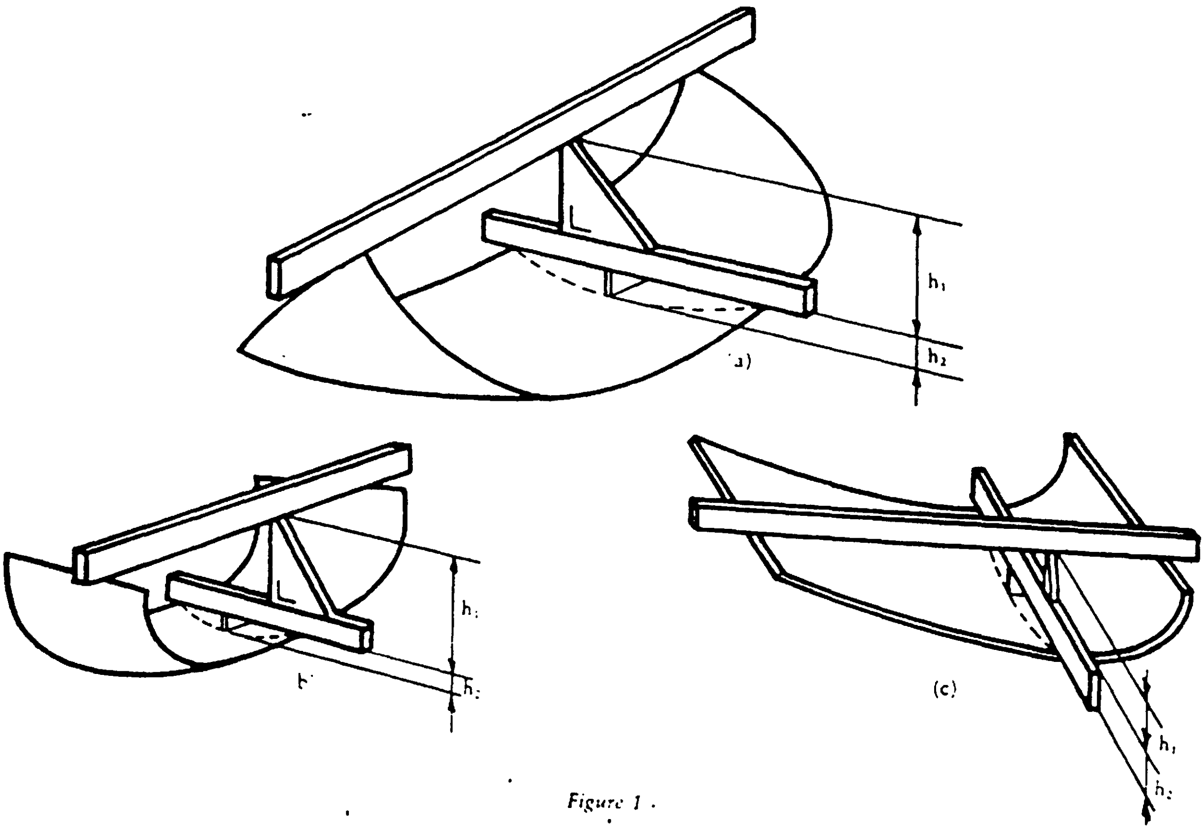


Figure 1

Determination of height of segment, h

For a glass pane with a single curve, the height of segment will be h_1 maximum

For a glass pane with a double curve, the height of segment will be $h_1 + h_2$ maximum.

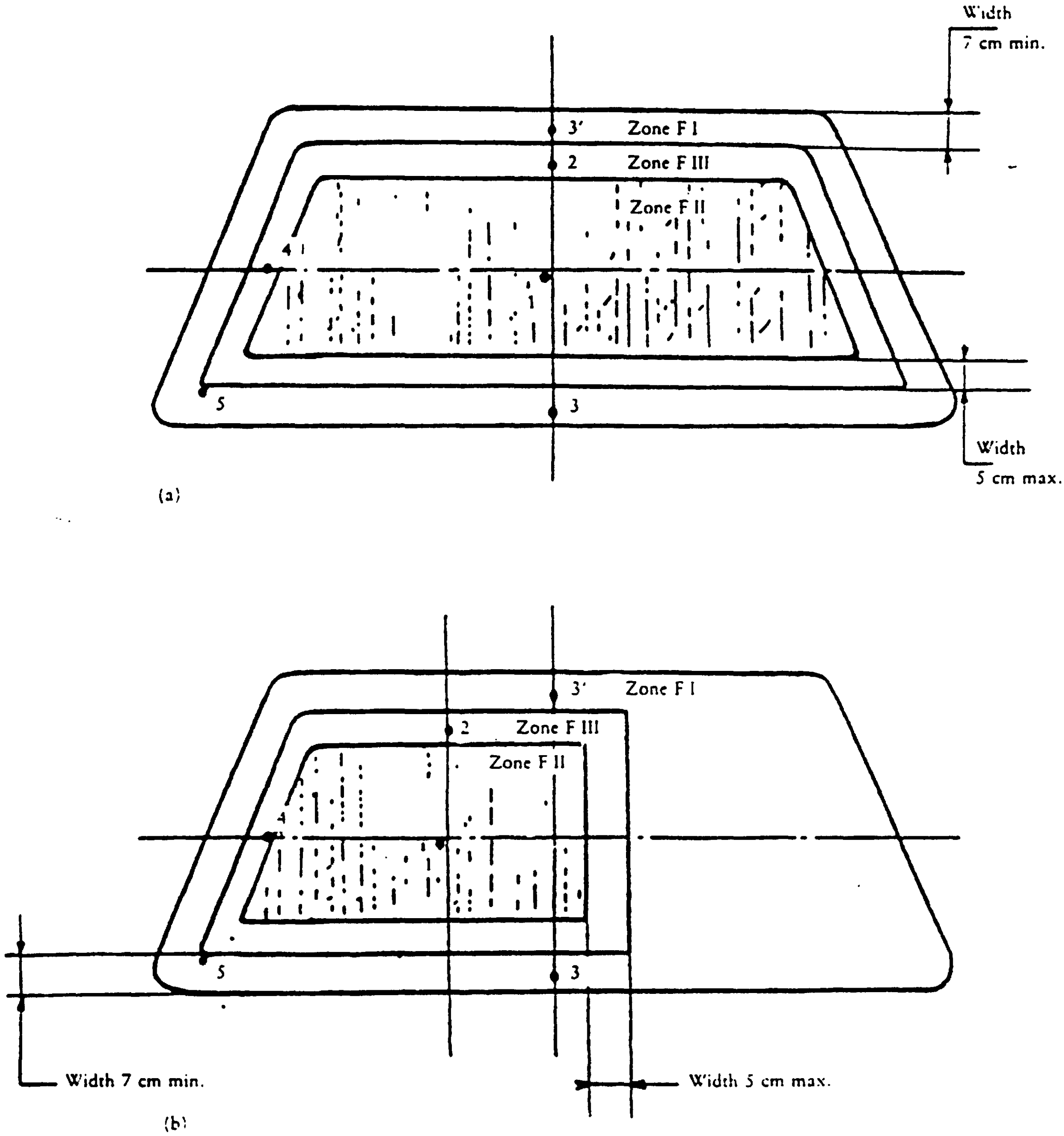
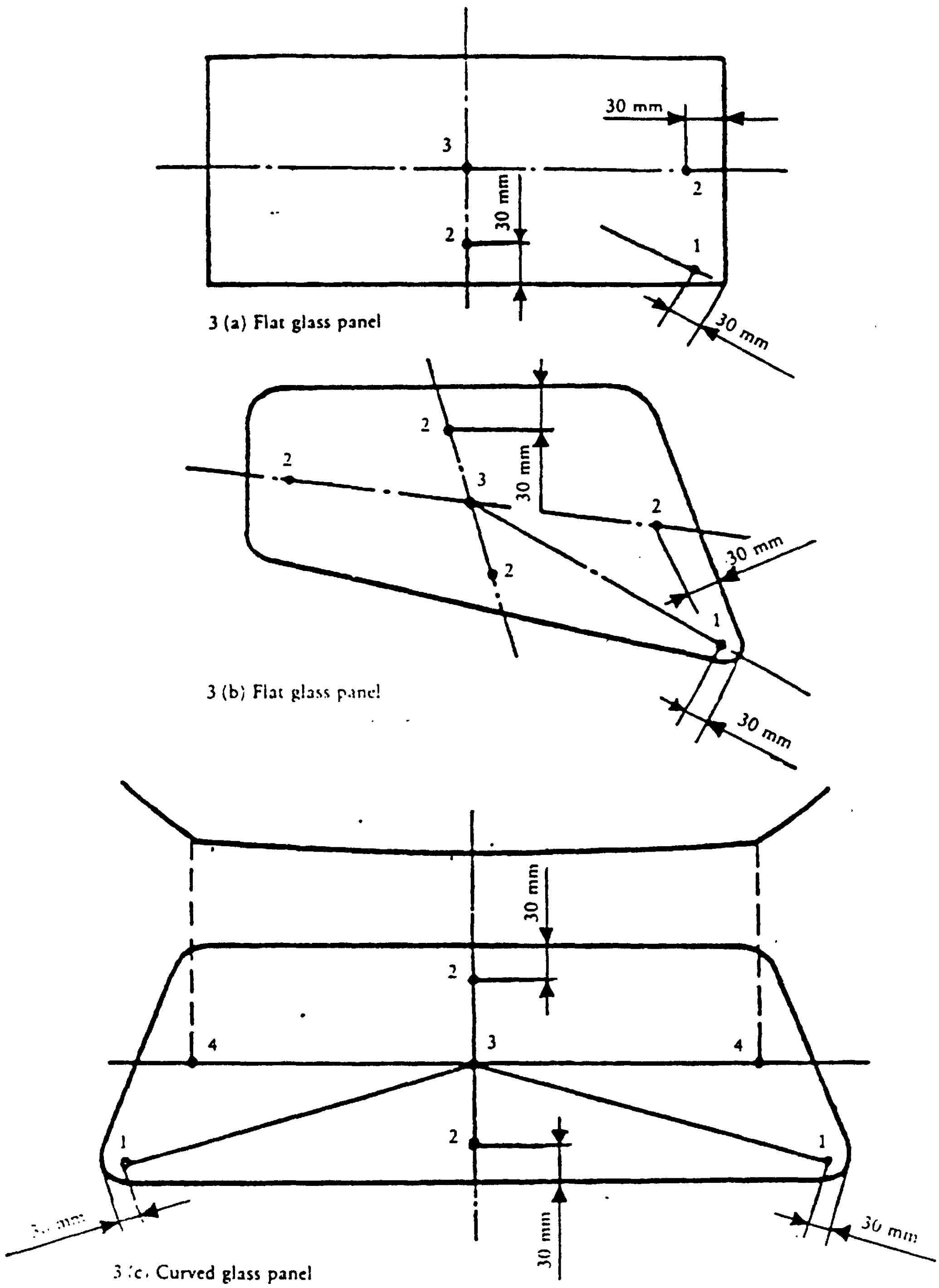


Figure 2

Prescribed points of impact for windscreens



Figures 3 (a), 3 (b) and 3 (c)

Prescribed points of impact for uniformly toughened glass panes

The points '2' shown in Figures 3 (a), 3 (b) and 3 (c) are examples of the sites for point '2' prescribed in [illegible] Part 3-E.

PART 3-0

CHECKS ON CONFORMITY OF PRODUCTION

1. DEFINITIONS

For the purposes of this Part.:

1.1. 'type of product' means all glass panes having the same principal characteristics;

1.2. 'thickness class' means all glass panes having the thickness of component parts within the permitted tolerances;

1.3. 'production unit' means all production facilities of one or several types of glass panes established in the same place; it may include several production lines;

1.4. 'shift' means a period of production carried out by the same production line during daily working hours;

1.5. 'production run' means a continuous period of production of the same type of product in the same shift;

1.6. 'Ps' means the number of glass panes of the same type of product produced by the same shift;

1.7. 'Pr' means the number of glass panes of the same type of product produced during a production run.

2. TESTS

The glass panes are subjected to the following tests:

2.1. Toughened-glass windscreens

2.1.1. Fragmentation test in accordance with the requirements of section 2 of Part 3-D.

2.1.2. Light transmission measurement in accordance with the requirements of section 9.1 of Part 3-C.

2.1.3. Optical distortion test in accordance with the requirement of section 9.2 of Part 3-C.

2.1.4. Secondary image separation test in accordance with the requirements of section 9.3 of Part 3-C.

2.2. Uniformly toughened glass panes

2.2.1. Fragmentation test in accordance with the requirements of section 2 of Part 3-E.

2.2.2. Light transmission measurement in accordance with the requirements of section 9.1 of Part 3-C.

2.2.3. In the case of glass panes used as windscreens:

2.2.3.1. Optical distortion test in accordance with the requirements of section 9.2 of Part 3-C.

2.2.3.2. Secondary image separation test in accordance with the requirements of section 9.3 of Part 3-C.

2.3. Ordinary laminated-glass windscreens and glass-plastic windscreens

2.3.1. Headform test in accordance with the requirements of section 3 of Part 3-F.

2.3.2. 2 260-g-ball test in accordance with the requirements of section 4.2 of Part 3-F and section 2.2 of Part 3C.

2.3.3. Test of resistance to high temperature in accordance with the requirements of section 5 of Part 3C.

2.3.4. Light transmission measurement in accordance with the requirements of section 9.1 of Part 3-C.

2.3.5 Optical distortion test in accordance with the requirements of section 9.2 of Part 3-C.

2.3.6. Secondary image separation test in accordance with the requirements of section 9.3 of Part 3-C.

2.3.7. In the case of glass-plastic windscreens only:

2.3.7.1 Test of resistance to abrasion in accordance with the requirements of section 2.1 of Part 3-I.

2.3.7.2. Resistance-to-humidity test in accordance with the requirements of section 3 of Part 3-I.

2.3.7.3. Test of resistance to chemicals in accordance with the requirements of section 11 of Part 3-C.

2.4. **Ordinary laminated-glass and glass-plastic panes other than windscreens**

2.4.1. 227-g-ball impact test in accordance with the requirements of section 4 of Part 3-G.

2.4.2. Test of resistance to high temperature in accordance with the requirements of section 5 of Part 3-C.

2.4.3. Light transmission measurement in accordance with the requirements of section 9.1 of Part 3-C.

2.4.4. In the case of glass-plastic panes only:

2.4.4.1. Test of resistance to abrasion in accordance with the requirements of section 2.1 of Part 3-I.

2.4.4.2. Resistance-to-humidity test in accordance with the requirements of section 3 of Part 3-I.

2.4.4.3. Test of resistance to chemicals in accordance with the requirements of section 11 of Part 3-C.

2.4.5. The above provisions are considered to be met if the corresponding tests have been carried out on a windscreen of the same composition.

2.5. **Treated laminated-glass windscreens**

2.5.1. In addition to the tests described in section 2.3, a fragmentation test is to be carried out in accordance with the requirements of section 4 of Part 3-H.

2.6. **Glass panes faced with plastic material**

In addition to the tests prescribed in the various sections of this Part, the following tests are to be carried out:

2.6.1. Tests of resistance to abrasion in accordance with the requirements of section 2.1 of Part 3-I.

2.6.2. Resistance-to-humidity test in accordance with the requirements of section 3 of Part 3-I.

2.6.3. Test of resistance to chemicals in accordance with the requirements of section 11 of Part 3-C.

2.7. **Double-glazed units**

The tests to be performed are those specified in this Part for each glass pane composing the double-glazed unit, with the same frequency and the same requirements.

3. FREQUENCY OF TESTS AND RESULTS

3.1. **Fragmentation**

3.1.1. *Tests*

3.1.1.1. A first series of tests consisting of a break at each impact point specified by this Directive are to be carried out with photographic prints at the beginning of the production of each new type of glass pane to determine the most severe break point.

However, for toughened-glass windscreens, this first series of tests are to be carried out only if the annual production of this type of glass pane exceeds 200 units.

3.1.1.2. During the production run the check test is to be carried out using the break point as determined in point 3.1.1.1.

3.1.1.3. A check is to be carried out at the beginning of each production run or following a change of colour.

3.1.1.4. During the production run the check tests are to be carried out at the following minimum frequency:

Toughened-glass windscreens	Toughened-glass panes other than windscreens	Treated laminated-glass windscreens
$Pr \leq 200$: one break per production run	$Pr \leq 500$: one per shift	0.1% per type
$Pr > 200$: one break [illegible] hours of production	$Pr > 500$: [illegible] per shift	

3.1.1.5. A check test is to be carried out at the end of the production run on one of the last glass panes manufactured.

3.1.1.6. for $Pr < 20$, only one fragmentation test per production run need be carried out.

3.1.2. *Results*

All results must be recorded, including the results without photographic print.

In addition, a photographic contact print must be made once per shift, except for Pr $\leq$ 500. In this last case only one photographic contact print is made per production run.

3.2. **Headform impact test**

3.2.1. *Tests*

The check is to be carried out on samples corresponding to at least 0,5 % of the daily production of laminated-glass windscreens of one production line. A maximum of 15 windscreens per day are tested.

The choice of samples must be representative of the production of the various types of windscreen.

With the agreement of the administrative service, these tests may be replaced by the 2 260-g-ball impact test (see section 3.3). Behaviour under head impact must in any event be checked on at least two samples for each thickness class per year.

3.2.2. *Results*

All results must be recorded.

3.3. **2 260-g-ball impact test**

3.3.1. *Tests*

The minimum frequency for the check is one complete test per month for each thickness class.

3.3.2. *Results*

All results must be recorded.

3.4. **227-g-ball impact test**

3.4.1. *Tests*

The test pieces are to be cut from samples. However, for practical reasons, the tests may be carried out on finished products, or on parts of them.

The check is to be carried out on a sampling corresponding to at least 0,5 % of the production of one shift with a maximum of 10 samples per day.

3.4.2. *Results*

All results must be recorded.

3.5. **High temperature**

3.5.1. *Tests*

The test pieces are to be cut from samples. However, for practical reasons, the tests may be carried out on finished products or on parts of them. These are selected so that all interlayers are tested proportionately to their use.

The check is to be carried out on at least three samples per colour of interlayer taken from the daily production.

3.5.2. *Results*

All results must be recorded.

3.6. Light transmission

3.6.1. *Tests*

Representative samples of tinted finished products are to be submitted to this test.

The check is to be carried out at least at the beginning of every production run if there is any change in the characteristics of the glass pane affecting the results of the test.

Glass panes having a regular light transmission measured during component type-approval of not less than 80 % in the case of windscreens and not less than 75 % in the case of glass panes other than windscreens, and glass panes of category V are exempted from this test.

Alternatively, for toughened-glass panes, a certificate of compliance with the above requirements may be submitted by the glass supplier.

3.6.2. *Results*

The value of light transmission is to be recorded. In addition, for windscreens with shade bands or obscuration bands, it must be verified, from the drawings referred to in point 3.2.1.2.2.3 of Part 3-A that such bands are outside zone I'.

3.7. Optical distortion and secondary-image separation

3.7.1. *Tests*

Every windscreen is to be inspected for visual defects. In addition, using the methods specified or any method giving similar results, measurements are to be made in the various areas of vision at the following minimum frequencies:

either where Ps $\leqslant$ 200, one sample per shift,

or where Ps > 200, two samples per shift,

or 1 % of the whole production, the samples chosen being representative for all production.

3.7.2. *Results*

All results must be recorded.

3.8. Resistance to abrasion

3.8.1. *Tests*

Plastic-faced and glass-plastic panes only are to be subjected to this test. There must be at least one check per month and per type of plastic material facing or interlayer.

3.8.2. *Results*

The measurement of the light scatter is to be recorded.

3.9. Resistance to humidity

3.9.1. *Tests*

Plastic-faced and glass-plastic panes only are to be subjected to this test. There must be at least one check per month and per type of plastic material facing or interlayer.

3.9.2. *Results*

All results must be recorded.

3.10. Resistance to chemicals

3.10.1. *Tests*

Plastic-faced and glass-plastics panes only are to be subjected to this test. There must be at least one check per month and per type of plastic material facing or interlayer.

3.10.2. *Results*

All results must be recorded.

PART 3 - P

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR IN RESPECT OF THE WINDSCREEN AND OTHER GLASS PANES

(Articles 4 (2))

EEC type-approval No: .... Extension No: ....

1. Make (name of undertaking) of tractor: ....

2. Type and where appropriate commercial name of tractor: ....

3. Name and address of manufacturer: ....

....

4. Name and address of manufacturer's authorized representative (if any): ....

....

5. Description of type of windscreen and other glass panes (toughened, laminated, plastic, glass-plastic flat, curved, etc.)..

6. EEC component type-approval number of the windscreen and other panes: ....

7. Date on which tractor was submitted for EEC type-approval: ....

8. Technical service resonsible for type-approval: ....

9. Date of report issued by that service: ....

10. Number of report issued by that service: ....

11. EEC component type-approval for the windscreen and other glass panes is granted/refused [1].

12. Place: ....

13. Date: ....

14. Signature: ....

15. The following documents bearing the EEC type-approval number given above are attached to this document:

    .... dimensioned drawings;

    .... sketch or photograph of the windscreen and other glass panes in the tractor cab.

    These data are supplied to the competent authorities of the other Member States at their specific request.

16. Remarks: ....

....

....

....

....

[1] Delete where inapplicable.

PART 4

MECHANICAL COUPLINGS BETWEEN TRACTOR AND TOWED VEHICLE AND VERTICAL LOAD ON THE COUPLING POINT

1. Definitions

1.1. 'Mechanical coupling between tractor and towed vehicle' means the components installed on the tractor and on the towed vehicle in order to provide the mechanical coupling between those vehicles.

Only mechanical coupling components for tractors are covered in this Annex.

Among the various types of mechanical coupling components for tractors a basic distinction is made between:

— clevis type (see Figures 1 and 2 of Appendix 1),

— towing hook (see Figure 3 of Appendix 1),

— tractor drawbar (see Figure 4 of Appendix 1).

1.2. 'Type of mechanical coupling between tractor and towed vehicle' means parts which do not differ from one another in such essential respects as:

1.2.1. nature of mechanical coupling component,

1.2.2. drawbar rings (40 mm and/or 50 mm diameter),

1.2.3. external shape, dimensions or mode of operation (e.g. automatic or non-automatic),

1.2.4. material,

1.2.5. value of D as defined in Appendix 2 for the test performed using the dynamic method or the trailer mass as defined in Appendix 3 for tests performed using the static method, and also the vertical load on the coupling point S.

1.3. 'Reference centre of mechanical coupling' means the point on the pin axis which is equidistant from the wings in the case of a fork and the point resulting from the interesection of the plane of symmetry of the hook with the generatrix of the concave part of the hook at the level of contact with the ring when this is in the traction position.

1.4. 'Height above ground of mechanical coupling (h)' means the distance between the horizontal plane through the reference centre of the mechanical coupling and the horizontal plane on which the wheels of the tractor are resting.

1.5. 'Projection of mechanical coupling (c)' means the distance between the reference centre of the mechanical coupling component and the vertical plane passing through the axle on which the rear wheels of the tractor are mounted.

1.6. 'Vertical load on the coupling point (S)' means the load transmitted, under static conditions on the reference centre of the mechanical coupling.

1.7. 'Automatic' means a mechanical coupling component which closes and secures itself when the sliding mechanism for the drawbar rings is actuated, without further action.

1.8. 'Wheelbase of tractor (l)' means the distance between the vertical planes perpendicular to the median longitudinal plane of the tractor passing through the axles of the tractor.

1.9. 'Weight on the front axle of the unladen tractor (a)' means that part of the weight of the tractor, which, under static conditions, is transmitted on the ground by the front axle of the tractor.

2. General requirements

2.1. The mechanical coupling components may be designed to function automatically or non-automatically.

2.2. The mechanical coupling components on the tractor must conform to the dimensional and strength requirements in point 3.1 and point 3.2 and the requirements for the vertical load on the coupling point in point 3.3.

2.3. The mechanical coupling components must be so designed and made that in normal use they will continue to function satisfactorily and retain the characteristics prescribed by this Annex.

2.4. All parts of mechanical coupling components must be made of materials of a quality sufficient to withstand the tests referred to in point 3.2. and must have durable strength characteristics.

2.5. All the couplings and their locks must be easy to engage and release and must be so designed that under normal operating conditions no accidental de-coupling is possible.

In automatic coupling components the locked position must be secured in a form-locking manner by two independently functioning safety devices. However, the latter may be released using the same control device.

2.6. The drawbar ring must be capable of tilting horizontally at least 60° on both sides of the longitudinal axis of a non-built-in coupling device. In addition, vertical mobility of 20° upwards and downwards is required at all times. (See also Appendix 1.)

The angles of articulation must not be attained at the same time.

2.7. The jaw must permit the drawbar rings to swivel axially at least 90° to the right or left around the longitudinal axis of the coupling with a fixed braking momentum of between 30 and 150 Nm.

The towing hook must allow the drawbar ring to swivel axially at least 20° to the right or left around the longitudinal axis of the hook.

3. Special requirements

3.1. *Dimensions*

The dimensions of the mechanical coupling components on the tractor must comply with Appendix 1, Figures 1 to 4. Any dimensions may be chosen if not shown in these figures.

3.2. *Strength*

3.2.1. For the purposes of checking their strength the mechanical coupling components must undergo a dynamic test under the conditions set out in Appendix 2 or a static test under the conditions set out in Appendix 3.

3.2.2. The test must not cause any permanent deformation, breaks or tears.

3.3. *Vertical load on the coupling point (S)*

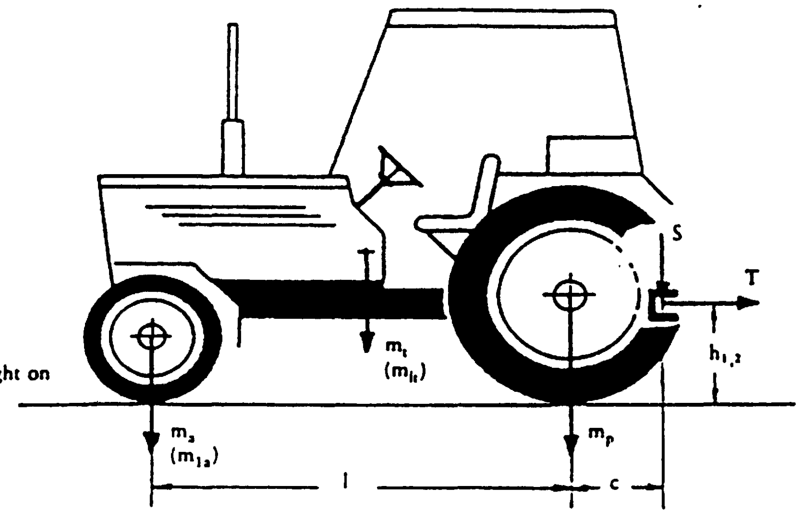
3.3.1. The maximum static vertical load is laid down by the manufacturer. In no case, however, must it exceed 3 tonnes.

3.3.2. Conditions of acceptance:

3.3.2.1. The permissible static vertical load must not exceed the technically permissible static vertical load recommended by the manufacturer of the tractor nor the static vertical load laid down for the towing device pursuant to EEC component type-approval.

3.3.2.2. The requirements of point 2 of Part 1 of Annex II must be complied with, but the maximum load on the rear axle must not be exceeded.

3.4. *Height above the ground of the coupling device (h)*
(see figure below).



3.4.1. All tractors must be fitted with a coupling device, the height above the ground of which must be in accordance with one of the following relationships:

$$h_1 \leqslant \frac{(m_a - 0{,}2\ m_t)\, l - S.c}{0{,}8\ (0{,}8\ m_t + S)} \quad \text{or} \quad h_2 \leqslant \frac{(m_{la} - 0{,}2\ m_{lt})\, l - S.c}{0{,}8\ (0{,}8\ m_{lt} + S)}$$

where:

m_t: mass of the tractor (see Part 1, point 1.6),

m_{lt}: mass of the tractor (see Part 1, point 1.6) with ballast weight on the front axle,

m_a: weight on the front axle of the unladen tractor (see Part 4, point 1.9),

m_{la}: weight on the front axle of the tractor (see Part 4, point 1.9) with ballast weight on the front axle,

l: tractor wheelbase (see Part 4, point 1.8),

S: vertical load on the coupling point (see Part 4, point 1.6),

c: distance between the reference centre of the mechanical coupling and the vertical plane passing through the axle of the rear wheels of the tractor (see Part 4, point 1.5).

4. **Application for EEC component type-approval**

4.1. An application for EEC component type-approval for a tractor with respect to the coupling device must be submitted by the manufacturer of the device or by his authorized representative.

4.2. For each type of mechanical coupling component the application must be accompanied by the following documents and particulars:

— scale drawings of the coupling device (three copies). These drawings must in particular show the required dimensions in detail as well as the measurements for mounting the device,

— a short technical description of the coupling device specifying the type of construction and the material used,

— a statement of the value of D as referred to in Appendix 2 for the dynamic test or the value of T (traction force) as referred to in Appendix 3 for the static test, and also the vertical load on the coupling point S,

— one or more sample devices as required by the technical service.

5. **Inscriptions**

5.1. Every mechanical coupling component conforming to the type for which EEC component type-approval has been granted must bear the following inscriptions:

5.1.1. trade name or mark;

5.1.2. EEC component type-approval mark conforming to the model in Appendix 4;

5.1.3. where the strength is checked in accordance with Appendix 2 (dynamic test):
permissible value of D,
static vertical load value of S;

5.1.4. where the strength is checked in accordance with Appendix 3 (static test):
towable mass and vertical load on the coupling point, S.

5.2. The data must be clearly visible, easily legible and durable.

6. **Instructions for use**

All mechanical couplings must be accompanied by the manufacturer's instructions for use. These instructions must include the EEC component type-approved number and also the values of D or T depending on which test was performed on the coupling.

Appendix 1

DRAWINGS OF MECHANICAL COUPLING COMPONENTS

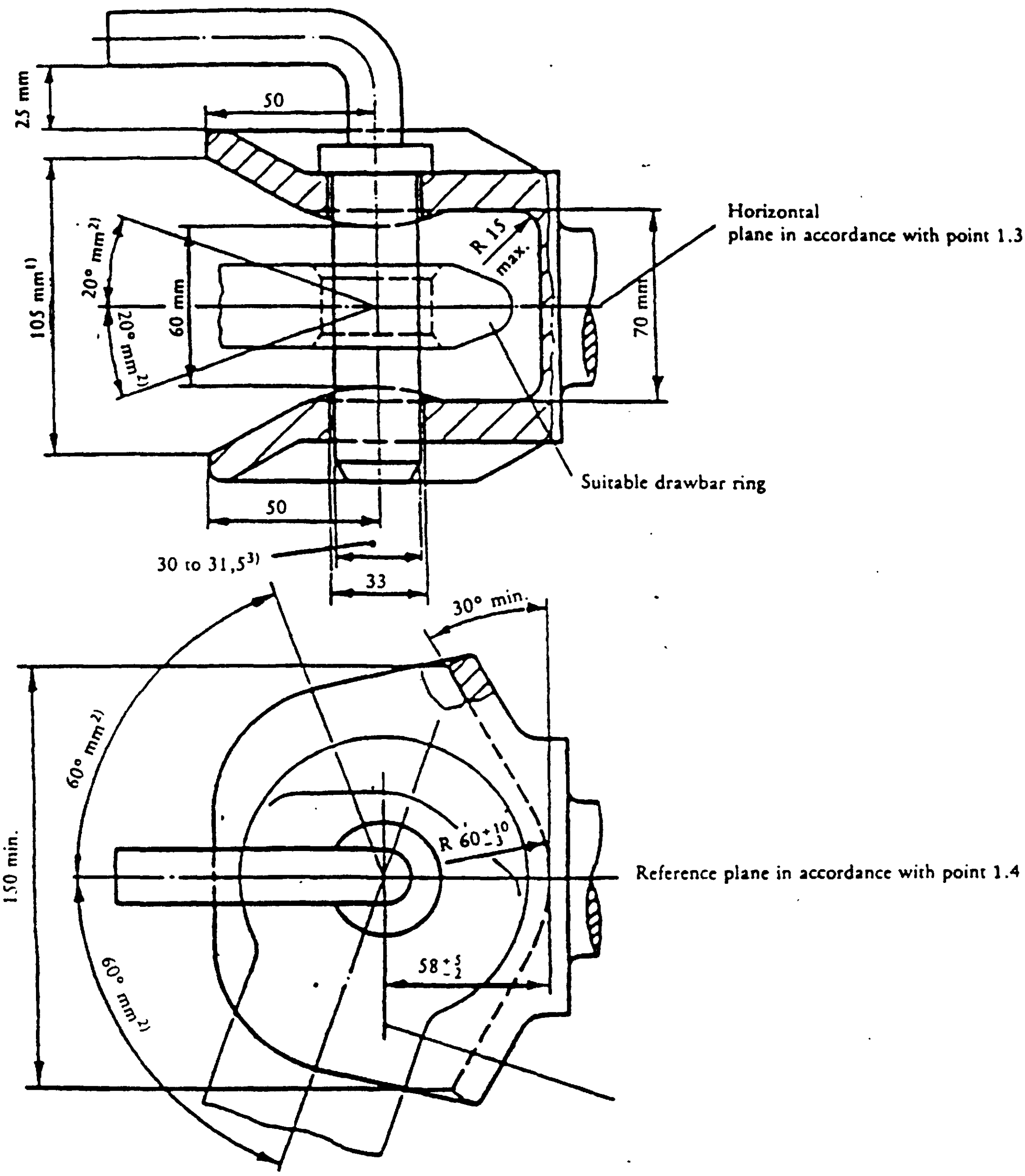


Figure 1

Non-automatic trailer coupling

1. The height of the jaw must be at least half of its width.
2. The angular mobility values must at least be attained with the available drawbar rings.
3. Range of nominal dimensions for the coupling pins.

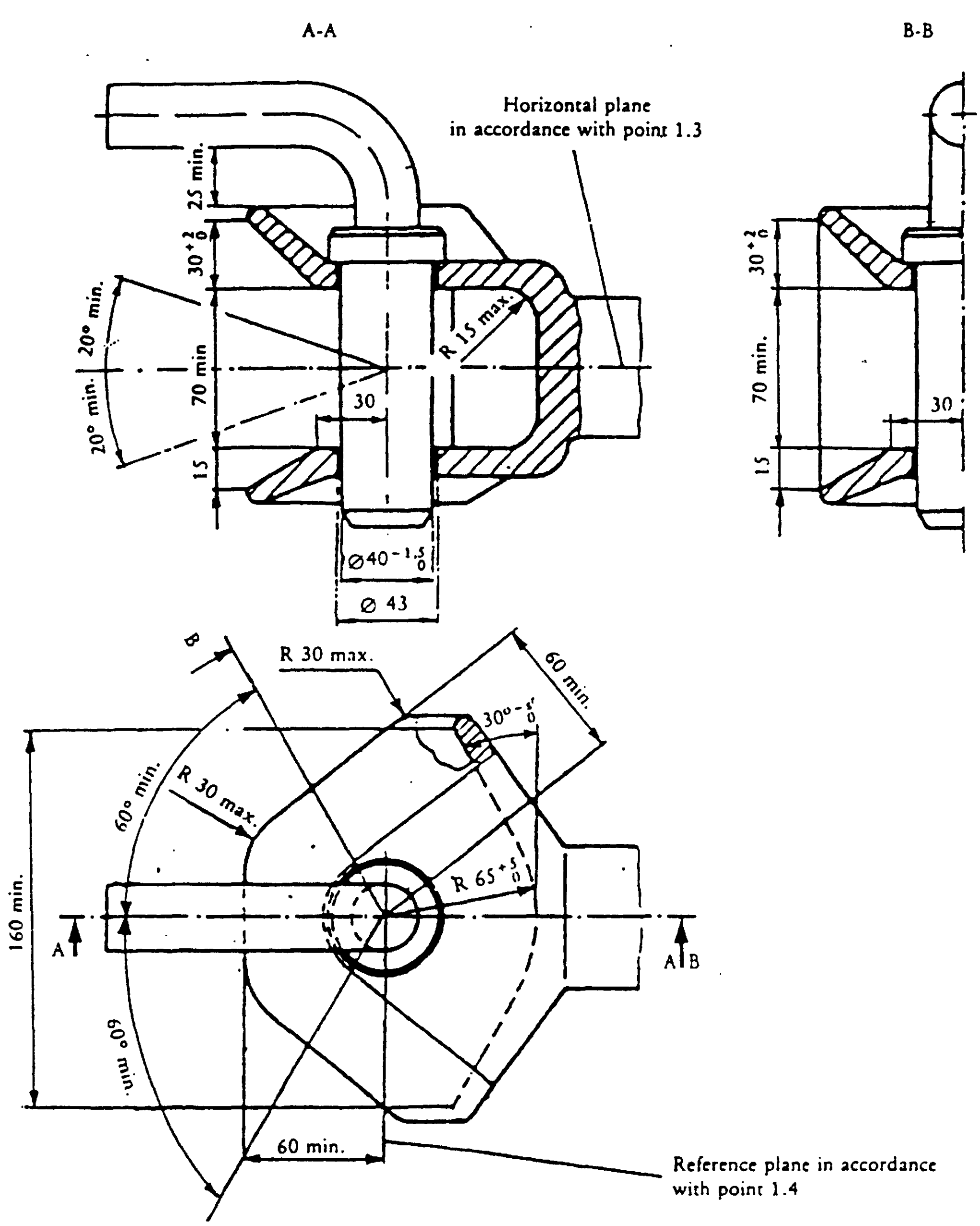
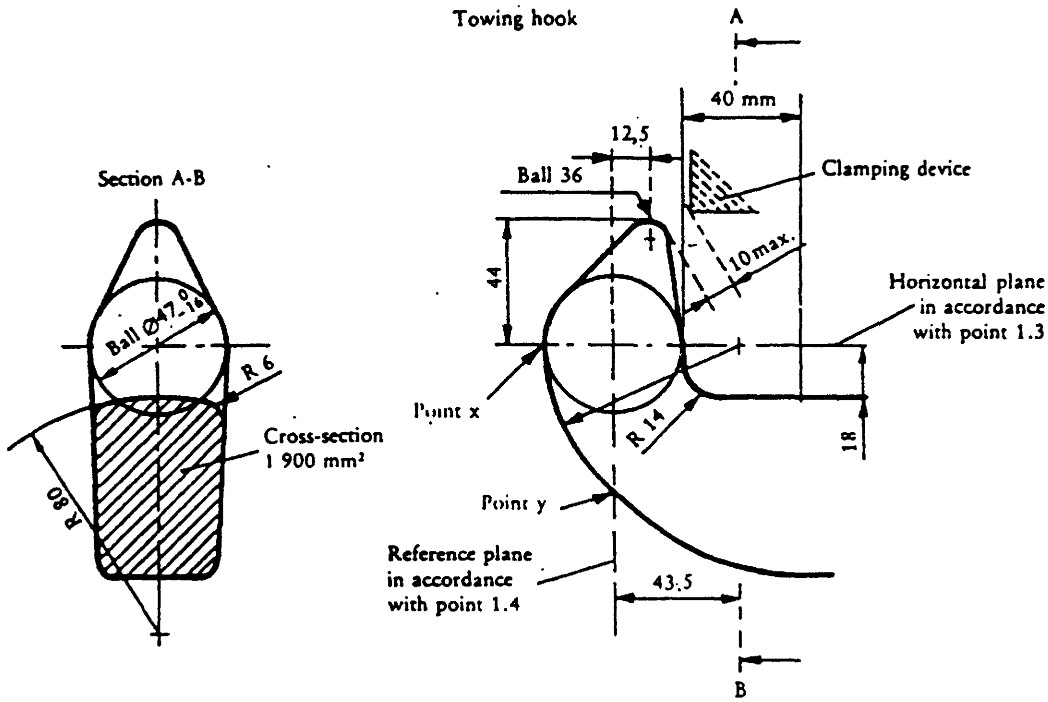


Figure 2

Non-automatic trailer coupling

corresponds to ISO 6489/II of October 1980

Towing hook



No part of the towing hook may be outside radius r between point x and y

Figure 3

Angle of tilt in accordance with points 2.8 and 2.9

corresponds to ISO 6489/I of October 1980

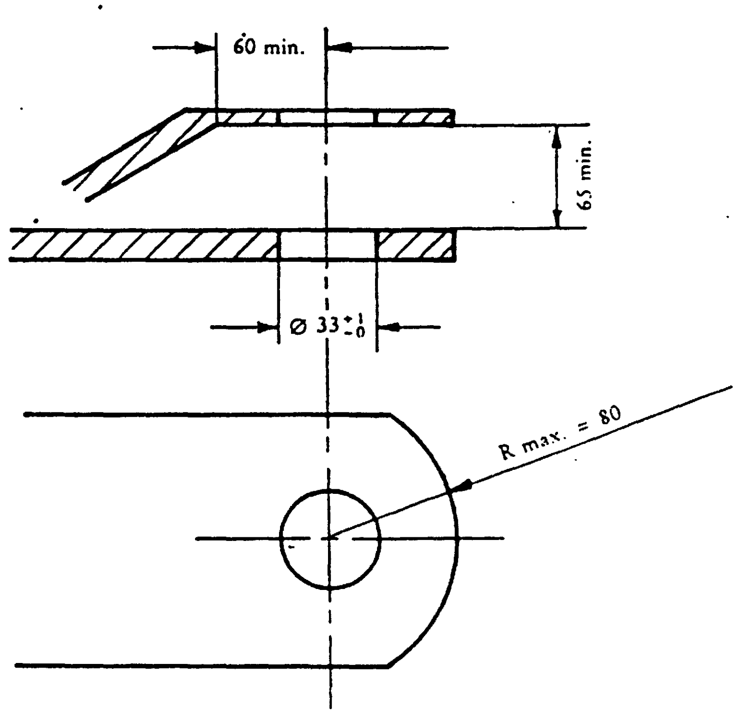


Figure 4

Tractor drawbar

corresponds ISO Standard 6489/III

Appendix 2

DYNAMIC TEST METHOD

1. TEST PROCEDURE

The strength of the mechanical coupling is to be established by alternating traction on a test bed.

This method describes the fatigue test to be used on the complete mechanical coupling device, i.e. when fitted with all the parts needed for its installation the mechanical coupling is mounted and tested on a test bed.

The alternating forces are applied as far as possible sinusoidally (alternating and/or rising) with a load cycle depending on the material involved. No tears or breaks may occur during the test.

2. TEST CRITERIA

The horizontal force components in the longitudinal axis of the vehicle together with the vertical force components form the basis of the test loads.

In so far as they are of secondary importance, horizontal force components at right angles to the longitudinal axis of the vehicle and also moments are not to be taken into consideration.

The horizontal force components in the longitudinal axis of the vehicle are represented by a mathematically established representative force, the value D.

The following equation applied to the mechanical coupling:

$$D = g \cdot \frac{M_T \cdot M_R}{M_T - M_R}$$

Where:

M_T = the technically permissible total mass of the tractor,

M_R = the technically permissible total mass of the towed vehicles,

g = 9,81 m/s².

The vertical force components at right angles to the track are expressed by the static vertical load S.

The technically permissible loads are given by the manufacturer.

3. TEST PROCEDURE

3.1. General requirements

The test force is applied to the mechanical coupling device being tested by means of an appropriate standard drawbar ring beneath an angle formed by the position of the vertical test load F_v *vis-à-vis* the horizontal test load F_h in the direction of the median longitudinal plane passing from top front to bottom rear.

The test force is applied at the usual point of contact between the mechanical coupling device and the drawbar ring.

The play between the coupling device and the ring must be kept to a minimum.

In principle the test force is applied in an alternating manner around the zero point. With an alternating test force the resulting load is equal to zero.

Should the design of the coupling device (e.g. excessive play, towing hook) make it impossible to carry out the test with an alternating test load, the test load may also be applied on a rising basis in the direction of traction or pressure, whichever is the greater.

Where the test is carried out with a rising force curve, the test load is equal to the upper (highest) load, and the lower (smallest) load should not exceed 5 % of the upper load.

Care should be taken in the alternating force test to ensure that by suitable mounting of the test apparatus and choice of power conduction system no additional moments or forces arising at right angles to the test force are introduced; the angular error for the direction of force in the alternating force test should not exceed ± 1,5°; and for the rising force test the angle is set in the upper load position.

The test frequency must not exceed 30 Hz. For components made of steel or steel casting the load cycle amounts to $2 \cdot 10^6$. The subsequent tear test is carried out using the colour penetration method or similar method.

If springs and/or dampers are incorporated into the coupling parts, they are not to be removed during the test but may be replaced if, during the test, they are subject to strain under conditions which would not obtain during normal operation (e.g. heat action) and become damaged. Their behaviour before, during and after the test must be described in the test report.

3.2. Test forces

The test force consists in geometrical terms of the horizontal and vertical test components as follows:

$$F = \sqrt{F_h2 + F_v2}$$

where:

F_h = $\pm$ 0,6 · D in the case of alternating force,

or

F_h = 1,0 · D in the case of rising force (traction or pressure),

F_v = g · 1,5 · S

S = static drawbar load (vertical force components on the track).

Appendix 3

COUPLING DEVICE

STATIC TEST METHOD

1. TEST SPECIFICATIONS

1.1. **General**

1.1.1. Subject to a check on its construction characteristics, the towing device must undergo static tests in accordance with the requirements of points 1.2, 1.3 and 1.4.

1.2. Test preparation

The tests must be carried out on a special machine, with the towing device and any structure coupling it to the body of the agricultural tractor attached to a rigid structure by means of the same components used to mount it on the agricultural tractor.

1.3. Test instruments

The instruments used to record loads applied and movements must have the following degree of accuracy:

— loads applied ± 50 daN,

— movements ± 0,01 mm.

1.4. Test procedure

1.4.1. The coupling device must first be subjected to a pre-traction load which does not exceed 15 % of the traction test load defined in point 1.4.2.

1.4.1.1. The operation described in point 1.4.1 must be repeated at least twice, starting with a zero load, which is gradually increased until the value prescribed in point 1.4.1 is reached, and then decreased to 500 daN; the settling load must be maintained for at least 60 seconds.

1.4.2. The data recorded for plotting the load/deformation curve under traction, or the graph of that curve provided by the printer linked to the traction machine, must be based on the application of increasing loads only, starting from 500 daN, in relation to the reference centre of the coupling device.

There must be no breaks for values up to and including the traction test load which is established as 1,5 times the technically permissible trailer mass; in addition, the load/deformation curve must show a smooth progression, without irregularities, in the interval between 500 daN and 1/3 of the maximum traction load.

1.4.2.1. Permanent deformation is recorded on the load/deformation curve in relation to the load of 500 daN after the test load has been brought back to that value.

1.4.2.2. The permanent deformation value recorded must not exceed 25 % of the maximum elastic deformation occurring.

1.5. The test referred to in point 1.4.2 must be preceded by a test in which an initial load of three times the maximum permissible vertical load recommended by the manufacturer is applied in a gradually increasing manner, starting from an initial load of 500 daN, to the reference centre of the coupling device.

During the test, deformation of the coupling device must not exceed 10 % of the maximum elastic deformation occuring.

The check is carried out after removing the vertical load and returning to the initial load of 500 daN.

Appendix 4

COMPONENT TYPE-APPROVAL MARK

The EEC component type-approval mark consists of:

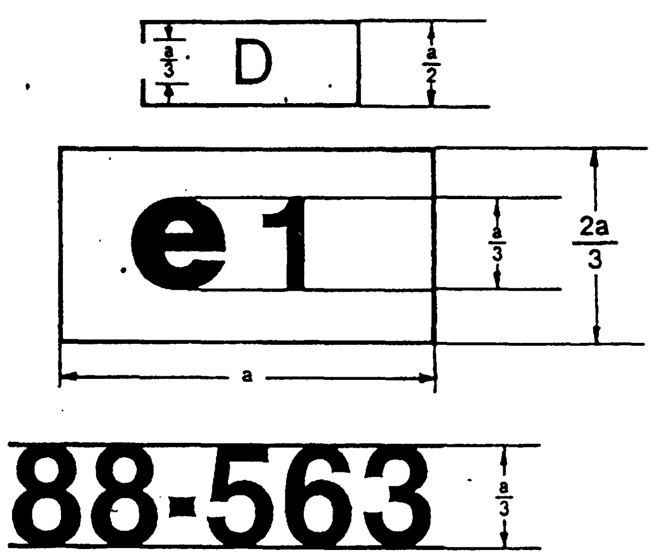
— a rectangle surrounding the lower-case letter 'e', followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval:

1 for Germany,
2 for France
3 for Italy,
4 for the Netherlands,
6 for Belgium,
9 for Spain,
11 for the United Kindom,
13 for Luxembourg,
18 for Denmark,
IRL for Ireland,
EL for Greece,
21 for Portugal.

— an EEC component type-approval number, which corresponds to the number of the EEC component type-approval certificate issued for the type of coupling device in question as regards its strength and dimensions, placed in any convenient position below and near the rectangle,

— by the capital letter 'D' or 'S' according to which test was performed on the mechanical coupling (dynamic test = D and static test = S) above the rectangle surrounding the lower-case letter 'e'.

Example of an EEC component type-approval mark



a ≧ 30 mm

The coupling bearing the EEC component type-approval mark shown above is a device for which EEC component type-approval was granted in Germany (e 1) under the number 88-563 and on which a dynamic strength test (D) was performed.

Appendix 5

MODEL EEC COMPONENT TYPE-APPROVAL CERTIFICATE

Name of administration

Notification concerning the granting, refusal, withdrawal or extension of EEC component type-approval with regard to the strength and dimensions and vertical load on the coupling point of a type of coupling device (clevis type, towing hook tractor drawbar)

EEC component type-approval No: ....

.... extension (1)

1. Trade name or mark: ....

....

2. Type of coupling device (clevis type, towing hook, tractor drawbar) (2):

3. Name and address of manufacturer of coupling device: ....

....

4. If applicable, name and address of authorized representative of manufacturer of coupling device: ....

....

5. The coupling device was subjected to a dynamic/static (2) test and approved for the following values:

5.1. *Dynamic test:*

value of D: .... (kN)

vertical load on the coupling point: .... (daN)

5.2. *Static test:*

towable mass: .... (kg)

vertical load on the coupling point: .... (daN)

6. Submitted for EEC component type-approval on: ....

7. Technical service responsible for carrying out the tests: ....

8. Date and number of test report: ....

9. EEC component type-approval in respect of the mechanical coupling is granted/refused (2): ....

10. Place: ....

11. Date: ....

12. The following documents, bearing the component type-approval number shown above, are attached to this certificate (e.g. test report, drawings, etc.). This information is to be made available to the competent services of the other Member States only by express request: ....

....

13. Remarks: ....

....

14. Signature: ....

---

(1) If applicable, state whether this is the first, second, etc., extension of the original EEC component type-approval.
(2) Delete where inapplicable.

89/173 /EEC

Appendix 6

CONDITIONS FOR GRANTING EEC TYPE-APPROVAL

1. The application for EEC type-approval of a tractor, with regard to the strength and dimensions of a coupling device, is submitted by the tractor manufacturer or by his authorized representative.

2. A tractor representative of the tractor type to be approved, on which a coupling device, duly approved, is mounted is submitted to the technical services responsible for conducting the type-approval tests.

3. The technical service responsible for conducting the type-approval tests checks whether the approved type of coupling device is suitable for mounting on the type of tractor for which type-approval is requested. In particular, it ascertains that the attachment of the coupling device corresponds to that which was tested when the EEC component type-approval was granted.

4. The holder of the EEC type-approval may ask for its extension for other types of coupling device.

5. The competent authorities grant such extension on the following conditions:

5.1. the new type of coupling device has received EEC component type-approval;

5.2. it is suitable for mounting on the type of tractor for which the extension of the EEC type-approval is requested;

5.3. the attachment of the coupling device on the tractor corresponds to that which was presented when EEC component type-approval was granted.

6. A certificate, of which a model is shown in Appendix 5, is annexed to the EEC type-approval certificate for each type-approval or type-approval extension which has been granted or refused.

7. If the application for EEC type-approval for a type of tractor is made at the same time as the request for EEC component type-approval for a type of coupling device on a tractor for which EEC type-approval is requested, then points 2 and 3 are unnecessary.

Appendix 7

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE COUPLING DEVICE AND THE STRENGTH OF ITS ATTACHMENT TO THE TRACTOR

(Article 4 (2))

EEC type-approval No: ....

.... extension (1)

1. Trade name or mark of tractor: ....

2. Tractor type and trade name: ....

3. Name and address of tractor manufacturer: ....

....

4. If applicable, name and address of manufacturer's authorized representative: ....

....

5. Trade name or mark of coupling device: ....

....

6. Type(s) of coupling device(s):

7. EEC mark and EEC component type-approval number: ....

8. Extension of EEC type-approval to the following type(s) of coupling: ....

....

9. Permissible static vertical load on the coupling point: .... daN

10. Tractor submitted for EEC type-approval testing on: ....

11. Technical service responsibile for EEC type-approval tests: ....

12. Date of test report issued by that technical service: ....

13. Number of test report issued by that service: ....

14. EEC type-approval with regard to the coupling device and the strength of its attachment to the tractor has been granted/refused (2).

15. The extension of the EEC type-approval with regard to the coupling device and the strength of its attachment to the tractor has been granted/refused (2).

16. Place: ....

17. Date: ....

18. Signature: ....

---

(1) If applicable, state whether this is the first, second, etc. extension of the original EEC type-approval.
(2) Delete where inapplicable.

PART 5

LOCATION AND METHOD OF AFFIXING STATUTORY PLATES AND INSCRIPTIONS ON THE BODY OF THE TRACTOR

1. GENERAL

1.1. All agricultural or forestry tractors must be provided with the plate and inscriptions described in the following sections. The plate and inscriptions are attached either by the manufacturer or by his authorized representative.

2. MANUFACTURER'S PLATE

2.1. A manufacturer's plate, modelled on that shown to the Appendix hereto, must be firmly attached in a conspicuous and readily accessible position on a part normally not subject to replacement in use. It must show clearly and indelibly the following information in the order listed.

2.1.1. Name of manufacturer.

2.1.2. Type of tractor (and version if necessary).

2.1.3. EEC type-approval number.

This number is composed of a small letter 'e' followed in the order given, by the distinguishing number or letters of the country which granted the EEC type-approval (1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 6 for Belgium, 9 for Spain, 11 for the United Kingdom, 13 for Luxembourg, 18 for Denmark, 21 for Portugal, EL for Greece, IRL for Ireland) and by the type-approval certificate for the type of vehicle. An asterisk is placed between the letter 'e' and the distinguishing letters or number of the country which granted the EEC type-approval as well as between that number or the letters concerned and the EEC type-approval number.

2.1.4. Tractor identification number.

2.1.5. Minimum and maximum values for the maximum permitted laden mass of the tractor, depending om the possible types of tyre which may be fitted.

2.1.6. Maximum permitted vehicle mass bearing on each tractor axle, according to the possible types of tyre which may be fitted; this information must be listed in order from front to rear.

2.1.7. Technically permissible towable mass(es): as referred to in point 1.7 of Part 1.

2.1.8. Member States may require for tractors placed on their markets, that the country of final assembly also be indicated in addition to the name of the manufacturer where the final assembly was carried out elsewhere than in the manufacturer's country, but not in a Member State of the Community.

2.2. The manufacturer may give additional information below or to the side of the prescribed inscriptions, outside a clearly marked rectangle enclosing only the information prescribed in points 2.1.1 to 2.1.7 (see example of manufacturer's plate below).

3. TRACTOR IDENTIFICATION NUMBER

The tractor identification number is a fixed combination of characters assigned to each tractor by the manufacturer. Its purpose is to ensure that every tractor can be clearly identified over a period of 30 years through the intermediary of the manufacturer, without a need for reference following requirements.

3.1. It must be marked on the manufacturer's plate, and also on the chassis or other similar structure

3.1.1. It must wherever possible be entered on a single line

3.1.2. It must be marked on the chassis or other similar structure, on the front right-hand side of the vehicle.

3.1.3. It must be placed in a clearly visible and accessible position by a method such as hammering or stamping, in such a way that it cannot be obliterated or deteriorate.

4. CHARACTERS

4.1. Roman letters and arabic numerals must be used for all of the markings provided for in points 2 and 3. However, the roman letters used in the markings provided for in points 2.1.1 and 2.1.3 and point 3 must be capital letters.

4.2. For the tractor identification number:

4.2.1. use of the letters 'I' 'O' and 'Q' and dashes, asterisks and other special signs is not permitted;

4.2.2. the minimum height of the letters and figures should be as follows:

4.2.2.1. 7 mm for characters marked directly on the chassis, frame or other similar structure of the tractor,

4.2.2.2. 4 mm for characters marked on the manufacturer's plate.

Example of manufacturer's plate

The following example in no way prejudices the data which may actually be entered on the manufacturer's plate: it is given solely for information purposes.

STELLA TRAKTOR WERKE
Type: 846 E
EEC number: e • 1 • 1792
Identification number: GBS18041947
Total permissible mass (*): 4 820 to 6 310 kg Permissible front axle load (*): 2 390 to 3 200 kg Permissible rear axle load (*): 3 130 to 4 260 kg (*) Depending on the tyres.
Permissible towable mass: — unbraked towable mass: 3 000 kg — independently-braked towable mass: 6 000 kg — inertia-braked towable mass: 3 000 kg — towable mass fitted with an assisted braking system (hydraulic or pneumatic): 12 000 kg

Appendix

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE POSITION AND THE METHOD OF AFFIXING STATUTORY PLATES AND INSCRIPTIONS ON THE BODY OF THE TRACTOR

(*Articles 4* (2))

EEC type-approval number: ....

1. Make of tractor or business name of manufacturer: ....

2. Type and, if appropriate, trade name of tractor: ....

3. Manufacturer's name and address: ....

4. If applicable, name and address of manufacturer's authorized representative: ....

5. Date of submission of tractor for EEC type-approval: ....

6. Technical service conducting the type-approval tests: ....

7. Date of report issued by that service: ....

8. Number of report issued by that service: ....

9. EEC type-approval for the location and method of affixing statutory plates and inscriptions on the body of the tractor is granted/refused (¹).

10. Place: ....

11. Date: ....

12. Signature: ....

13. The following documents bearing the EEC type-approval number indicated above are attached to this certificate:

    .... dimensioned drawing;

    .... sketch or photograph of the location and method of affixing statutory plates and inscriptions on the body of the tractor.

    The date must be supplied at the competent authorities of the other Member States if they so request.

14. Remarks: ....

....

....

....

(¹) Delete where inapplicable

PART 6

BRAKE CONTROL OF TOWED VEHICLES AND BRAKE COUPLING BETWEEN THE TRACTOR AND TOWED VEHICLES

1. Where a tractor includes a trailer brake control, the control must be either hand- or foot-operated and it must be possible to moderate and operate it from the driver's seat, but it must not be affected by any operation of other controls.

   Where the tractor is fitted with a pneumatic or hydraulic coupling system located between the tractor and the towed mass, only one single control should be fitted for the service braking of the vehicle combination.

2. The braking systems used may be systems, the characteristics of which are as defined in point 1.7 of Part 1 of Annex IX.

   The fitting must be designed and effected in such a way as to ensure that the operation of the tractor is not adversely affected in the event of the failure or the poor operation of the towed vehicle's breaking device or in the case of a breach in the coupling.

3. Where the coupling between the tractor and the towed vehicle(s) is hydraulic or pneumatic it must also comply with one or other of the following conditions.

3.1. Hydraulic coupling:

The hydraulic coupling must be of a single conduit type.

It must comply with ISO standard ISO/5676 of 1983, the projecting section being on the tractor.

Operation of the control must permit zero pressure to be delivered to the coupling head in the rest position; the working pressure must be no less than 10 and no more that 15 MPa.

It must not be possible to disconnect the source of power from the engine.

3.2. Pneumatic coupling:

The coupling between the tractor and the towed vehicle(s) of a dual-conduit type: an automatic conduit and a direct braking conduit operates by an increase in pressure.

The coupling head must comply with ISO standard ISO 1728 of 1980.

Operation of the control must permit a working pressure of no less than 0,65 and no more than 0,8 MPa to be delivered to the coupling head.

Appendix

MODEL

Name of administration

ANNEX TO THE EEC TYPE-APPROVAL CERTIFICATE FOR A TRACTOR TYPE WITH REGARD TO THE BRAKE CONTROL OF THE TOWED VEHICLE

(Article 4 (2))

EEC type-approval number: ....

1. Make of tractor (or business name of manufacturer): ....

....

2. Type and where appropriate commercial name of tractor: ....

3. Manufacturer's name and address: ....

4. If applicable, name and address of manufacturer's authorized representative: ....

....

5. Description of component(s) and/or characteristic(s) of the brake control of the towed vehicle: ....

....

6. Date of submission of tractor for EEC type-approval: ....

....

7. Technical service conducting the type-approval tests: ....

8. Date of report issued by that service: ....

....

9. Number of report issued by that service: ....

10. EEC type-approval for the brake control of the towed vehicle granted/refused (1):

11. Place: ....

12. Date: ....

13. Signature: ....

14. The following documents, bearing the EEC type-approval number indicated above, are attached to this certificate:

   .... sketch or photograph of the relevant parts of the tractor.

   These data must be supplied to the component authorities of the other Member States if they so request.

15. Remarks: ....

....

(1) Delete where inapplicable.

ANNEX A

Repealed Directives
(referred to in Article 78)

- Council Directive 74/150/EEC
- Council Directive 74/151/EEC
- Council Directive 74/152/EEC
- Council Directive 74/346/EEC
- Council Directive 74/347/EEC
- Council Directive 75/321/EEC
- Council Directive 75/322/EEC
- Council Directive 75/323/EEC
- Council Directive 76/432/EEC
- Council Directive 76/763/EEC
- Council Directive 77/311/EEC
- Council Directive 77/536/EEC
- Council Directive 77/537/EEC
- Council Directive 78/764/EEC
- Council Directive 78/933/EEC
- Council Directive 79/532/EEC
- Council Directive 79/533/EEC
- Council Directive 79/622/EEC
- Council Directive 80/720/EEC
- Council Directive 86/297/EEC
- Council Directive 86/298/EEC
- Council Directive 86/415/EEC
- Council Directive 87/402/EEC
- Council Directive 89/173/EEC

ANNEX B

Directive		Deadline for implementation
74/150/EEC	(OJ No L 84 of 28.03.1974, p. 10)	28 September 1975
79/694/EEC	(OJ No L 205 of 13.08.1974, p. 17)	13 September 1981
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
88/297/EEC	(OJ No L 126 of 20.05.1988, p. 52)	31 December 1988
74/151/EEC	(OJ No L 84 of 28.03.1974, p. 25)	28 September 1975
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
88/410/EEC	(OJ No L 200 of 26.07.1988, p. 27)	30 September 1988
74/152/EEC	(OJ No L 84 of 28.03.1974, p. 33)	28 September 1975
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
88/412/EEC	(OJ No L 200 of 26.07.1988, p. 31)	30 September 1988
74/346/EEC	(OJ No L 191 of 15.07.1974, p. 1)	15 January 1976
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
74/347/EEC	(OJ No L 191 of 15.07.1974, p. 5)	15 January 1976
79/1073/EEC	(OJ No L 331 of 27.12.1979, p. 20)	30 April 1980
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
75/321/EEC	(OJ No L 147 of 09.06.1975, p. 24)	9 December 1976
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
88/411/EEC	(OJ No L 200 of 26.07.1988, p. 30)	30 September 1988
75/322/EEC	(OJ No L 147 of 09.06.1987, p. 28)	9 December 1976
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
75/323/EEC	(OJ No L 147 of 09.06.1975, p. 38)	9 December 1976
76/432/EEC	(OJ No L 122 of 08.05.1976, p. 1)	1st January 1977
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
76/763/EEC	(OJ No L 262 of 27.09.1976, p.135)	27 March 1978
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
77/311/EEC	(OJ No L 105 of 28.04.1977, p. 1)	28 October 1979
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
77/536/EEC	(OJ No L 220 of 29.08.1977, p. 1)	29 February 1980
87/354/EEC	(OJ No L 192 of 11.07.1987, p. 43)	11 January 1989
89/680/EEC	(OJ No L 398 of 30.12.1989, p. 26)	3 January 1990
77/537/EEC	(OJ No L 220 of 29.08.1977, p. 38)	29 February 1980
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
78/764/EEC	(OJ No L 255 of 18.09.1978, p. 1)	18 March 1980
82/890/EEC	(OJ No L 378 of 31.12.1982, p. 45)	31 June 1983
83/190/EEC	(OJ No L 109 of 26.04.1983, p. 13)	30 September 1983
87/354/EEC	(OJ No L 192 of 11.07.1987, p. 43)	
88/465/EEC	(OJ No L 228 of 17.08.1988, p. 31)	

78/933/EEC (OJ No L 325 of 20.11.1978, p. 16) 82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)	20 May 1980 31 June 1983
79/532/EEC (OJ No L 145 of 13.06.1979, p. 16) 82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)	13 December 1980 31 June 1983
79/533/EEC (OJ No L 145 of 13.06.1979, p. 20) 82/890/EEC (OJ No L 378 of 31.12.1982, p. 45)	13 December 1980 31 June 1983
79/622/EEC (OJ No L 179 of 17.07.1979, p. 1) 82/953/EEC (OJ No L 386 of 31.12.1982, p. 31) 87/354/EEC (OJ No L 192 of 11.07.1987, p. 43) 88/413/EEC (OJ No L 200 of 26.07.1988, p. 32)	17 January 1981 30 September 1983 30 September 1983
80/720/EEC (OJ No L 194 of 28.07.1980, p. 1) 82/890/EEC (OJ No L 378 of 31.12.1982, p. 45) 88/414/EEC (OJ No L 200 of 26.07.1988, p. 34)	28 January 1982 31 June 1983 30 September 1988
86/297/EEC (OJ No L 186 of 08.07.1986, p. 18)	8 January 1988
86/298/EEC (OJ No L 186 of 08.07.1986, p. 26) 89/682/EEC (OJ No L 398 of 30.12.1989, p. 29)	2 June 1988 3 January 1990
86/415/EEC (OJ No L 240 of 26.08.1986, p. 1)	1st October 1987
87/402/EEC (OJ No L 220 of 08.08.1987, p. 1) 89/681/EEC (OJ No L 398 of 30.12.1989, p. 27)	26 June 1989 3 January 1991
89/173/EEC (OJ No L 67 of 10.03.1989, p. 1)	31 December 1989

A N N E X C

CORRELATION TABLE

Directive 74/150/EEC	This Directive
Article 1	Article 1
Article 2	Article 2
Article 3	Article 3
Article 4	Article 4
Article 5	Article 5
Article 6	Article 6
Article 7	Article 7
Article 8	Article 8
Article 9	Article 9
Article 9 (a)	Article 10
-	Article 11

Directive 77/311/EEC	This Directive
Article 2	Article 12
Article 3	Article 13
Article 4	Article 14

Directive 78/764/EEC	This Directive
Article 1	Article 15
Article 2	Article 16
Article 3	Article 17
Article 4	Article 18
Article 5	Article 19
Article 6	Article 20
Article 7	Article 21
Article 8	Article 22

Directive 78/933/EEC	This Directive
Article 4	Article 23

Directive 77/537/EEC and 75/322/EEC	This Directive
Article 4	Article 24

Directive 77/536/EEC	This Directive
Article 1	Article 25
Article 2	Article 26
Article 3	Article 27
Article 4	Article 28
Article 5	Article 29
Article 6	Article 30
Article 7	Article 31
Article 8	Article 32
Article 9	Article 33
Article 10	Article 34

Directive 89/173/EEC	This Directive
Article 2	Article 35
Article 3	Article 36
Article 4	Article 37
Article 5	Article 38
Article 6	Article 39
Article 7	Article 40
Article 8	Article 41

Directive 79/622/EEC	This Directive
Article 1	Article 42
Article 2	Article 43
Article 3	Article 44
Article 4	Article 45
Article 5	Article 46
Article 6	Article 47
Article 7	Article 48
Article 8	Article 49
Article 9	Article 50
Article 10	Article 51

Directive 86/298/EEC	This Directive
Article 1	Article 52
Article 2	Article 53
Article 3	Article 54
Article 4	Article 55
Article 5	Article 56
Article 6	Article 57
Article 7	Article 58
Article 8	Article 59
Article 9	Article 60
Article 10	Article 61
Article 11	Article 62

Directive 87/402/EEC	This Directive
Article 1	Article 63
Article 2	Article 64
Article 3	Article 65
Article 4	Article 66
Article 5	Article 67
Article 6	Article 68
Article 7	Article 69
Article 8	Article 70
Article 9	Article 71
Article 10	Article 72

Directive 74/152/EEC	This Directive
Article 4	Article 73

Directive 74/150/EEC	This Directive
Article 12	Article 74
Article 13	Article 75
Article 11	Article 76
Article 15	Article 77
Article 16	Article 79

FICHE D'IMPACT SUR LA COMPETITIVITE ET L'EMPLOI

Version codifiée des directives du Conseil, concernant le rapprochement des législations des Etats membres relatives aux tracteurs agricoles ou forestiers à roues.

La présente proposition de la Commission répond au souci maintes fois exprimé par les Etats membres et le Parlement européen afin que des mesures soient prises pour accélérer la codification et la simplification du droit communautaire. Cette proposition ne contient aucune disposition nouvelle par rapport au droit existant; elle n'a donc pas d'effet particulier sur les P.M.E., mais il convient de le signaler, car l'objectif de la transparence du droit communautaire s'impose, en particulier, dans les intérêts à long terme desdites P.M.E.