COMMISSION OF THE EUROPEAN COMMUNITIES

COM(92) 108 final - SYN 408
Brussels, 30 March 1992

Proposal for a

COUNCIL DIRECTIVE

relating to the mechanical coupling devices of motor vehicles and their trailers and their attachment to these vehicles

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(presented by the Commission)

EXPLANATORY MEMORANDUM

I. BACKGROUND

1. The implementation of the EEC type-approval procedure for motor vehicles and their trailers covered by Council Directive 70/156/EEC of 6 February 1970[1] comprises especially the adoption of the last separate Directives for passenger cars (tyres, masses and dimensions, safety glazing). For this reason the Commission submitted proposals in January 1990. Furthermore, the framework Directive assigns the adoption of special provisions for goods vehicles, buses and coaches. To take care of the precise and comprehensive content of these provisions it is deemed opportune to adopt in particular harmonized Community requirements, inter alia, masses and dimensions (items 2.2, 2.4, 2.6 and 2.8 of Annex II), speed limiters and external projections of cabs (item 12.2 and 12.4 of Annex II) as special safety provisions for goods vehicles, buses and coaches. The Commission submitted the relevant draft Directives in April 1991. With regard to mechanical coupling devices (item 11 of Annex II) harmonized provisions have to be established to guarantee compatibility and interchangeability of motor vehicles and trailers.

2. The European Parliament adopted, on the 13 March 1984, a resolution on the introduction of a programme of Community measures to promote road safety[2], and on the 18 February 1986 another resolution on common measures to reduce road accidents as part of the Community's programme for Road Safety Year 1986[3]. The Council and the Commission are requested by these resolutions to take the necessary measures with the aim of promoting road safety.

3. In view of the entry into force of the Single European Act and of the aim of a single internal market to be achieved by the end of 1992, it is now urgent that the remaining measures that are needed to complete EEC type-approval should be adopted.

4. The legal/administrative procedure put forward in the enacting terms of these proposals does not depart from that laid down in framework Directive 70/156/EEC that is currently in force except as regards the procedure for adaptation to technical progress, whereby the Regulatory Committee has been replaced by the Advisory Committee. Indeed, the Commission intends to apply the provisions of the Single Act, which provide for the delegation of power to the Commission in order to proceed with this task.

5. With regard to the other options, such as that of the method of harmonization (total or optional), the Commission is still applying the solutions currently in force.

   However, the Commission does not intend to neglect this important matter; considering that the total harmonization will be essential in order to fully achieve the large single market, it intends to put forward relevant proposals when the framework Directive 70/156/EEC is next amended.

(1) OJ No L 42, 23.2.1970, p. 1.
(2) OJ No C 104, 16.4.1984, p. 38.
(3) OJ No C 68, 24.3.1986, p. 35.

II. REASONS FOR AND CONTENT OF THE PROPOSAL OF THE DIRECTIVE RELATING TO MECHANICAL COUPLING DEVICES FOR MOTOR VEHICLES AND THEIR TRAILERS

For the completion of the EEC whole vehicle type-approval of certain categories of motor vehicles and trailers the framework Directive 70/156/EEC (item 11. of Annex II) requires special provisions for the connections between drawing vehicles and trailers and semi-trailers. The mechanical coupling devices, e.g. drawbar couplings, fifth wheel couplings and ball couplings all have to meet these special requirements if they are fitted to road vehicles.

In view of the single internal market to be achieved by the end of 1992 it is necessary to facilitate the interchangeability of motor vehicles and trailers within the territory of the Community and to harmonize the technical requirements of mechanical coupling devices. The harmonization of these provisions can contribute to a decrease in the mileage of road vehicles and lead to a reduction in fuel consumption, noise and pollutant emissions.

The draft proposal of this Council Directive is based mainly on the ECE (Economic Commission for Europe of the United Nations) Regulation No 55 with respect to strength requirements and test procedures. Furthermore international ISO-standards have been taken into account for uniform dimensions of mechanical coupling systems connecting the road vehicles to guarantee the compatibility of the vehicle coupling devices throughout the Community. For this reason it is strongly recommended that only certain classes of coupling devices with specified dimensions should be used in all Member States, but in exceptional cases EEC type-approvals may be granted for special coupling devices designed for special purposes and used exclusively on the national territory of a single Member State.

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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(1),

In cooperation with the European Parliament(2),

Having regard to the opinion of the Economic and Social Committee(3),

Whereas it is important to adopt measures with the aim of progressively establishing the internal market over a period expiring on 31 December 1992; whereas the internal market shall comprise an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured;

Whereas the technical requirements which motor vehicles and their trailers must satisfy pursuant to national laws relate, inter alia, to the mechanical couplings of such vehicles;

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 to allow, in particular, the EEC type-approval procedure which was the subject of Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of Member States relating to the type-approval of motor vehicles and their trailers(4), as last amended by Directive 87/403/EEC(5), to be implemented;

Whereas, with the view of improving road safety and facilitating the interchangeability of motor vehicles and trailers in international traffic, it is considered important that all kinds of vehicles forming a road train or being an articulated vehicle shall be equipped with standardized and harmonized mechanical coupling systems;

Whereas it is desirable to follow the technical requirements of the ECE (Economic Commission for Europe of the United Nations) Regulation No 55 relating to the uniform provisions concerning mechanical coupling components of combinations of vehicles; Regulation No 55 is annexed to the Agreement of 20 March 1958 concerning the adoption of uniform conditions of approval and reciprocal recognition of approval for motor vehicle equipment and parts;

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(1) OJ No C
(2) OJ No C
(3) OJ No C
(4) OJ No L 42, 23.2, 1970, p. 1.
(5) OJ No L 220, 8.8.1987, p. 44.

Whereas mainly international standards (ISO) have been taken into consideration for uniform dimensions of mechanical coupling systems to ensure interchangeability of the individual vehicles forming road trains or articulated vehicles and to guarantee a free traffic within the Member States;

Whereas in all cases where the Council confers powers upon the Commission to implement rules laid down in the motor vehicle sector it is appropriate to provide for a procedure of prior consultation between the Commission and the Member States within an advisory committee,

HAS ADOPTED THIS DIRECTIVE:

Article 1

For the purpose of this Directive:

- "vehicle" means any motor vehicle intended for use on the road, with speed exceeding 25km/h, and its trailers, with the exception of vehicles which run on rails and of agricultural tractors and machinery;

- "mechanical coupling type" means a mechanical coupling device for which type-approval of a component within the meaning of Article 9a of Directive 70/156/EEC may be granted.

Article 2

Member States may not refuse:

- EEC type-approval or national type-approval for a vehicle, or refuse or prohibit the sale, registration, entry into service or use of a vehicle on grounds relating to its optional equipment with mechanical coupling devices,

- EEC component type-approval or national component type-approval for a mechanical coupling, or prohibit the sale or use of a mechanical coupling device,

if the requirements of the Annexes are satisfied.

Article 3

With effect from 1 October 1995 Member States may prohibit the first entry into service of vehicles of which the mechanical coupling devices do not comply with the provisions of this Directive.

Article 4

Any amendments necessary to adapt the requirements of the Annexes to technical progress shall be adopted by the Commission in accordance with the procedure laid down in Article 5.

Article 5

The Commission shall be assisted by the committee established under Article 12 of Directive 70/156/EEC.

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, if necessary by taking a vote.

The opinion shall be recorded in the minutes; in addition, each Member State shall have the right to ask to have its position recorded in the minutes.

The Commission shall take the utmost account of the opinion delivered by the committee. It shall inform the committee of the manner in which its opinion has been taken into account.

Article 6

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 30 June 1993. They shall forthwith inform the Commission thereof.

When Member States adopt these provisions, these shall contain a reference to this Directive or shall be accompanied by such reference at the time of their official publication. The procedure for such reference shall be adopted by Member States.

Article 7

This Directive is addressed to the Member States.

Done at Brussels,

For the Council

The President

ANNEX I

1. SCOPE

1.1. This Directive applies to the mechanical coupling devices for motor vehicles and their trailers and the attachment of these devices to the road vehicles, as described in Article 1. of this Directive.

1.2. This Directive states the requirements which mechanical coupling devices intended for use between combinations of vehicles must satisfy in order to:
- ensure compatiblity when combining motor vehicles with different types of trailer
- ensure the safe coupling together of the vehicles under all conditions of use
- ensure safe procedures for coupling and uncoupling

1.3. The coupling devices are classified according to type, and distinguishing between:

- standard coupling devices
- non-standard coupling devices

The classification is as follows:

1.3.1. Class A: Coupling balls and towing brackets
(see Annex V, Section 1)

1.3.1.1. Class A50-1 to A50-3 : Standard coupling balls 50 and flange type towing brackets

1.3.1.2. Class A50-X: Non-standard coupling balls 50 and towing brackets

1.3.2. Class B50-X: Non-standard coupling heads 50
(see Annex V, Section 2)

1.3.3. Class C: Automatic drawbar couplings

1.3.3.1. Class C50: Drawbar couplings 50
Class C50-1 to C50-7: Standard drawbar couplings 50
(See Annex V, Section 3, Tables 3 and 4)

1.3.3.2. Class C50-X:Non-standard drawbar couplings 50

1.3.4. Class D: Drawbar eyes

1.3.4.1. Class D50 Drawbar eyes 50
Class D50-A:Standard drawbar eyes D50 for welding attachment
(See Annex V, Fig. 9, Table 5)

Class D50-B: Standard drawbar eyes 50 for screwing attachment
(See Annex V, Fig. 10, Table 5)
Class D50-C: Standard drawbar eyes D50-C1 and D50-C2 for bolting attachment
(See Annex V, Fig. 11 and 12, Table 5)

1.3.4.2. Class D50-X: Non-standard drawbar eyes 50
(See Annex V, Fig 9)

1.3.5. Class E: Non-standard drawbars

1.3.6. Class F: Non-standard mounting frames

1.3.7. Class G: Fifth wheel couplings

1.3.7.1. Class G50: Standard fifth wheel couplings 50
(See Annex V, Fig. 15, Table 7)

1.3.7.2. Class G50-X: Non-standard fifth wheel couplings 50

1.3.8. Class H: Fifth wheel coupling pins

1.3.8.1. Class H50-X: Non-standard fifth wheel coupling pins 50

1.3.9. Class J: Non-standard mounting plates

1.3.10. Class S: Non-standard miscellaneous coupling devices

2. Définitions

2.1. Mechanical coupling devices between motor vehicles and trailers are all parts and devices on the frames, load-bearing parts of the bodywork and chassis of the vehicles by means of which towing and towed vehicles are connected together.

It also includes fixed or detachable parts for the attachment, adjustment or operation of the above-mentioned coupling devices.

2.1.1. The coupling balls and towing brackets in 1.3.1. are mechanical coupling devices employing a spherical device and brackets on the towing vehicle for connecting to the trailer by means of a coupling head.

2.1.2. The coupling heads in 1.3.2. are mechanical coupling devices on the drawbar of trailers for connecting to a coupling ball on the towing vehicle.

2.1.3. The drawbar couplings in 1.3.3. are mechanical coupling devices with a jaw and an automatic closing and locking pin on the towing vehicle for connecting to the trailer by means of a drawbar eye.

2.1.4. The drawbar eyes in 1.3.4. are mechanical coupling devices on the drawbar of trailers having a parallel hole for connecting to

the automatic drawbar couplings.

2.1.5. The drawbars in 1.3.5. comprises overrun devices and similar items of equipment mounted on the front of the towed vehicle or to the vehicle chassis, which is suitable for coupling to a towing vehicle by means of drawbar eyes, coupling heads and similar coupling devices.
Drawbars can be attached to the trailer so as to move freely in the vertical plane and therefore support no vertical load, so called hinged drawbars, or be fixed in the vertical plane so as to support a vertical load, so called rigid drawbars. Drawbars fixed in the vertical plane can be either rigid or sprung.
Drawbars can be equipped with a height adjusting device to permit the adjustment of the drawbar eye of ball coupling to the height of the jaw or coupling ball.
Drawbars may also comprise more than one component, be adjustable or cranked.
This directive concernes drawbars only of the type which forms a separate unit, which is not part of the chassis of the towed vehicle.

2.1.6. The mounting frames in 1.3.6. are all parts and devices placed between the coupling devices, such as coupling balls, drawbar couplings and fifth wheel couplings (with mounting plates), and the frame (e.g. rear cross member), the load-bearing bodywork or the chassis of the towing vehicle.

2.1.7. The fifth wheel couplings in 1.3.7. are plate-like coupling devices used on towing vehicles having an automatic coupling lock and connecting to the fifth wheel coupling pins in 1.3.8.

2.1.8. The fifth wheel coupling pins in 1.3.8. are a coupling device in the form of a pin for mounting on a semi-trailer and connecting to the towing vehicle by means of a fifth wheel coupling.

2.1.9. The mounting plates in 1.3.9. are all parts and devices used for attaching fifth wheel couplings to the frame of the towing vehicle. The mounting plate may have provision to move horizontally (i.e. sliding fifth wheel).

2.1.10. Steering wedges are components mounted on semi-trailers which control positive steering of the trailer in conjunction with the fifth wheel coupling.

2.1.11. Standard coupling devices are classified in 1.3. and conform to standard dimensions and standard characteristic values as given in this directive. They are interchangeable within their class, independent of type and manufacturer.

2.1.12. Non-standard coupling devices are those of classes A to J which do not fall under the classification of standard coupling devices but which can be connected to standard coupling devices of the relevant classes.

2.1.13. The miscellaneous coupling devices for transitional or exceptional use in 1.3.10. are mechanical coupling devices which do not belong to any of the Classes A to J (e.g. coupling devices according to existing national standards or for heavy transport).

2.1.14. Remote control devices are devices which enable in case of in inaccessible coupling devices, the coupling device to be operated from the side of the vehicle or from the driving cab.

2.1.15. Remote indicators are indicating devices which indicate to the vehicle driver in his cab that coupling has been effected and the safety devices have engaged.

2.1.16. A type of mechanical coupling device means a device which do not differ in such essential aspects as:

2.1.16.1. Class of coupling device

2.1.16.2. Factory mark or trade name

2.1.16.3. External shape or principal dimensions or other fundamental differences in design

2.1.16.4. Characteristic values D, S, V and U

2.1.17. A coupling procedure is automatic if backing the towing vehicle against the trailer is sufficient to engage the coupling completely and properly without any external intervention, to secure it automotically and to indicate proper engagement of the safety devices. An automatic coupling procedure requires the use of automatic couplings.

2.1.18. The "D-value" is defined as the theoretical reference force for the horizontal force between towing vehicle and trailer.
The D-value is taken as the basis for horizontal loads in the dynamic tests.
For mechanical coupling devices unsuitable for transmitting vertical bearing loads the value is:

$$D = g \times \frac{T \times R}{T + R} \ (kN)$$

For mechanical coupling devices suitable for centre axle trailers the value is:

$$D = g \times \frac{T \times C}{T + C} \ (kN)$$

For fifth wheel couplings on towing tractors and vehicles of comparable type the value is:

$$D = g \times \frac{0.6 \times T \times R}{T + R - U} \text{ (kN)}$$

Where:

T = Technically permissible maximum mass in t of the towing vehicle (also towing tractors) including, if necessary, the vertical load of a centre axle trailer

R = Technically permissible maximum mass in t of the full trailer with drawbar free to move in the vertical plane or of the semi-trailer

C = Sum of the axle loads of the centre axle trailer carrying maximum permissible load, in t (see 2.1.20.)

U = Fifth wheel imposed vertical load in t

S = The static vertical load S in kg is the proportion of the mass of the centre axle trailer exerted under static conditions at the coupling point

g = acceleration due to gravity (assumed as 9,81 m/s^2)

2.1.19. The "V-value" is defined as the theoretical reference force for the amplitude of the vertical force between towing vehicle and centre axle trailers (see 2.1.21.).
The V-value is taken as a basis for the vertical test loads in the dynamic tests.

$$V = a \cdot \frac{x^2}{l^2} \cdot C$$

where

a is an equivalent vertical acceleration in the coupling point, dependent on the kind of suspension on the rear axle(s) of the towing vehicle including a constant factor:
$a_1 = 1.8\ m/s^2$
for vehicles with air suspension or equivalent

$a_2 = 2.4\ m/s^2$ for vehicles with other suspension

x is the length of the loading area of the trailer, in meters, see fig.1

l is the theoretical drawbar length, i.e. the distance between the centre of the drawbar eye and the centre of the axle assembly, in meters, see fig.1

$\frac{x^2}{l^2} \geq 1,0$ in all cases

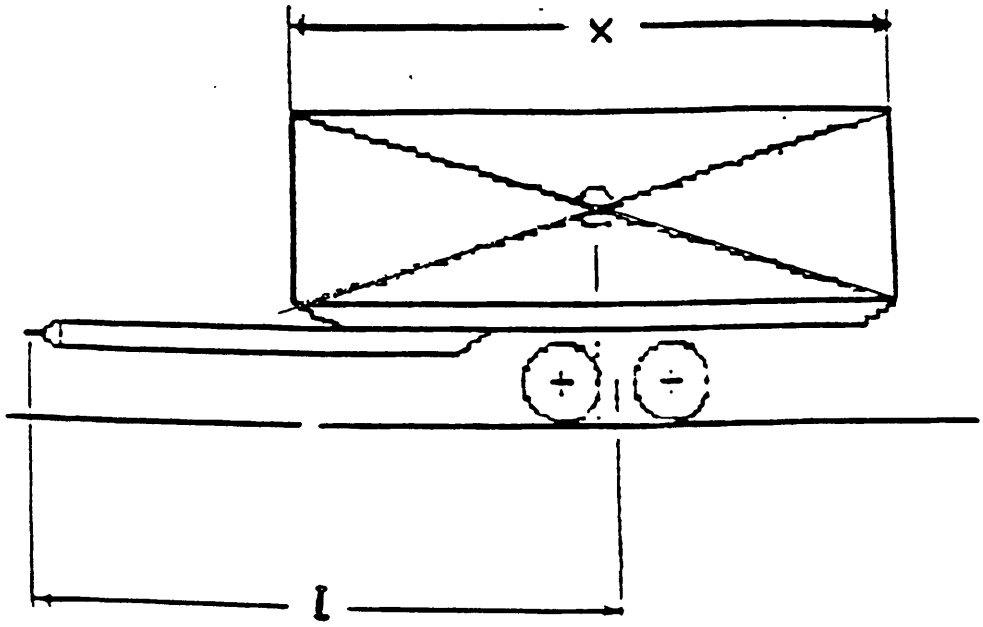


Fig. 1.: Dimensions of the centre axle trailer

2.1.20. "Centre-axle trailer" means a towed vehicle equipped with a towing device which cannot move vertically (in relation to the trailer), and in which the axle(s) is (are) positioned close to the centre of gravity of the vehicle (when uniformly loaded) such that only a small vertical load, not exceeding 10 % of the maximum mass of the trailer or 1000 kg (whichever is the lesser) is transmitted to the drawing vehicle.

The maximum mass of a centre-axle trailer to be taken into consideration shall be the mass transmitted to the ground by the axle(s) of the centre-axle trailer when coupled to the drawing vehicle and laden with a maximum load.

2.1.21. For vehicles not falling clearly in any of the above categories they shall be treated in the same way as the type they most closely resemble.

2.1.22. "Vehicle type" means vehicles which do not differ with respect to the following main characteristics:
The structure, dimensions, shape and materials of the rear part of the towing vehicle, or the front part in the case of a trailer, in so far as they have a bearing on the requirements of Annex VII.

3. <u>EEC Type Approval for a Component</u>

3.1. Application for EEC type approval

3.1.1. An application for EEC Component type approval for a type of mechanical coupling device must be submitted by the manufacturer of the coupling device.

3.1.2. For each type of a mechanical coupling device the application must be accompagnied by the following documentation (in triplicate):

3.1.2.1. A technical description of the coupling device, its design and mode of operation.

3.1.2.2. Data on the characteristic values, the classification and, if necessary, the restricted field of application (specific types of vehicles only).

3.1.2.3. Drawings of the principal parts of the coupling device and an assembly drawing for each version giving all principal dimensions, materials and the position for the EEC approval mark.
It must also be possible to see how the coupling device is mounted on the vehicle and what means of attachment are employed.

3.1.3. The Technical Department which performs or approves the tests for type approval must be provided with a specimen coupling device which should normally be unpainted. The Technical Department and other approval authorities may also request additional specimens.

3.1.4. The Technical Service which performs or approves the tests for type approval may also request specificl parts, additional drawings or samples of the materials used.

3.1.5. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production of the mechanical coupling device before type approval is granted.

3.2. Marking of specimen

3.2.1. Each of the specimens of the particular type of coupling device in 3.1.3 for which an application for EEC component type approval has been submitted must be marked as follows:

3.2.2. Factory mark, trade name or manufacturer's name (and trade mark if appropriate)

3.2.3. Type and, if applicable, version

3.2.4. A sufficiently large space for the EEC approval mark and the additional information according to 3.3.4.

3.3. Granting of component type approval

3.3.1. If the mechanical coupling device submitted for approval pursuant to this Directive meets the requirements of item 5 below, approval of that type of mechanical coupling device shall be granted.

3.3.2. An approval number shall be assigned to each type of mechanical coupling device approved. The same Member State may not assign the same number to another type of a mechanical coupling device .

3.3.3. Notice of approval, or of extension or of refusal of approval of a type of the mechanical coupling device pursuant to this Directive shall be communicated to the Member States by means of a form conforming to the model in Annex IV to this Directive.

3.3.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every mechanical coupling device conforming to a type of mechanical coupling device approved under this Directive an international approval mark consisting of:

1 for Federal Republic of Germany
2 for France
3 for Italy
4 for The Netherlands
6 for Belgium
9 for Spain
11 for United Kingdom
13 for Luxemburg
18 for Denmark
21 for Portugal
IRL for Ireland
EL for Greece

3.3.4.1. A rectangle surrounding the letter "e" followed by the distinguishing number of the country which has granted approval

3.3.4.2. The approval number, as given on the EEC type-approval certificate (see Annex IV), near to the rectangle of the approval mark.

3.3.4.3. The following supplementary marks placed anywhere close to the rectangle:

- class of coupling device
- permissible values for D, S, V and U (unnecessary for standard coupling devices)

3.3.5. The approval mark shall be indelible and clearly legible even when the coupling device is attached to the vehicle.

3.3.6. Annex II to this Directive gives examples of the arrangement of the approval mark.

3.4. Modification of the type of mechanical coupling device and extension of EEC component type approval

3.4.1. Every modification of the type of mechanical coupling device shall be notified to the administrative department which approved the type of mechanical coupling device.
The department may then either:

3.4.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the mechanical coupling device still complies with the requirements, or

3.4.1.2. Require a further report from the technical service responsible for conducting the tests.

3.4.2. Confirmation or refusal of approval, specifying the modification, shall be communicated by the procedure specified in items 3.3. above to the Member States.

3.4.3. The competent authority issuing the extension of approval shall assign a serial number to each communication form drawn up for such a extension.

4. EEC Vehicle Type Approval

4.1 Application for EEC type approval

4.1.1. In order for a vehicle to be granted type approval with a coupling fitted, a representative type of vehicle with a coupling device for which a component type approval has been granted, must be submitted to the relevant Technical Service ,by the manufacturer of the vehicle.

4.1.2. In order for a vehicle to be granted type approval without a coupling fitted, the manufacturer or his representative agent must supply only the data mentioned in Annex VII, section 1.1.

4.1.3. The relevant Technical Service will examine according to Annex VII, the suitability of the type of coupling device for which type approval has been granted for the type of vehicle for which vehicle approval has been applied for.The Technical Service will particularly ensure that the attachment of the coupling device corresponds to that which is prescribed for EEC component type approval.

4.1.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production of the vehicle before type approval is granted.

4.2 Granting of vehicle type approval

4.2.1. If the type of vehicle meets the requirements of item 5 below, approval for that type of vehicle shall be granted.

4.2.2. An approval number shall be assigned to each type of vehicle approved. The same Member State may not assign the same number to another type of vehicle.

4.2.3. Notice of approval, or of extension or refused of approval of a type of vehicle pursuant to this Directive shall be communicated to the Member States by means of a form conforming to the model in Annex IX to this directive.

4.3. Modification of the type of vehicle and extension of EEC vehicle type approval

4.3.1. Every modification of the type of vehicle shall be notified to the administrative department which appproved the type of vehicle.
The department may then either:

4.3.1.1. Consider that the modifications are unlikely to have an appreciable adverse effect and that in any case the vehicle type still complies with the requirements, or

4.3.1.2. Require a further report from the technical service responsible for conduction the tests.

4.3.2. The holder of an EEC vehicle type approval can apply for it to be extended to other types or classes of coupling devices.

The competent authorities will grant such an extension on the following conditions:

4.3.2.1. EEC component type approval has already been granted for the other type of coupling device

4.3.2.2. it is suitable for the type of vehicle for which the extension of the EEC vehicle type approval has been applied for

4.3.2.3. the attachment of the coupling device to the vehicle corresponds to that proposed for the granting of EEC component type approval.

4.3.3. In the case of standard coupling devices in classes A,C, D and G, EEC vehicle type approval is also valid for other coupling devices of the same class without the need for a further mounting check and extension of EEC vehicle type approval.

4.3.4. Confirmation or refusal of approval, specifying the modification, shall be communicated by the procedure specified in items 4.2.3.

4.3.5. The competent authority issuing the extension of approval shall assign a serial number to each communication form drawn up for such an extension.

5. Requirements

5.1. The mechanical coupling devices between motor vehicles and trailers must be manufactured and attached in accordance with good engineering practice, and must be safe to operate.

5.2. Safe coupling and uncoupling of the vehicles must be possible by a single person without the use of tools.
Only automatic coupling devices which allow an automatic coupling procedure shall be employed for the coupling of trailers having a maximum mass of more than 3,5 t.

5.3. The mechanical coupling devices shall be so designed and manufactured that in normal use, with proper maintenance and the timely replacement of wearing parts, they will continue to function satisfactorily.

5.4. Every coupling device must be accompanied by installation and operating instructions giving sufficient information for a competent person to install it on the vehicle and operate it propertly. The instructions must be in the language or languages of the Member State in which the coupling device will be offered for sale. In the case of coupling devices supplied for assembly-line use by vehicle builders or bodybuilders, the provision of installation and operating instructions for each coupling device can be dispensed with. It is then the responsibility of the vehicle builder or bodybuilder to ensure that the vehicle operator is provided with the information necessary for operating the coupling device.

5.5. The materials that may be used are those for which the properties relevant to the application are laid down in a standard or those for which the properties are given in the documentation according to 3.1.2.3. of this Annex.

5.6. All parts of the mechanical coupling devices whose failure could result in separation of the two vehicles must be made of steel or forged or cast steel.
Other materials may be used provided equivalence has been demonstrated by the manufacturer to the satisfaction of the Technical Service.

5.7 All couplings must be designed for positive mechanical engagement, and the closed position must be secured at least once by positive mechanical engagement, unless further requirements are stated in Annex V.

5.8 The mechanical coupling devices must satisfy the requirements of Annex V.

5.9 Loading requirements

5.9.1. Mechanical coupling devices are subject to the tests described in Annex VI.

5.9.2. These tests must not cause any cracks, fractures or other visible external damage, or any excessive permanent distortion which would be detrimental to the satisfactory operation of the device.

5.10 The installation of the mechanical coupling devices to the vehicle must be checked according to the requirements given in Annex VII.

5.11. The above-mentioned requirements and those of Annexes V, VI and VII are also applicable, as relevant, to miscellaneous coupling devices (Class S).

6. Conformity of production

6.1. Every mechanical coupling device or vehicle approved to this Directive shall be so manufactured as to conform to the type approved by meeting the requirements of this directive.

6.2. In order to verify that the requirements of paragraph 6.1. are met, suitable controls of the production shall be carried out.

6.3. The holder of the approval shall in particular:

6.3.1. ensure existence of procedures for the effective control of the quality of products,

6.3.2. have access to the control equipment necessary for checking the conformity of each approved type,

6.3.3. ensure that data of test results are recorded and that annexed documents shall remain available for a period to be determined in accordance with the administrative service,

6.3.4. analyse the results of each type of test, in order to verify and ensure the stability of the product characteristics making allowance for tolerances of an industrial production,

6.3.5. ensure that in the case of a component for each type of product at least the tests prescribed in Annex VI to this Directive are carried out,

6.3.6. ensure that in the case of a component all safety-relevant parts of every single mechanical coupling device are checked by non-destructive methods in order to ascertain the absence of structural anomalies, if the manufacturing process contains operations like casting or heat-treating or other operations where anomalies cannot be excluded.

6.3.7. ensure that any sampling of samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.

6.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.

6.4.1. In every inspection the test books and production survey records shall be presented to the visiting inspector.

6.4.2. The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.

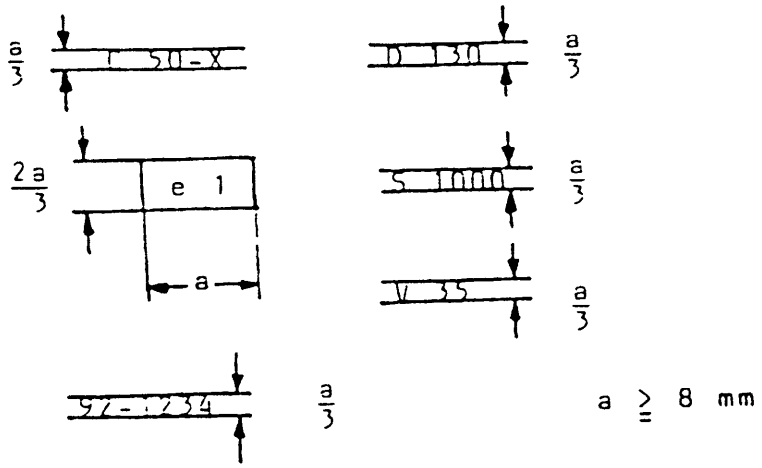
6.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application of paragraph 6.4.2. the inspector shall select samples to be sent to the Technical Service which has conducted the type approval tests.

6.4.4. The competent authority may carry out any test prescribed in this Directive.

6.4.5. The normal frequency of inspections authorized by the competent authority shall be one per year. In the case where negative results are recorded during one of these visits, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.

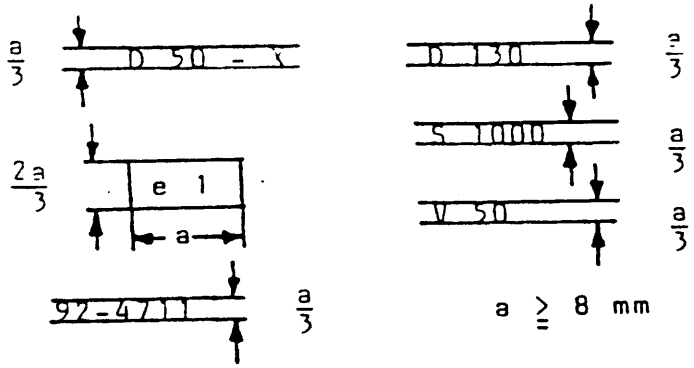
ANNEX II

a) Example EEC approval mark for a drawbar coupling



The coupling device with the EEC approval mark illustrated above is a non-standard drawbar coupling of Class C50-X with a maximum permitted D value of 130 kN, a maximum permitted static vertical bearing load of 1000 kg and a maximum permitted V-value of 35 kN, for which EEC component type approval was granted in the Federal Republic of Germany (el) under the number 92-1234.
If any characteristic values, such as S and V, are not relevant, the positions must be marked with a dash.
Characteristic values D;S and V are not required for standard couplings.

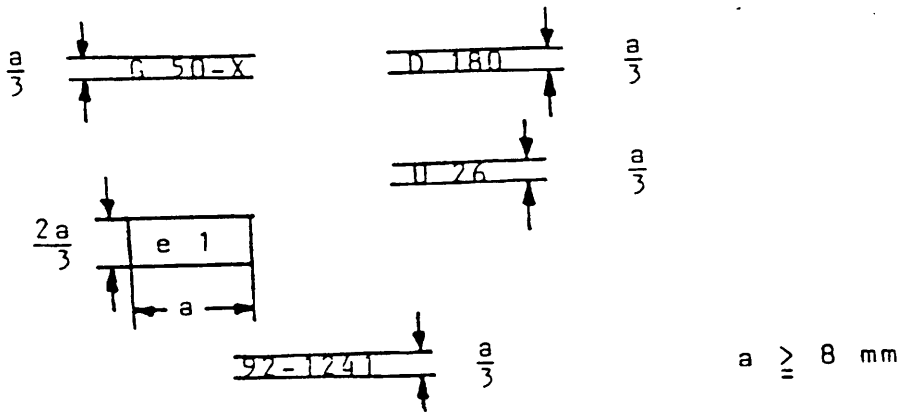
b) Example EEC approval mark for a drawbar eye



The coupling device with the EEC approval mark illustrated above is a non-standard drawbar eye 50 of Class D50-X for welding attachment having a D value of 130 kN, a maximum permitted static vertical bearing load of 1000 kg and a maximum permitted V-value of 50 kN, for which EEC component type approval was granted in the Federal Republic of Germany (el) under the number 92-4711.

If any characteristic values, such as S and V with hinged drawbar, are not relevant, the positions must be marked with a dash. Characteristic values D, S and V are not required for standard coupling devices.

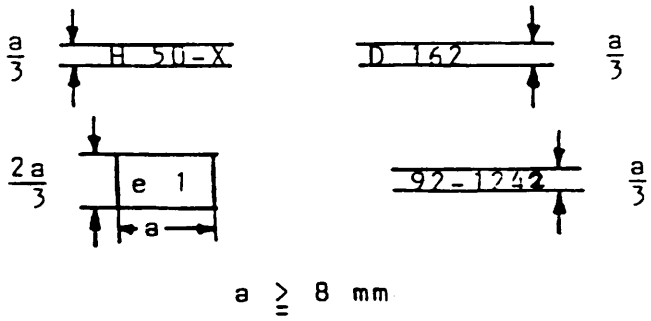
c) Specimen EEC approval mark for a fifth wheel coupling



The coupling device with the EEC approval mark illustrated above is a non-standard fifth wheel coupling of Class G50-X having a maximum permitted D value of 180 kN and a maximum permitted fifth wheel load of 26 t, for which EEC component type approval was granted in the Federal Republic of Germany (el) under the number 92-1241.

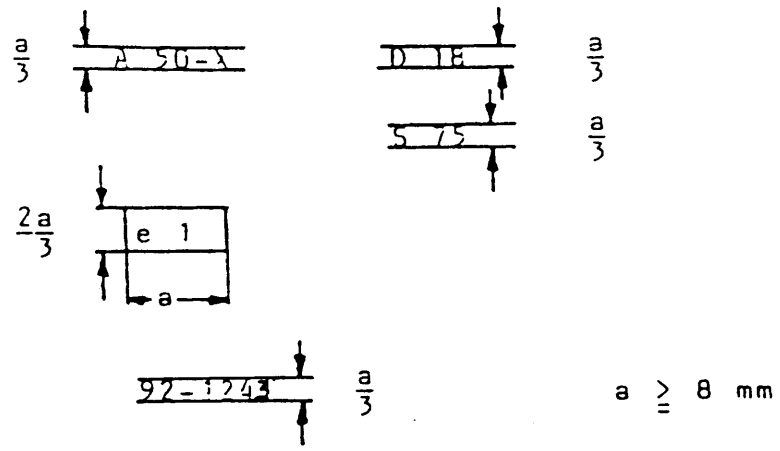
Characteristic values D and U are not relevant at all for standard fifth wheels.

d) Specimen EEC approval mark for a fifth wheel coupling pin



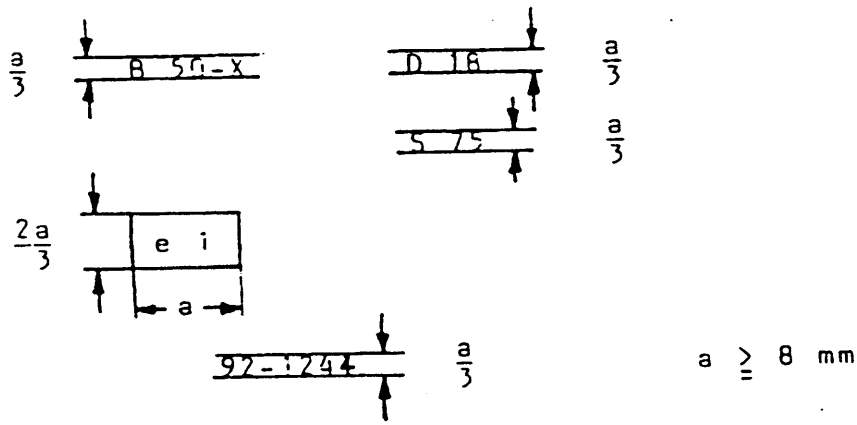
The coupling device with the EEC approval mark illustrated above is a non-standard fifth wheel coupling pin of Class H50-X having a D value of 162 kN for which EEC component type approval was granted in the Federal Republic of Germany (el) under the number 92-1242.

e) Specimen EEC approval mark for a coupling ball and towing brackets



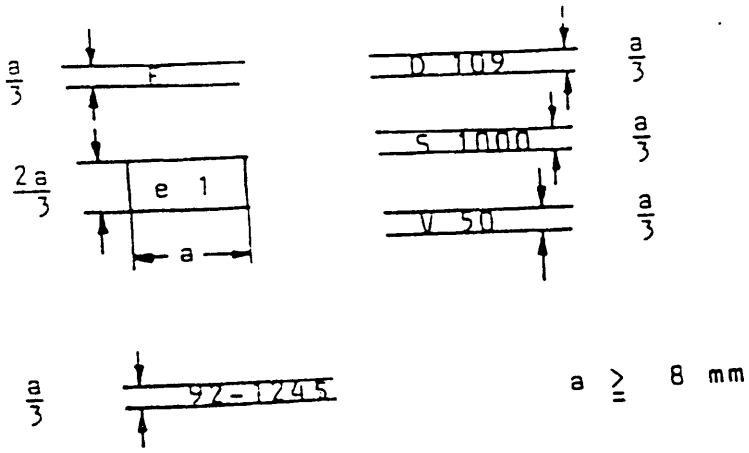
The coupling device with the EEC approval mark illustrated above is a non-standard coupling ball and towing brackets of Class A 50-X having a maximum permitted D value of 18 kN and a maximum permitted static vertical bearing load of 75 kg, for which EEC component type approval was granted in the Federal Republic of Germany (el) under the number 92-1243.

f) Specimen EEC approval mark for a coupling head



The coupling device with the EEC approval mark illustrated above is a non-standard coupling head of Class B50-X having a D value of 18 kN and a maximum permitted static vertical bearing load of 75 kg, for which EEC component type approval was granted in the Federal Republic of Germany (el) under the number 92-1244.

g) Specimen EEC approval mark for a drawbar



The coupling device with the EEC approval mark illustrated above is a drawbar for a centre axle trailer of Class E with a maximum permitted D value of 109 kN, a maximum permitted static vertical bearing load of 1000 kg and a maximum permitted V-value of 50 kN, for which EEC component type approval was granted in the Federal Republic of Germany (e1) under the number 92-1245.
If any characteristic values, such as S and V with hinged drawbar, are not relevant, the positions must be marked with a dash.

ANNEX III

Information Document N°. .....
relating to the EEC Coponent Type Approval of
Mechanical Coupling Devices for Motor Vehicles and their Trailers (.../.../EEC)

0. GENERAL

0.1. Make (trade name of manufacturer):
0.2. Type and commercial description(s):
0.5. Name and address of manufacturer:
0.7. Location and method of affixing of the EEC approval mark:

1 CONNECTIONS BETWEEN DRAWING VEHICLES AND TRAILERS AND SEMI-TRAILERS

1.1. Detailed technical description (including drawings and material specifications) of the type of the mechanical coupling device:
1.2. Class and type of the coupling device(s):
1.3. Maximum D-value(1):.....kN
1.4. Maximum vertical load S at the coupling point(1):.....kg
1.5. Maximum load U at the fifth wheel coupling (1):.....t
1.6. Maximum V-value(1).....kN
1.7. Instructions of attachment of the coupling type to the vehicle and photographs or drawing of the fixing points at the vehicle given by the manufacturer; additional information, if the use of the coupling type is restricted to special types of vehicles:
1.8. Information of the fitting of special towing brackets or mounting plates(1):

Date, File

(1) if applicable

ANNEX IV

M O D E L (a)
(maximum format: A4 (210 x 297)

EEC TYPE-APPROVAL CERTIFICATE

Communication concerne the :

- type-approval(1)
- extension of type-approval (1)
- refusal of type-approval(1)
- withdrawal of type approval(1)

of a type of a component(1) with regard to Directive (..../..../EEC), as last amended by Directive.....

Type-approval number(2) :

Reason for extension:

SECTION I

0.1. Make (trade name of manufacturer):
0.2. Type and commercial description(s):
0.3. Means of identification of type if marked on the component (1)(3)
0.3.1. Location of that marking:
0.5. Name and address of manufacturer:
0.7. Location and method of affixing of the EEC approval mark:

SECTION II

1. Additional information (where applicable): See Appendix I
2. Technical service responsible for carrying out the tests:
3. Date of test report:
4. Number of test report:
5. Remarks (if any) : See Appendix I
6. Place:
7. Date:
8. Signature:
9. The index to the information package lodged with the competent authority that has granted type approval, which may be obtained on request, is attached.

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(1) Delete where not applicable

(2) The EEC type-approval number appearing on this document shall consist of all sections outlined in Annex VII to Directive 70/156/EEC, as last amended by Directive .../.../EEC. the component itself shall be marked as prescribed in the relevant separate Directive.

(3) If the means of identification of type contains characters not relevant to describe the component types covered by this type-approval certificate such characters shall be represented in the documentation by the symbol : "?" (e.g. ABC??123??)

Appendix I

to EEC type-approval certificate no. .....
concerning the component type approval of mechanical coupling devices with regard to Directive .../.../EEC

1. Additional information

1.1. Class of the type of coupling:

1.2. Catégories or types of vehicles for which the device is designed or restricted:

1.3. Maximum D-value(1):.... kN

1.4. Maximum vertical load S at the coupling point (1):.....kg

1.5. Maximum load U at the fifth wheel coupling point (1).....t

1.6. Maximum V-value (1): .... kN

1.7. Use of special towing brackets or mounting plates:
yes/no

5. Remarks:

(1) Delete where not applicable

ANNEX V

Requirements for mechanical coupling devices

1. Coupling balls and towing brackets

The requirements stated in 1.1. to 1.4. are applicable to all coupling balls and towing brackets of Class A.
Section 1.5. lists additional requirements which must be fulfilled by standard coupling balls 50 and flange type towing brackets.

1.1. Coupling balls of Class A must conform to Fig. 2 in shape and dimensions.

1.2. The shape and the dimensions of the towing brackets have to meet the requirements of the vehicle manufacturer concerning the attachment points and additional mounting devices, if necessary.

1.3. In the case of removable coupling balls the point of connection and their locking must be designed for positive mechanical engagement.

1.4. Coupling balls and towing devices must be able to satisfy the tests laid down in Annex VI, Section 4.1.

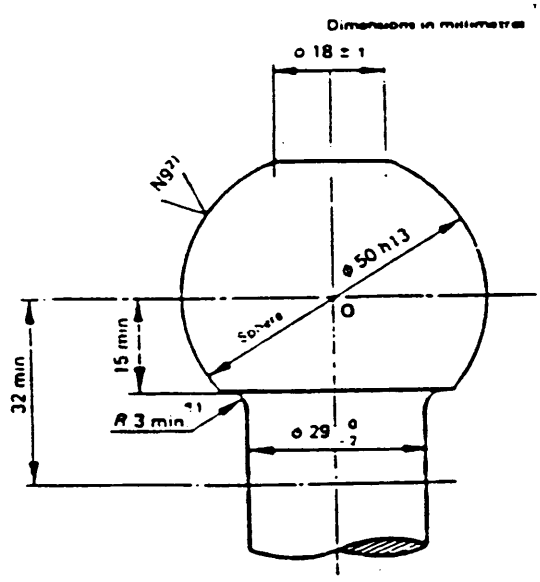


Fig 2

1) The connecting radius between the ball and the neck should be tangential both to the neck and to the lower horizontal surface of the coupling ball.

2) See ISO/R 468 and ISO 1302; the roughness number N9 refers to an R_a value of 6,3 mm.

1.5. Special requirements for standard coupling balls and flange type towing brackets of class A50-1, A50-2 and A50-3.

1.5.1. Dimensions of class A50-1 coupling balls and flange type towing brackets must be as given in Fig. 3 and Table 1.

1.5.2. Dimensions of class A50-2 and class A50-3 coupling balls and flange type towing brackets must be as given in Fig. 4 and Table 1.

1.5.3. Coupling balls and flange type towing brackets of the classes A50-1, A50-2 and A50-3 must be suitable and tested for the characteristic values given in Table 2.

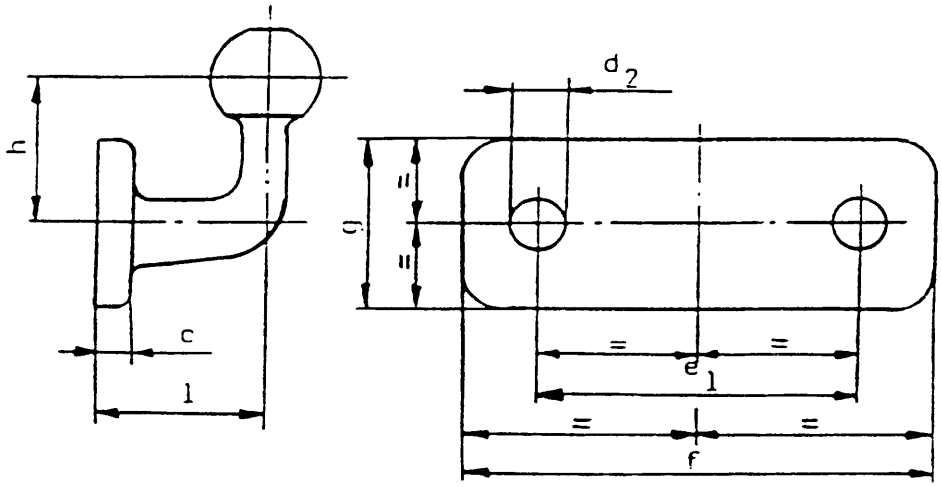


Fig. 3 Dimensions of standard ball couplings and flange type towing brackets of Class A50-1 (mm), see Table 1

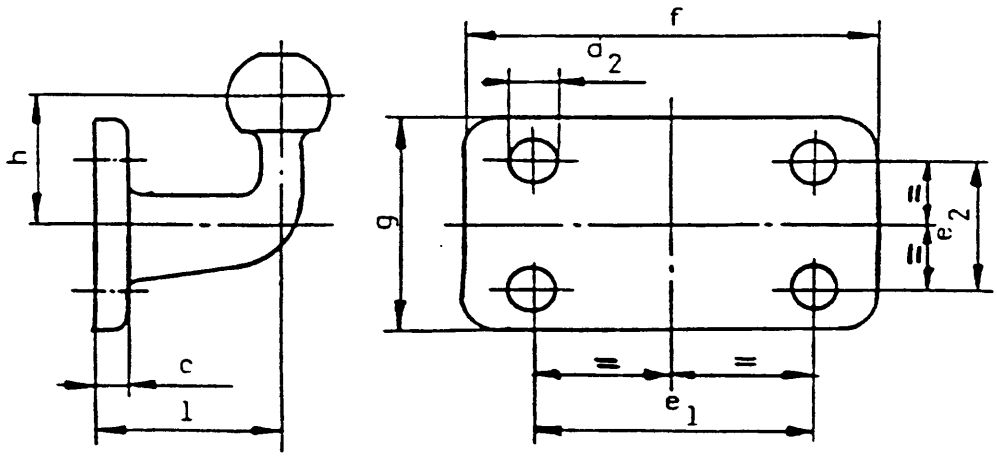


Fig. 4 Dimensions of standard ball couplings and flange type towing brackets of Classes A50-2 and A50-3 (mm), see Table 1Table 1:

Dimensions of standard ball couplings and flange type towing brackets (mm), see Fig. 3 and Fig. 4

	A50-1	A50-2	A50-3	remark
e1	90	83	120	+/-0,5
e2	-	56	55	+/-0,5
d2	17	10,5	15	H13
f	130	110	155	+6,-0
g	50	85	90	+6,-0
c	15	15	15	max
l	55	110	120	+/-5
h	70	80	80	+/-5

Table 2: Characteristic values for standard ball couplings and flange type towing brackets
D = Max. D-value (kN)
S = Max. static vertical load (kg)

	A50-1	A50-2	A50-3
D	10	20	30
S	75	100	120

2. Coupling heads

2.1. Coupling heads of Class B50 must be designed so that they can be used safely with the coupling balls described in Section 1 of this Annex and thereby retain the prescribed characteristics.

2.2. Coupling heads must be able to satisfy the tests laid down in Annex VI, Section 4.2.

2.3. Any additional device (e.g. braking, stabilizer etc.) shall not have any adverse effect on the mechanical connection.

2.4. Horizontal rotation of the coupling head at least 90° to either side of the centreline of the coupling ball and mounting described in Section 1 of this Annex when not attached to the vehicle must be possible.
Simultaneously there must be an angle of free vertical movement 20° above and below the horizontal. Also, in conjunction with the horizontal angle of rotation of 90° it must be possible for there to be 25° of roll in both directions about the horizontal axis. The following combinations of motions must be possible:

vertical pitch ± 15° with axial roll ± 25°
axial roll ± 10° with vertical pitch ± 20°

at all angles of horizontal rotation.

3. Drawbar couplings

The requirements of 3.1 to 3.8 are applicable to all drawbar couplings of Class C50.
Item 3.9 lists the additional requirements which must be fulfilled by standard drawbar couplings of Classes C50-1 to C50-7.

3.1. Load requirements
All drawbar couplins shall be able to satisfy the tests stated in Annex VI, item 4.3.

3.2. Suitable drawbar eyes
Class C50 drawbar couplings shall be compatible with all Class D50 drawbar eyes and coupling with the specified characteristics.

3.3. Automatic operation
Drawbar couplings must be automatic in operation (see Annex I, item 2.1.17).

3.4. Jaw
Class C50 drawbar couplings must have a jaw which is designed such that the appropriate drawbar eyes is guided into the coupling.

If the jaw, or a part supporting the jaw, can pivot about the vertical axis, it must establish itself automatically in the normal position and, with the coupling pin open, be restrained in a positive mechanical engagement in this position.

If the jaw, or a part supporting the jaw, can pivot about the transverse axis, the joint providing the rotation capability must be restrained in its normal position by a locking torque. This torque must be sufficient to prevent a force of 200 N acting vertically upwards on the top of the jaw producing any deflection of the joint from its normal position. It must be possible to bring the jaw to its normal position manually. A jaw that pivots about the transverse axis is only approved for vertical bearing loads S of up to 50 kg and a V-value of up to 5 kN.

If the jaw, or a part supporting the jaw, is pivoted about the longitudinal axis, the rotation must be restrained by a locking torque of at least 100 Nm.

The minimum required size of the jaw depends on the D value of the coupling:

D-value $\geq$ 18 kN	: width 150 mm, height 100 mm
18 kN < D-value $\leq$ 25 kN	: width 280 mm, height 170 mm
25 kN < D-value	: width 360 mm, height 200 mm

The external corners of the jaw may be radiused.
Smaller jaws are permitted for Class C50-X drawbar couplings if their use is restricted to centre axle trailers up to 3.5 t maximum permissible mass or if the use of a jaw from the above table is impossible due to technical reasons and if, furthermore, there are special circumstances such as visual aids

for ensuring safe execution of the automatic coupling procedure and if the field of application is restricted in the approval according to Annex III.

3.5. Minimum freedom of movement of the coupled drawbar eye

The coupled drawbar eye must be able to rotate horizontally ± 90° about the vertical axis from the longitudinal axis of the vehicle (see Fig. 5).
The coupled drawbar eye must be able to rotate vertically ± 20° about the transverse axis from the horizontal axis of the vehicle (see Fig. 6). If the motion is provided by a special joint (only on Class C50-X drawbar couplings) the field of application given in the approval according to Annex III must be restricted to the cases stated in Annex VII, Section 2.3.7.
It must be possible for the coupled drawbar eye to be rotated axially ± 25° about the longitudinal axis from the horizontal plane of the vehicle (see Fig. 7).
The stated angles of rotation are applicable to drawbar couplings not attached to the vehicle.

3.6. Minimum angle for coupling-up and uncoupling

Coupling and uncoupling of the drawbar eye must also be possible when the longitudinal axis of the drawbar eye in relation to the centreline of the jaw:

3.6.1. is rotated 50° horizontally to right or left
3.6.2. is rotated 10° vertically up or down
3.6.3. is rotated 10° axially to right or left.

3.7. Locking to prevent inadvertent uncoupling

In the closed position the coupling pin must be secured by two positive mechanical securing devices each of which must remain effective should the other fail.

The closed and secured position of the coupling must be clearly indicated externally by a mechanical device. It must be possible to verify the position of the indicator by feel, e.g. in the dark.

The mechanical device must indicate the engagement of both locking devices (an AND condition).

However, it is sufficient for the engagement of only one locking device to be indicated if, in this situation, engagement of the second locking device is an inherent feature of the design.

3.8 Hand levers

Hand levers must be of a design suitable for easy use with the end rounded off. The coupling must have no sharp edges or points of possible pinching near the hand lever which could result in injury during operation of the coupling.

The force needed to release the coupling, measured without the drawbar eye, must not exceed 250 N perpendicular to the hand lever along the line of operation.

3.9 Special requirements for standard drawbar couplings of Class C50-1 to C50-7

3.9.1 the swivel motion of the drawbar eye about the transverse axis must be achieved through the spherical shape of the coupling pin (and not by means of a special joint, see Fig. 6).

3.9.2 Tensile and compressive shock loads along the longitudinal axis due to the clearance between the coupling pin and the drawbar eye must be attenuated by spring and/or damping devices (except C50-1).

3.9.3 The dimensions given in Fig. 8 and Table 3 must be adhered to.

3.9.4 The couplings must be suitable and tested for the characteristic values given in Table 4.

3.9.5 The couling must be opened by means of a hand lever at the coupling (no remote control).

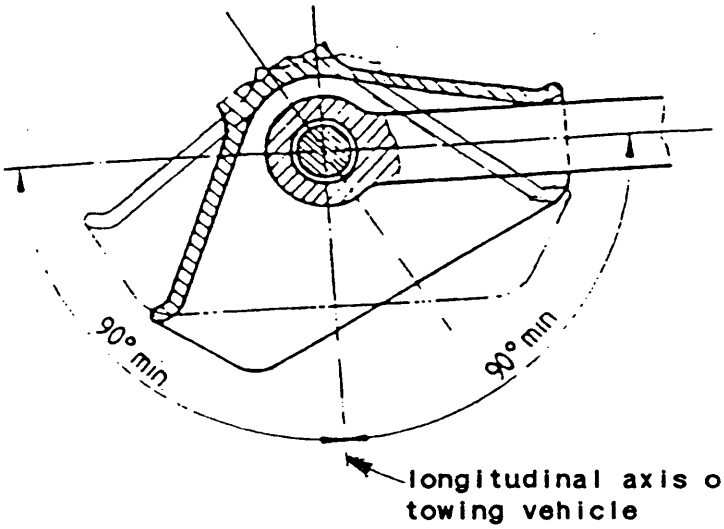


Fig. 5 Minimum horizontal rotation of the coupled drawbar eye ± 90° about the vertical axis from the longitudinal axis of the vehicle

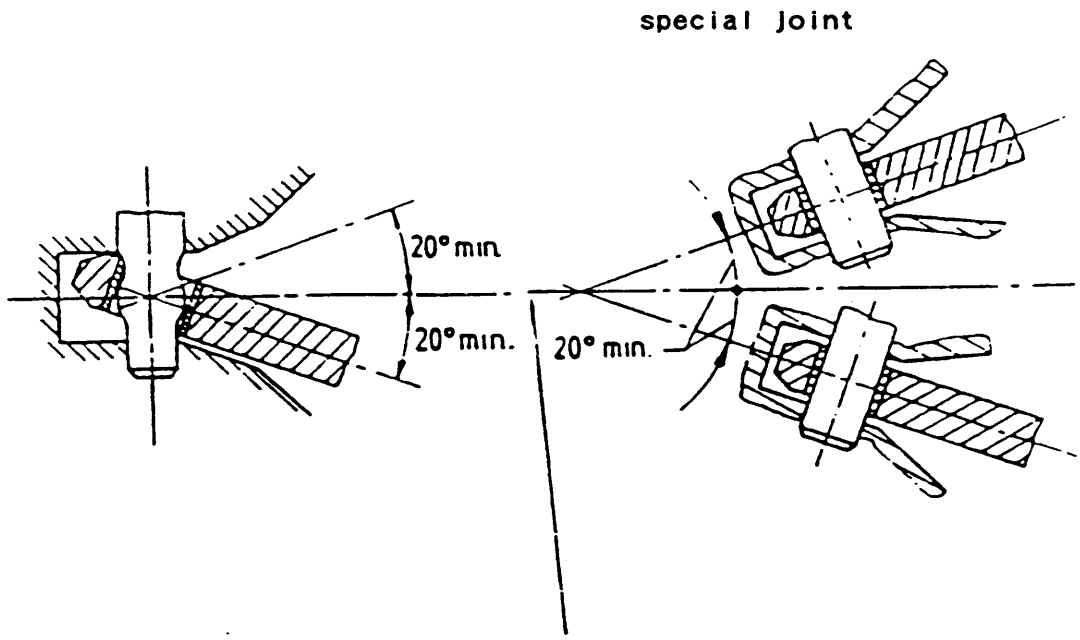
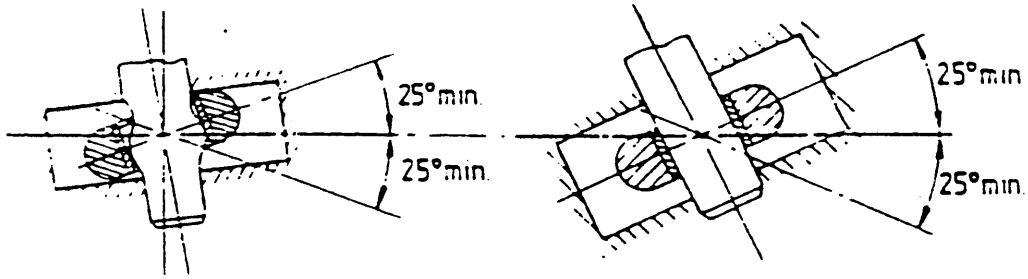


Fig. 6 Minimum vertical rotation of the coupled drawbar eye ±20° about the transverse axis from the horizontal plane of the vehicle.



Horizontal plane

Fig.7 Minimum axial rotation of the coupled drawbar eye ±25° about the longitudinal axis from the horizontal plane of the vehicle

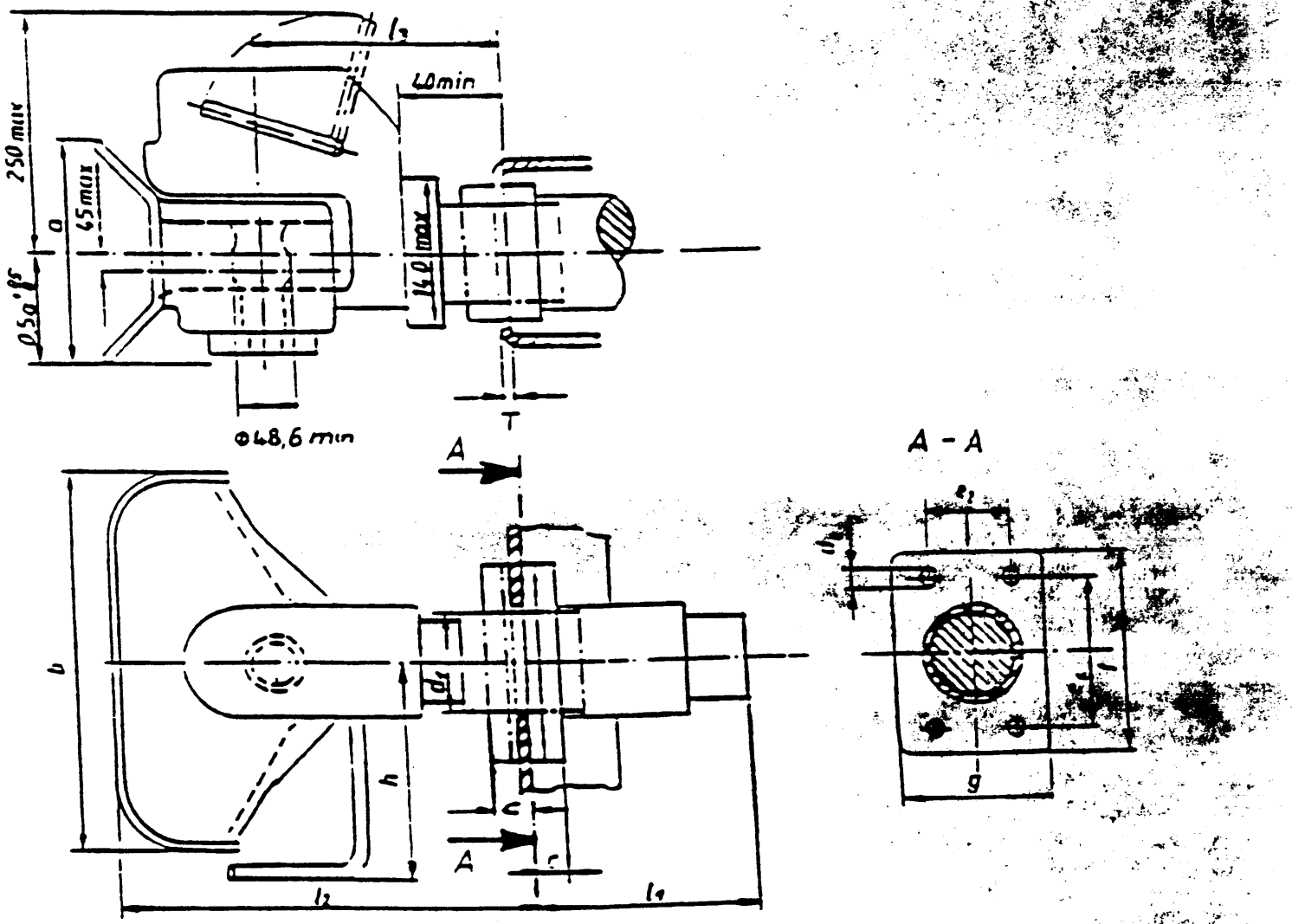


Fig.8 Dimensions of the standard drawbar coupling (mm), see Table 3

Table 3 : Dimensions of standard drawbar couplings (mm), see Fig. 8

	C50-1	C50-2	C50-3	C50-4	C50-5	C50-6	C50-7	remark
e1	83		120	140	160		200	+/-0,5
e2	56		55	80	100		120	+/-0,5
d1	-	54	74	84	94		124	max.
d2	10,5		15	17	21		25	H13
f	110		155	180	200		250	+6,-0
g	85		90	120	140		170	+/-3
a	100	170	200	200	200		200	+20,-0
b	150	280	360	360	360		360	+20,-0
c	20		24	30	30		40	max.
h	150	190	265	265	265		265	max.
l1	-	150	250	300	300		300	max.
l2	150	300	330	330	330		330	max.
l3	100	160	180	180	180		180	+/-20
T	-	15	20	25	25	30	30	max.

Table 4 : Characteristic values for standard drawbar couplings
D = Max. D value (KN)
S = Max. static vertical bearing load (kg)
V = Max. V-value (KN)

	C50-1	C50-2	C50-3	C50-4	C50-5	C50-6	C50-7
D	18	25	70	100	130	190	250
S	200	250	650	900	1000	1000	1000
V	12	10	18	25	35	50	85

4. Drawbar eyes

The requirements stated in 4.1 are applicable to drawbar eyes of Class D50.

Sections 4.2 to 4.5 list the additional requirements which must be fulfilled by standard drawbar eyes.

4.1 General requirements for drawbar eyes

All drawbar eyes shall be able to satisfy the test stated in Annex VI item 4.4.

Class D50 drawbar eyes are intended for use with C50 drawbar couplings.

Drawbar eyes must not be able to rotate axially (because the respective couplings can rotate).

If Class D50 drawbar eyes are fitted with sleeves, they shall comply with the dimensions shown in Fig. 13 (except class D50-C) or Fig. 14.

The sleeves must not be welded into the drawbar eyes.

Class D50 drawbar eyes must have the dimensions illustrated in Fig. 9 (if not stated otherwise in 4.2, 4.3 or 4.4)
The form of shank for drawbar eyes of Class D50-X is not specified, but in a distance of 210 mm from the centre of the eye the height "h" and the width "b" must be within the limits given by Table 6.

4.2 Special requirements for drawbar eyes of Class D50-A

Drawbar eyes of class D50-A must have the dimensions illustrated in Fig. 9.

4.3 Special requirements for drawbar eyes of Class D50-B

Class D50-B drawbar eyes must have the dimensions illustrated in Fig. 10.

4.4 Special requirements for drawbar eyes of Class D50-C

Class D50-C1 drawbar eyes must have the dimensions illustrated in Fig. 11.

Class D50-C2 drawbar eyes must have the dimensions illustrated in Fig. 12.

Class D50-C drawbar eyes must be fitted with the sleeves illustrated in Fig. 14.

4.5 Load values for standard drawbar eyes

The standard drawbar eyes and their means of attachement must be suitable and tested for the load values stated in Table 5.

Table 5 : Characteristic values for standard drawbar eyes

D = Max. D value (KN)
S = Max. static vertical bearing load (kg)
V = V-value (KN)

Class	D	S	V
D50-A	130	1000	30
D50-B	130	1000	25
D50-C1	190	1000	50
D50-C2	250	1000	85

Table 5

Table 6 : Dimensions for drawbar eyes D50-A and D50-X, see Fig.9

Class	h (mm)	b (mm)
D50-A	65^{+2}_{-1}	60^{+2}_{-1}
D50-X	67 max	62 max

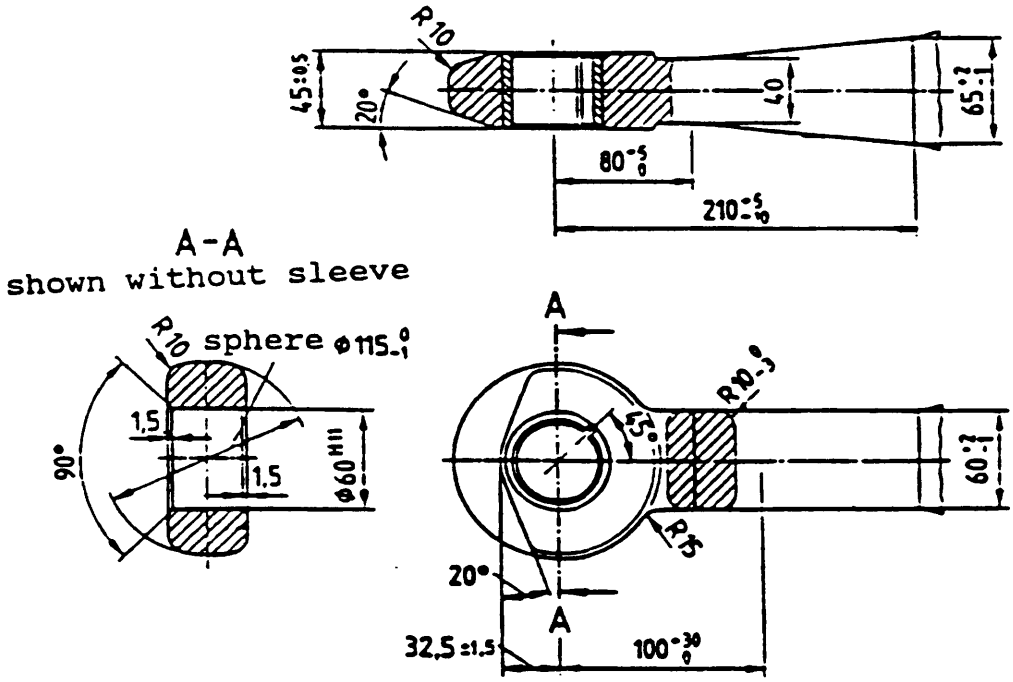
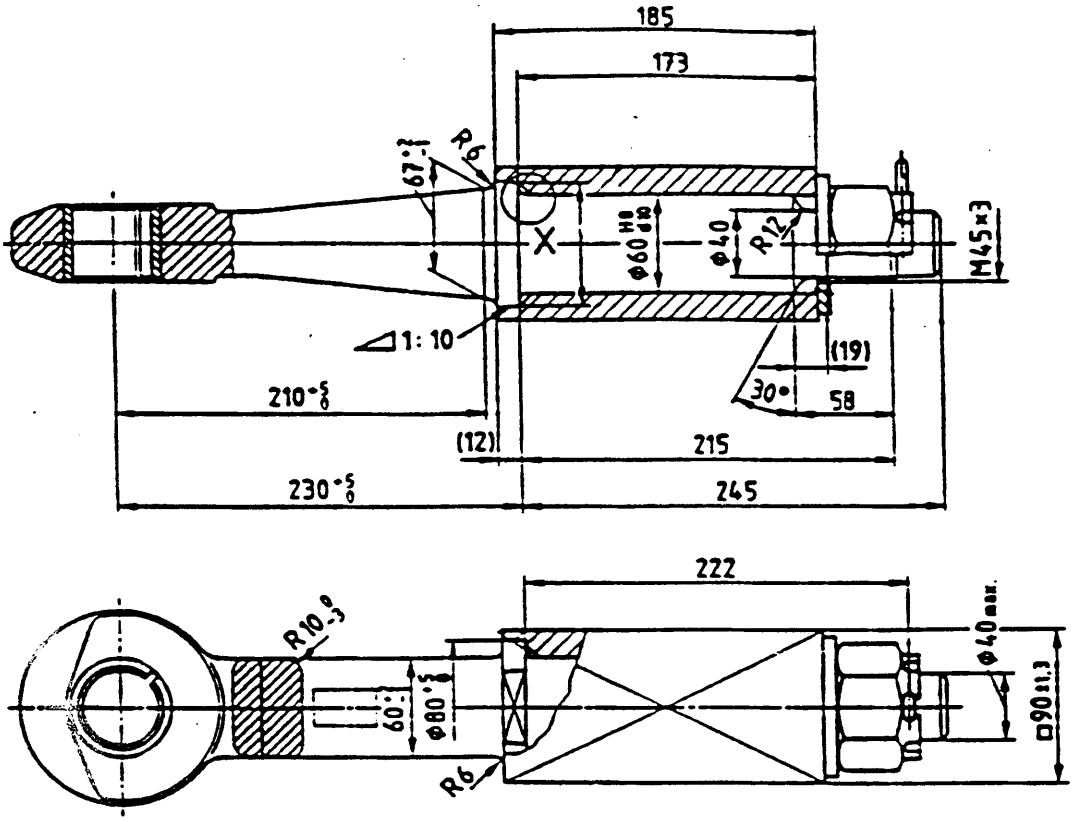
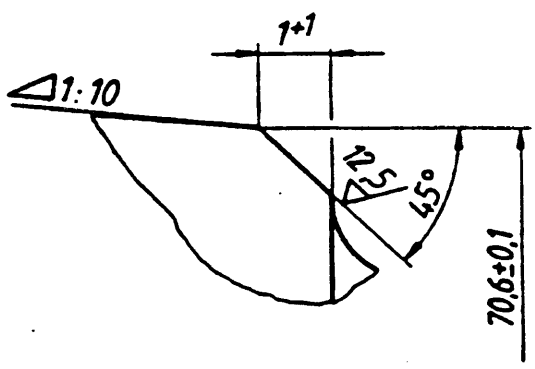
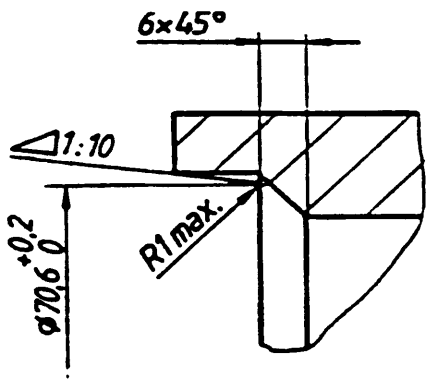


Fig. 9 Dimensions of Classes D50-A and D50-X drawbar eyes (see Table 6)





Drawbar eye



Drawbar eye socket

Fig. 10 Dimensions of Class D50-B drawbar eyes (see Fig. 9 for missing dimensions)

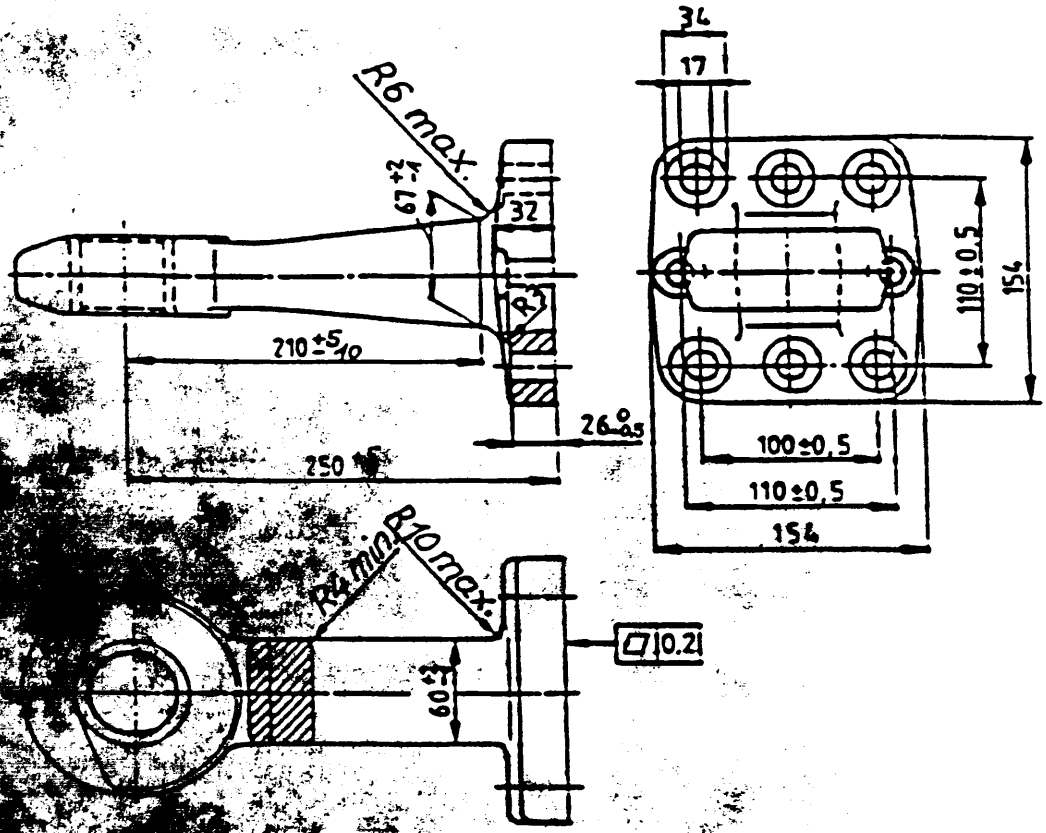


Fig. 11 — Dimensions of Class D50-C1 drawbar eyes (see Fig. 9 for missing dimensions)

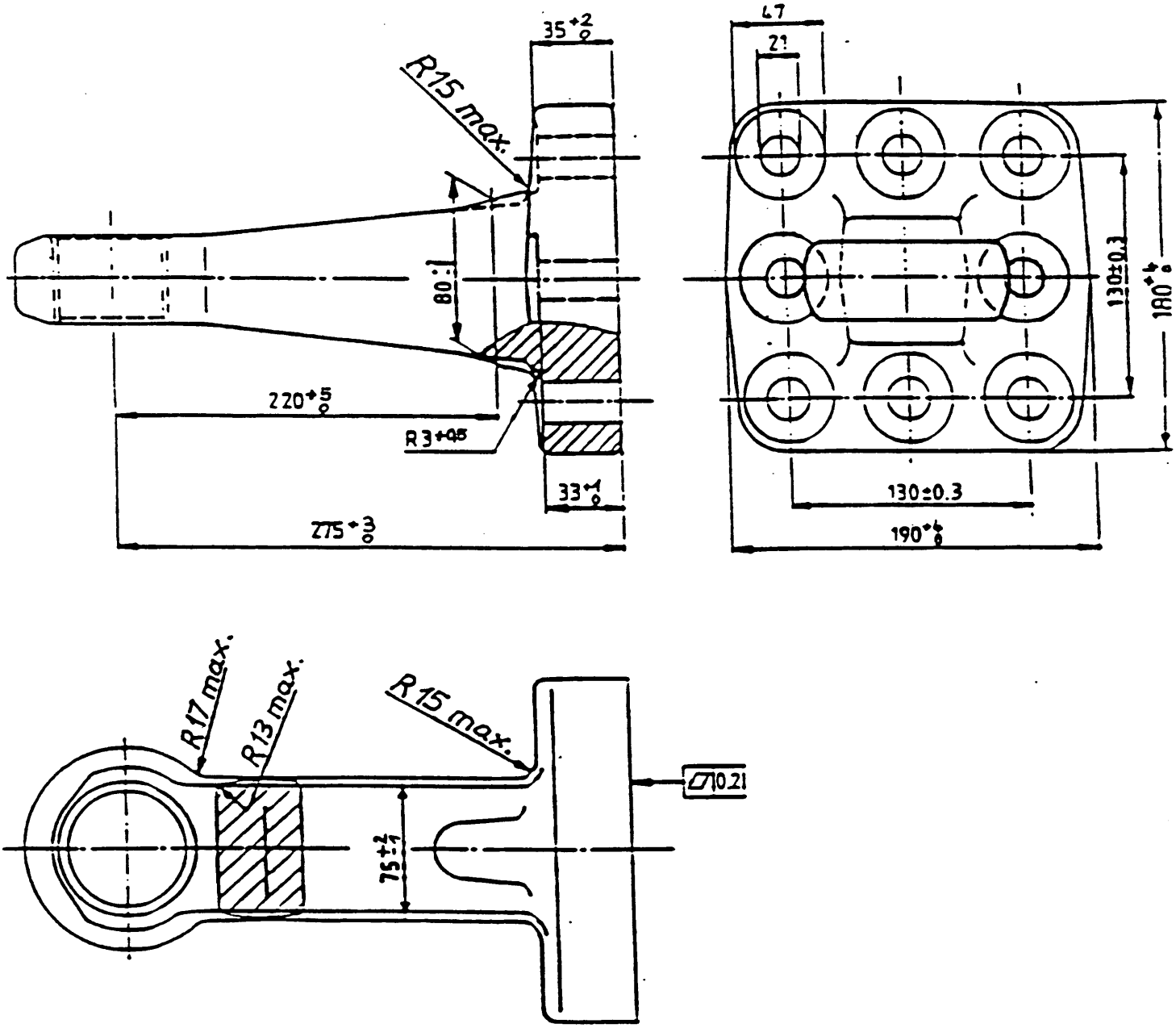


Fig. 12 Dimensions of Class D50-C2 drawbar eyes (see Fig. 9 for missing dimensions)

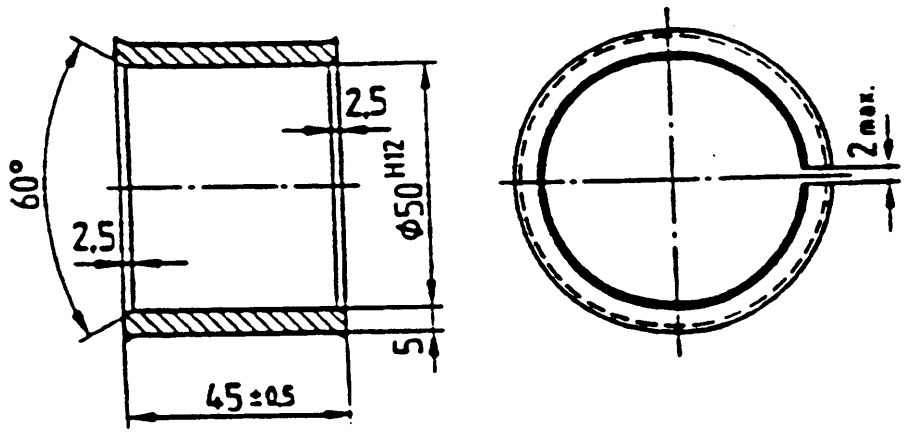


Fig. 13 Slotted sleeve for D50 drawbar eyes

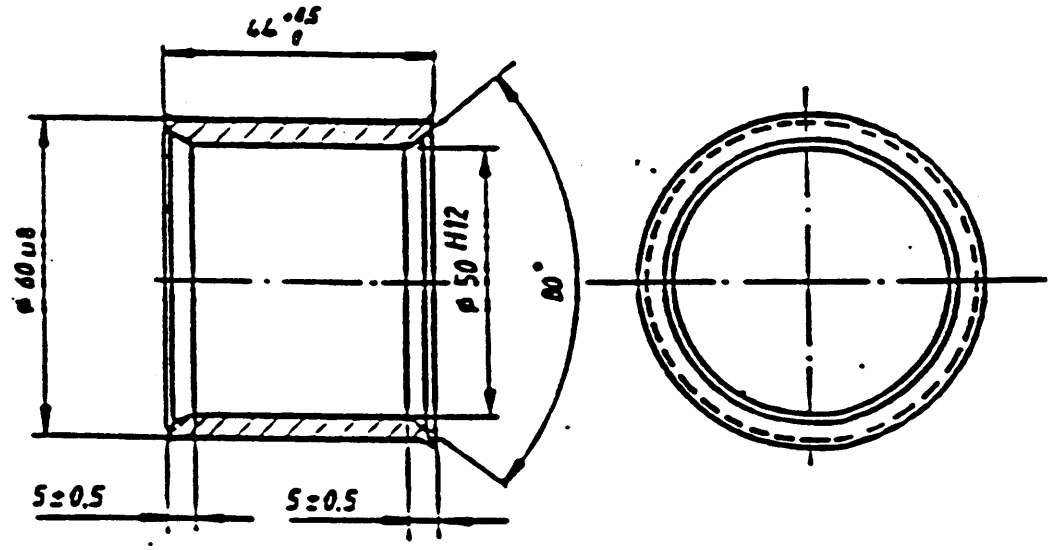


Fig. 14 Not slotted sleeve for D50-C drawbar eyes

5. Drawbars

5.1 Drawbars of class E must be able to satisfy the tests described in annex VI, Section 4.5.

5.2 In order to provide a connection to the towing vehicle, the drawbars can be fitted either with coupling heads as in Section 2 or drawbar eyes as in Section 4 of this Annex. The coupling heads and drawbar eyes can be attached by screwing, bolting or welding.

5.3 Hinged drawbars must be clear of the ground.
They shall not fall below a height of 200 mm from the ground when released from the horizontal position.

5.4 Height adjusting devices for hinged drawbars

5.4.1 Hinged drawbars have to be equipped with devices for adjusting the drawbar to the height of the coupling device of jaw. These devices must be designed so that the drawbar can be adjusted by one person without tools or any other aids.

5.4.2 Height adjusting devices must be able to adjust the drawbar eyes or ball couplings from the horizontal above the ground at least 300 mm upwards and downwards. Within this range the drawbar must be adjustable steplessly or in maximum steps of 50 mm measured at the drawbar eye or ball coupling.

5.4.3 The height adjusting device must not interfere with easy movement of the drawbar after coupling-up.

5.4.4 The height adjusting devices must not interfere with the action of any overrun brake.

5.5 In the case of drawbars combined with overrun brakes the distance between the centre of the drawbar eye and the end of the free shank of the drawbar eye must not be less than 200 mm in the brake application position. With the shank of the drawbar eye fully inserted the distance must not be less than 150 mm.

5.6 Drawbars for use on centre axle trailers must possess at least half the moment of resistance against lateral forces as against vertical forces.

6. Mounting frames

6.1 Mounting frames shall be appropriate for the attachment of the concerned coupling device to the corresponding vehicle(s).

6.2 Mounting frames must not be welded to the chassis, bodywork or other part of the vehicle.

6.3 Mounting frames must be able to satisfy the tests laid down in Annex VI, section 4.3.

7. Fifth wheel couplins and steering wedges

The requirements of 7.1 to 7.9 are applicable to all fifth wheel couplings of Class G50.
Section 7.10 lists the additional requirements which must be fulfilled by standard coupling devices.
Steering wedges must satisfy the requirements listed in 7.9.

7.1 Suitable fifth wheel coupling pins

Class G50 fifth wheel couplings must be designed so that they can be used with Class H50 coupling pins and provide the specified characteristics with them.

7.2 Automatic operation

Fifth wheel couplings must be automatic in operation.

7.3 Guides

Fifth wheel couplins must be equipped with a guide which ensures safe and secure engagement of the coupling pin. The entry width of the guide must be at least 350 mm.

7.4 Minimum free movement of the fifth wheel coupling with the coupling pin engaged (but with the fifth wheel coupling not attached to a mounting plate or vehicle)

With the coupling pin engaged, fifth wheel couplings must permit the following minimum values of rotation of the coupling pin in the travelling position:

7.4.1 ± 90° about the vertical axis (not applicable to fifth wheel couplings with positive sterring) and, simultaneously,

7.4.2 ± 12° about the horizontal axis transverse to the direction of travel. This angle does not necessarily cover off road use.

7.4.3 Rotation about the longitudinal axis of up to ± 3° is permitted. However, on a fully oscillating fifth wheel coupling, this angle may be exceeded, providing that a locking mechanism enables the restriction of the rotation up to ± 3°.

7.5 Locking devices to prevent uncoupling of fifth wheel couplings

The locking mechanism of the coupling must secure the coupling pin two positive ways; the second locking device may operate on the first. The first locking device must operate automatically at coupling-up. If the second locking device has to be operated by hand it should only be possible to engage it after the first device has been fully engaged. If the second locking device operates automatically, the engagement of both must be indicated visually.

7.6 Operating devices

In the closed position the operating devices must be secured to prevent inadvertent operation.

7.7 Surface finish

The surfaces of the coupling plate and coupling lock must be functionally satisfactory and carefully machined, forged, cast or pressed.

7.8 Load requirements

All fifth wheel couplings must be able to satisfy the tests described in Annex VI, Section 4.6.

7.9 Steering wedges

Couplings of Class G50-X which are unsuitable for positive steering must be marked appropriately.

7.9.1 The dimensions of steering wedges for the positive steering of semi-trailers must be as in Fig. 16.

7.9.2 The steering wedge must allow safe and secure coupling-up. The steering wedge must be spring-mounted.
The strength of the spring must be selected so that it is possible to couple up an unloaded semi-trailer and so that, with the semi-trailer fully loaded, the steering wedge is firmly in contact with the flanks of the coupling during travel.
Uncoupling of the fifth wheel must be possible with the semi-trailer both loaded and unloaded.

7.10 Special requirements for standard fifth wheels couplings

7.10.1 Standard fifth wheel couplings of Classes G50-1, G50-2, G50-3 and G50-4 must have the dimensions indicated in Fig. 15 and Table 7.

7.10.2 Standard fifth wheel couplings must be suitable for and tested for a D-value of 150 KN and a value of U of 20 t.

7.10.3 Release must be possible by a hand lever directly at the coupling.

7.10.4 Standard fifth wheel couplings must be suitable for the positive steering of semi-trailers by means of steering wedges (see section 7.9.).

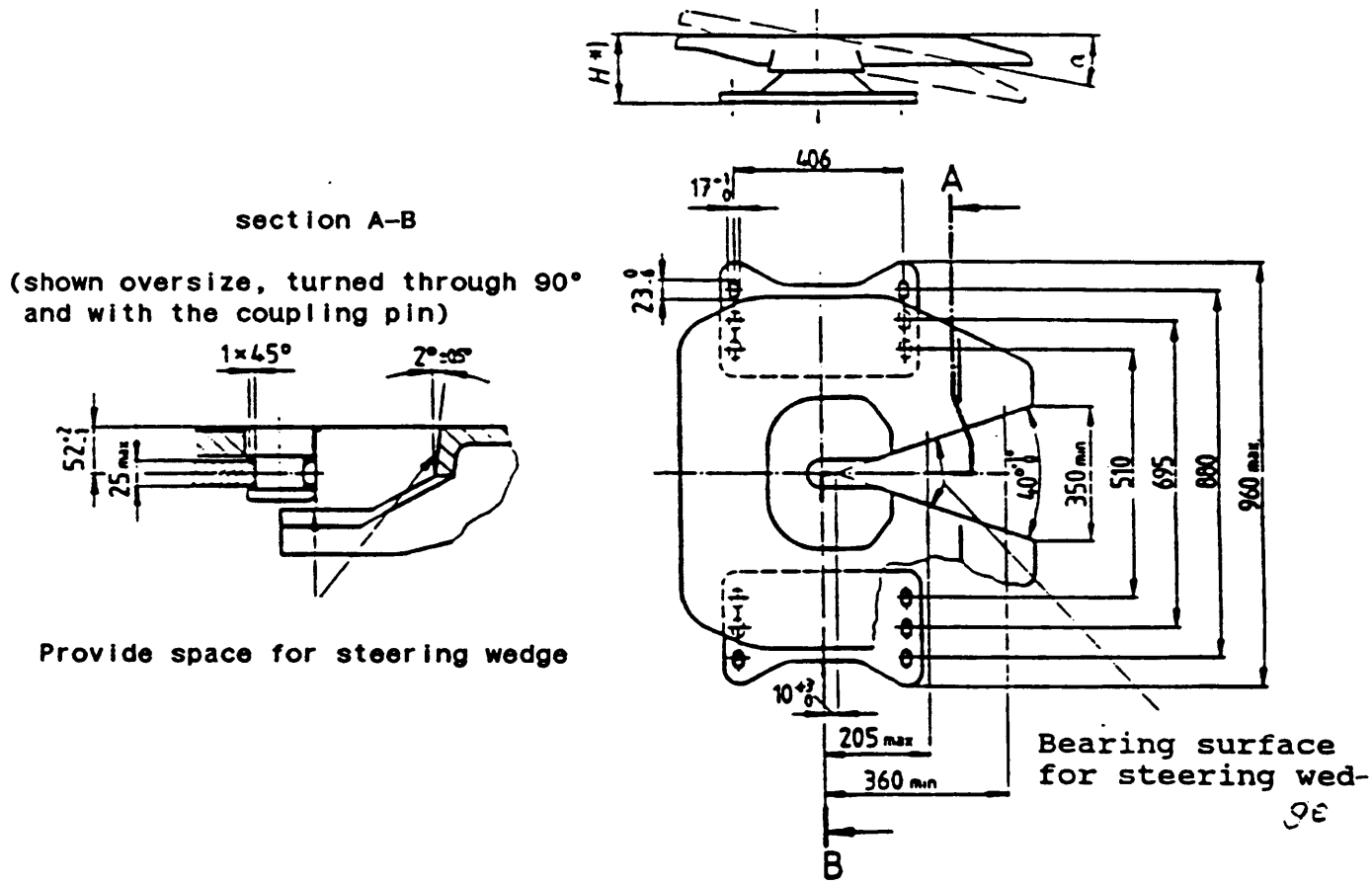
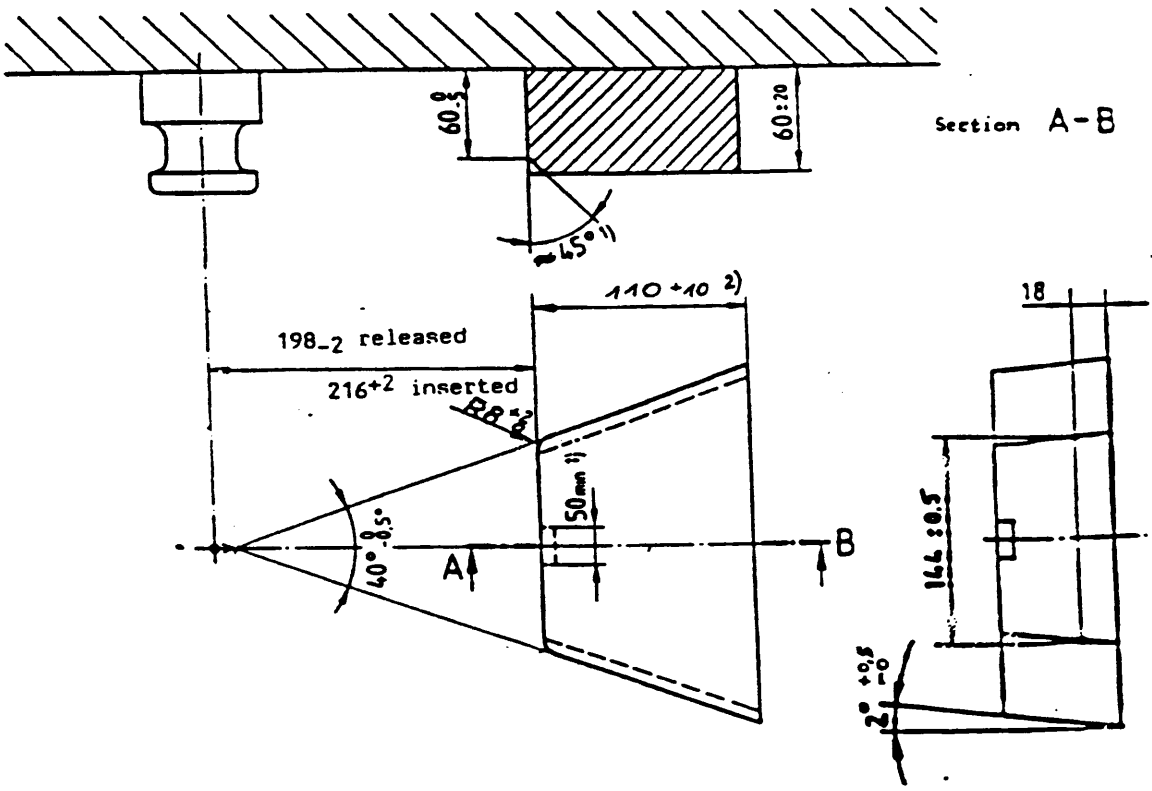


Fig. 15 Dimensions of standard fifth wheel couplings (see Table 7)

Table 7 Dimensions of standard fifth wheel couplings (mm) (see Fig. 15)

	G50-1	G50-2	G50-3	G50-4
H	150 ± 10	175 ± 10	200 ± 10	250 ± 10
h	52 + 2 − 1			
a	minimum ±12°			



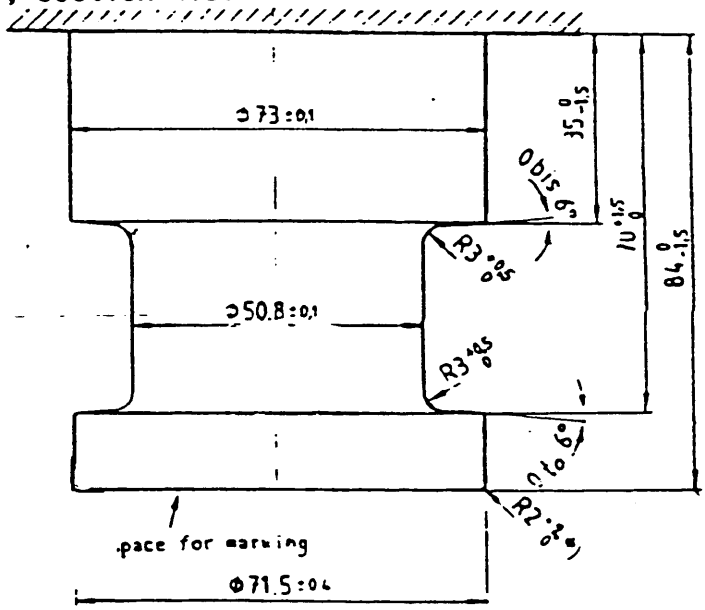
1) Only applicable to steering wedges over 60 mm thick
2) This dimension only refers to the functional surface; the steering wedge itself can be longer

Fig. 16 Dimensions of spring-mounted steering wedges

8. Fifth wheel coupling pins

8.1 Fifth wheel coupling pins of Class H50 (ISO 337) must have the dimensions shown in Fig. 17.

8.2 The coupling pins must be able to satisfy the tests described in Annex VI, Section 4.8.



☆ optional chamfer 2 +1 0 × 45°

Fig. 17 Dimensions of Class H50 fifth wheel coupling pins

9. Mounting plates

9.1 Class J mounting plates for fifth wheel couplings must have a hole configuration corresponding to Classes G50-1, G50-2, G50-3 and G50-4 if they are intended for standard fifth wheel couplings.

9.2 Mounting plates for standard fifth wheel couplings must be suitable for the positive steering of semi-trailers (with steering wedges). Mounting plates for non-standard fifth wheel couplings which are unsuitable for positive steering must be marked appropriately.

9.3 Mounting plates for fifth wheel couplings must be able to satisfy the tests described in Annex VI, Section 4.7.

10. Devices for remote indication and remote control

10.1 General requirements

Devices for remote indication and remote control are permitted on automatic coupling devices of Classes C50-X and G50-X.

Devices for remote indication and remote control must not interfere with the minimum free movement of the coupled drawbar eye or coupled semi-trailer. They must be permanently connected to the vehicle.

All the devices for remote indication or remote control fall within the scope of testing and approval of the coupling device together with all parts of the operating devices and transmission devices.

10.2 Remote indication

10.2.1 For an automatic coupling procedure, remote indication devices must indicate the closed and doubly locked position of the coupling in an optical manner according to section 10.2.2 and/or 10.2.3.

10.2.2 The change from the open to the closed and doubly locked position shall be indicated by a green optical signal.

10.2.3 If the open and/or unsecured position is indicated, a red optical signal shall be used.

10.2.4 In the case of indicating the termination of the automatic coupling procedure, the remote indication has to ensure that the coupled devices are really connected together (e.g. that pin has actually engaged in the drawbar eye).

10.2.5 The appearance of any fault in the remote indication system shall not indicate a closed and locked position during the coupling procedure if the endposition has not been reached.

10.2.6 The disengagement of one of the two locking devices must cause the green optical signal to extinguish and/or the red optical signal to show.

10.2.7 The mecanical indicators directly at the coupling device must be retained.
The remote indication device shall be automatically activated during every coupling procedure.

10.2.8 In order to avoid distracting the driver during normal driving, there shall be a provision for switching off the remote indication device.

10.2.9 The operating controls and indicators of the remote indication devices must be mounted within the driver's field of vision and be permanently and clearly identified.

10.3 Remote control

10.3.1 If a remote control device is employed, there must also be a remote indication device as described in 10.2 which must also indicate the open condition of the coupling.

10.3.2 There must be a dedicated switch (i.e. master switch, lever or valve) for enabling or barring opening of the coupling by means of the remote control device. If this master switch is not located in the driving cab it must not be in a position where it is freely accessible to unauthorized persons or it must be lockable. The actual operation of the coupling from the driving cab may only be possible when inadvertent operation has been precluded.

It must be possible to ascertain whether opening of the coupling under remote control has been enabled or not.

10.3.3 If remote control involves the coupling being opened by external force, the condition under which the external force acts on the coupling must be indicated appropriately to the driver. This is not necessary if the external force is only operative while the remote control is operating.

10.3.4 If the actuating device for opening the coupling under remote control is mounted externally on the vehicle it must be possible to oversee the area between the coupled vehicles, but it must not be necessary, however, to enter this area in order to operate it.

10.3.5 Any single error in operation or the occurrence of any single fault in the system must not result in accidental opening of the coupling during normal road travel. Any faults in the system must be indicated directly or be immediately obvious at the next operation, e.g. by a malfunction.

10.3.6 In the event of a failure of remote control it must be possible to open the coupling in at least one other way in an emergency case. If this requires the use of a tool it must be included in the vehicle's tool kit. The requirements of Annex V, Section 3.8 are not applicable to hand levers used exclusively for opening the coupling in an emergency.

10.3.7 The operating controls and indicators for the remote control devices must be permanently and clearly identified.

ANNEX VI

Testing of mechanical coupling devices

1. General testing requirements

1.1 Specimens of coupling devices must be tested; both, strength tests and function tests being performed.
However the Technical Service may waive a strength test if the simple design of a component makes a theoretical check possible.

1.2 With coupling devices the strenght must be verified by a dynamic test (endurance test). In certain cases some additional static tests may be necessary (see section 4). In the case of simple Class E components, which past experience has shown to require no endurance test for safe verification, a static test or theoretical calculation will be sufficient. In cases of doubt it is the results of dynamic testing that are overriding. The Technical Service responsible will decide on the type of tests to be employed.

1.3 Check calculations must ensure quality of the results with those of dynamic or static testing.

1.4 The dynamic test should be performed with approximately sinusoidal load (alternating and/or pulsating) with a number of stress cycles appropriate to the material. No cracks of fractures must occur.

1.5 Only slight permanent deformation is permitted with the static tests prescribed. The plastic deformation after releasing must not be more than 10 % of the maximum deformation.

1.6 The loading assumptions in the dynamic tests are based on the horizontal force component in the longitudinal axis of the vehicle and the vertical force component.
Horizontal force components transverse to the longitudinal axis of the vehicle, and moments, are not taken into account provided they are of only minor significance.
If the design of the coupling device or its attachment to the vehicle or the attachment of additional systems (as stabilizers, short coupling systems etc.) generates additional forces or moments additional tests may be required by the Technical Service.
The horizontal force component in the longitudinal axis of the vehicle is represented by a theoretically determined reference force, the D value as defined in Annex 1, Section 2.1.18. The vertical force component, where applicable, is represented by the static vertical bearing load S at the point of coupling and the assumed vertical load V, defined in Annex I, Section 2.1.19 or by the static vertical bearing load U in case of fifth wheel couplings.

1.7 The characteristic values D, S, V and U on which the tests are based, must be taken from the manufacturer's application for the granting of EEC type approval.

2. Test procedures

2.1 For the dynamic tests and static tests the specimen must be placed in a suitable rig with a suitable means of force application so that it is not subjected to any additional forces or moments apart from the specified test force. In the case of alternating tests the direction of force application must not deviate by more than ±1° from the specified direction. In the case of pulsating and static tests the angle must be set for top force. This will normally require a joint at the point of force application (i.e. the point of coupling) and a second joint an adequate distance away.

2.2 The test frequency must not exceed 35 Hz. The selected frequency shall be well seperated from resonance frequencies of the test set-up inclucing the tested device. With asynchronous testing the frequencies of the two force components must be approximately 1% to a maximum of 3% apart. For coupling devices made of steel the number of stress cycles is 2×10^6. for devices made of other materials than steel a higher number of cycles may be necessary. The dye-penetration method of crack testing or an equivalent method must be employed.

2.3 With alternating test forces (components) the mean force is zero. With pulsating tests the test force is equal to the top force; the bottom force may be up to 5% of the top force unless stated otherwise in the specific testing requirements.

2.4 With static tests the test force must be applied smoothly and quickly and be maintained for at least 60 seconds.

2.5 The coupling devices on test shoud normally be mounted as rigidly as possible on a test rig in the actual position in which they will be used on the vehicle. The fixing devices should be those specified by the manufacturer or applicant and should be those intented for its attachment to the vehicle and/or shall have identical mechanical characteristics.

2.6 Preferably, couplings have to be tested in original condition as being foreseen for the use on the road. At the discretion of the manufacturer and in agreement with the Teichnical Service flexible components may be neutralized if this is necessary for the test procedure and if there is no concern about unrealistic influence to the test result.

Flexible components being apparently overheated due to this accelerated test procedure are may be replaced during the test. The test loads may be applied by means of special slack-free devices.

3. Symbols and definitions in Annex VI

A_v = max. permitted axle load of the steered axle in t
C = mass of centre axle trailer in t (as Annex I, Section 2.1.18)
D = D value in kN (Annex I, Section 2.1.18)
R = mass of full trailer in t (Annex I, Section 2.1.18)
T = mass of towing vehicle in t (Annex I, Section 2.1.18)
F_A = static lifting force in kN
F_h = horizontal component of test force in longitudinal axis of vehicle in kN
F_s = vertical component of test force in kN
F_q horizontal component of test force transverse to longitudinal axis of vehicle in kN
$F_{hs\ res}$ = resultant test force of F_h and F_s in kN
$F_{hq\ res}$ = resultant test force of F_h and F_q in kN
S = static vertical load in kg
U = fifth wheel imposed vertical load in t
V = V-Value in kN (Annex I, Section 2.1.19)
a = equivalent vertical acceleration factor in the coupling point of centre axle trailers depending on the kind of suspension on the rear axle(s) of the towing vehicle
e = longitudinal distance between the coupling point of coupling balls which can be dismantled and the vertical plane of the fixing points (see Fig. 23 to 26) in mm
f = vertical distance between the coupling point of coupling balls which can be dismantled and the horizontal plane of the fixing points (see Fig. 22 to 26) in mm
g = acceleration due to gravity, assumed as 9,81 m/s^2
l = theoretical drawbar length between the centre of the drawbar eye and the centre of the axle assembly in m
n = distance between drawbar eye and centre line of the steered axle in mm
r = scrub radius in mm
s = track in mm
x = length of the loading area of a centre axle trailer in m

Subscripts :
o = top force
U = bottom force
w = alternating
h = horizontal
s = vertical

4. Specific testing requirements

4.1 Coupling balls and towing brackets

4.1.1 The mechanical coupling devices of coupling balls may be of the following types:

- one-piece coupling balls including devices with non-interchangeable detachable balls (see Fig. 21)
- coupling balls, comprising a number of parts which can be dismantled (see Fig. 22,23,24)
- towing brackets (see Fig. 25)

4.1.2 The basic test is an endurance test with an alternating test force. The test specimen is the coupling ball, the ball neck and the mountings necessary for attaching to the vehicle. The coupling ball and towing brackets must be rigidly mounted to a test rig, capable of producing alternating forces, in the actual position in which it is intended for use.

4.1.3 The positions of the fixing points for attaching the coupling ball and towing brackets are specified by the vehicle manufacturer (see Annex VII, Section 1.3).

4.1.4 The devices submitted to the test shall be provided with all design details which may have an influence on the strength criteria (for examle electrical socket plate, any marking etc.). The test periphery ends at the anchorage points or fitting points. The geometric location of the coupling ball and the fixing points of the coupling device related to the reference line shall be provided by the vehicle manufacturer and shall be shown in the test report.
All relative positions of the anchorage points with respect to the reference line, for which the towing vehicle manufacturer shall provide all the necessary information to the towing device manufacturer, shall be repeated on the test bed.

4.1.5 The assembly mounted on the test bed shall be subjected to a test on an alternating stress tensible testing machine (for example on a resonance pulser).
The test load shall be an alternating force and must be applied to the coupling ball at an angle of 15° ± 1° as shown in Fig. 18 and/or Fig. 19.
If the ball center is above that line parallel to the reference line as shown in Fig. 20 which contains the highest of the nearest fixing points, the test has to be carried out with an angle = -15° ± 1° (see Fig. 18). If the ball center is below that line parallel to the reference line as shown in Fig. 20 which contains the highest of the nearest fixing points, the test has to be carried out with an angle = 15° ± 1° (see Fig. 19).
This angle is chosen in order to take account of the vertical static and dynamic load. This test method is only applicable to a permitted static load of not more than $S = \frac{120 \cdot D}{g}$. If a static load above $\frac{120 \cdot D}{g}$ is requested, the test angle should be increased to 20°.
The dynamic test must be performed with the following test force: $F_{hs\ res} = \pm 0{,}6\ D$

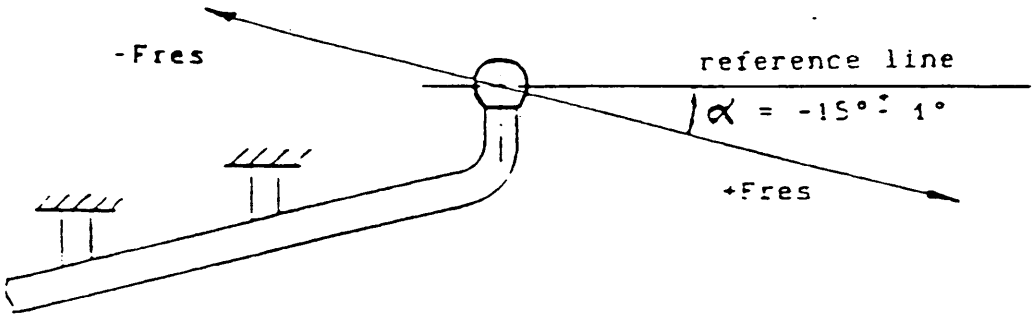


Fig. 18 Test rig I

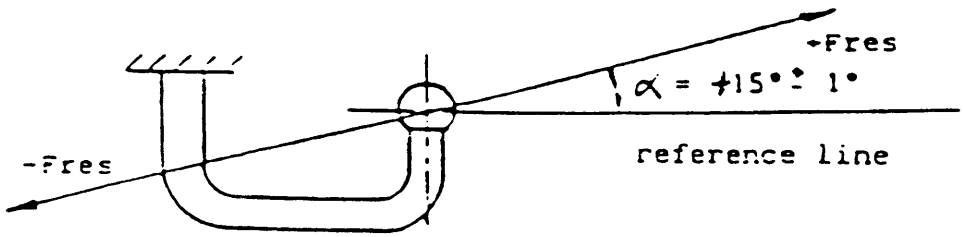


Fig. 19 Test rig II

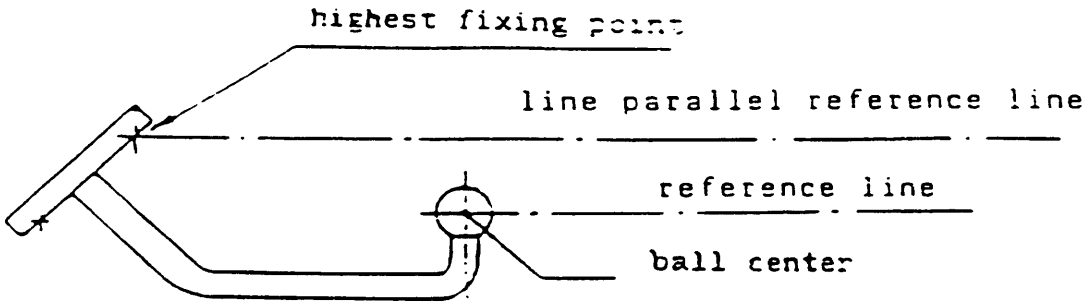


Fig. 20 Criteria for the test angles

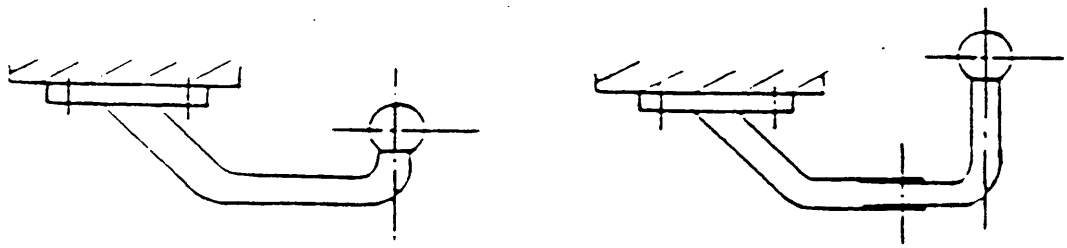


Fig. 21 One coupling ball

4.1.6 The test procedure is applicable to the different types of coupling devices (see 4.1.1) as follows :

4.1.6.1 One-piece coupling balls including devices with non-interchangeable detachable balls (see Fig. 21).

The strength test for the devices shown in Fig. 21 shall be carried out according to the requirements of section 4.1.5.

4.1.6.2 Coupling balls, comprising parts which can be dismantled.

The following categories are defined:

- towing bracket and ball (see Fig. 22)
- towing bracket and ball on integral support (see Fig. 23)
- towing bracket and ball (see Fig. 24)
- towing bracket without ball (see Fig. 25)

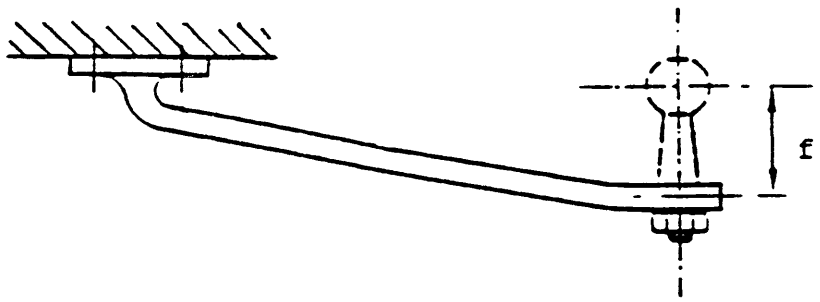


Fig. 22 Towing bracket and ball

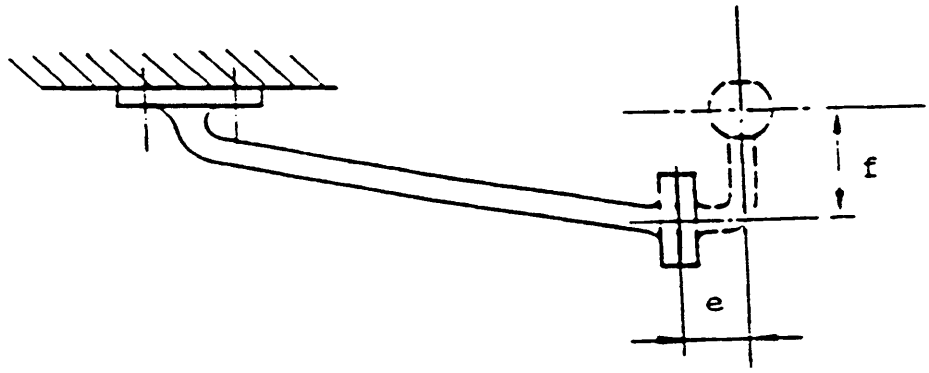


Fig. 23 Towing bracket and ball on integral support

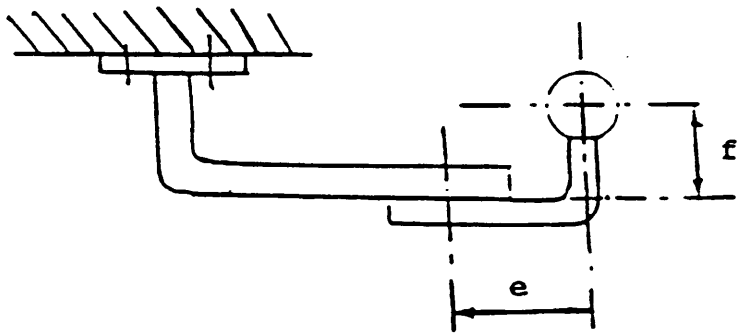


Fig. 24 Towing bracket and ball

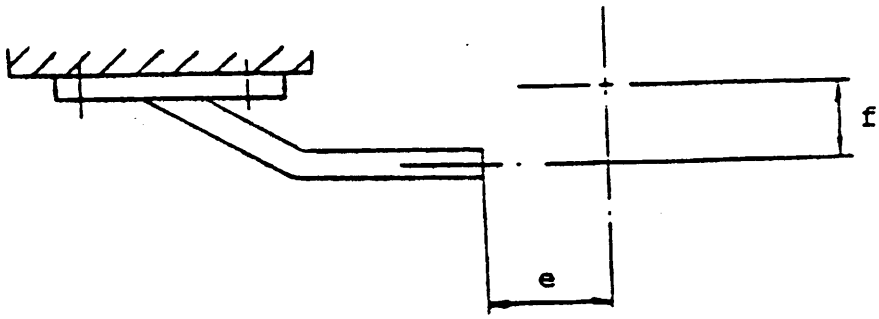


Fig. 25 Towing bracket

The strength test for the devices shown in Fig. 22 to 24 shall be carried out according to the requirements of Section 4.1.5. Dimensions e and f with a manufacturing tolerance of ± 5 mm, shall be shown in the test report.

The test of the towing bracket (see Fig. 25) shall be carried out with a mounted ball (on support). Account will be taken only of the results to the towing bracket between the fixing points and the mounting surface of the ball support.

The dimensions e and f are to be specified by the coupling device manufacturer.

4.1.6.3 Coupling devices with variable dimensions e and f for demountable and interchangeable coupling balls.

4.1.6.3.1. The strength tests for such towing brackets (shown in figure 26) shall be carried out to the requirements of Section 4.1.5.

4.1.6.3.2. If a worst case configuration can be defined by agreement between the manufacturer and the Technical Service, the testing of this one configuration alone shall be sufficient. Otherwise, several ball positions shall be tested in a simplified test programme according to 4.1.6.3.3.

4.1.6.3.3. In a simplified test programme, the value for f shall be between a defined value of f_{min} and a value of f_{max} which does not exceed 100 mm. The ball shall be at a distance (e_{max}) of 130 mm from the support.
To cover all possible positions of the ball, in the field given by the horizontal distance from the mounting surface and the vertical range of f (f_{min} to f_{max}), two devices are to be tested:

- one with a ball in top (f_{max}) and
- one with a ball in low (f_{min}) position.

If the field of possible ball positions is divided by the line parallel reference line (see fig. 26c), the test angles are: $-\alpha$ for the ball above, and $+\alpha$ for the ball below that reference line (compare Fig. 20).

a) f_{max} below line parallel reference line test angles: $+\alpha$

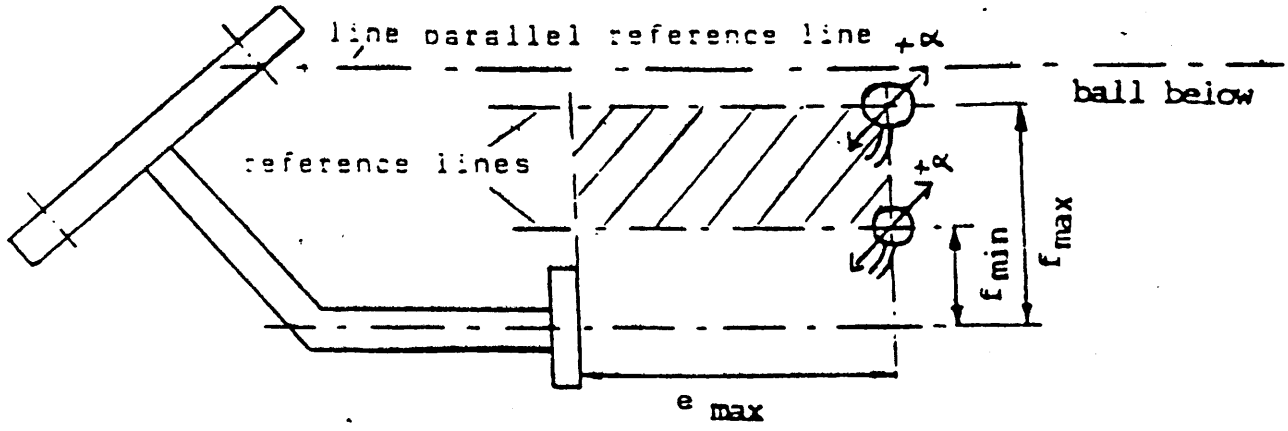


Fig. 26a Towing bracket and support for a various number of ball positions

b) f_{min} above line parallel reference line test angles: $-\alpha$

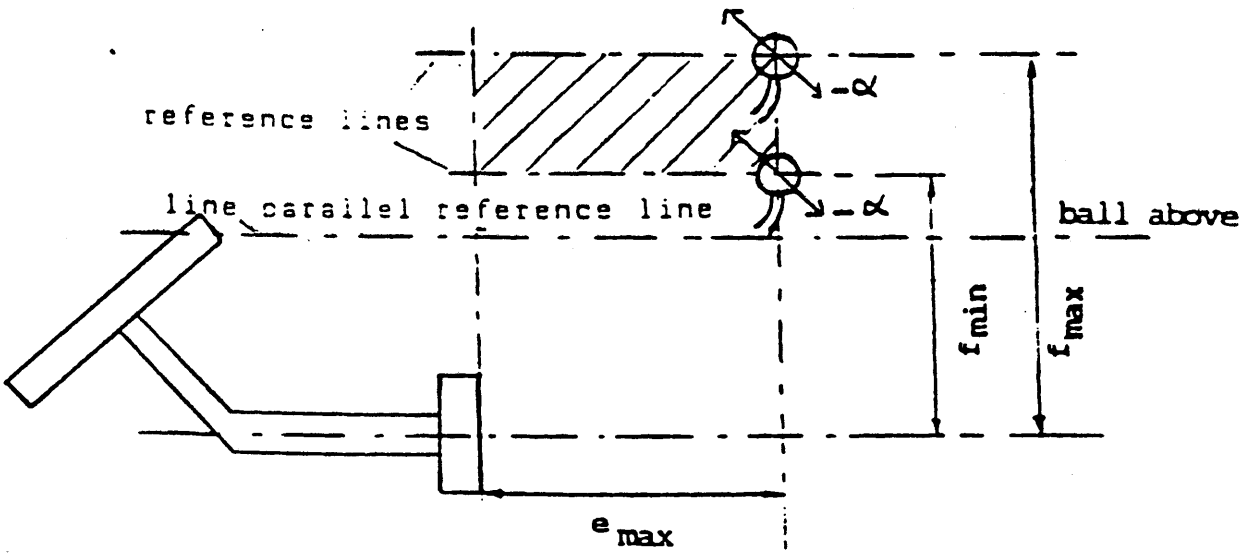


Fig. 26b Towing bracket and support for a various number of ball positions

c) f_{max} above line parallel reference line
f_{min} below line parallel reference line
test angles: $+\alpha$ and $-\alpha$

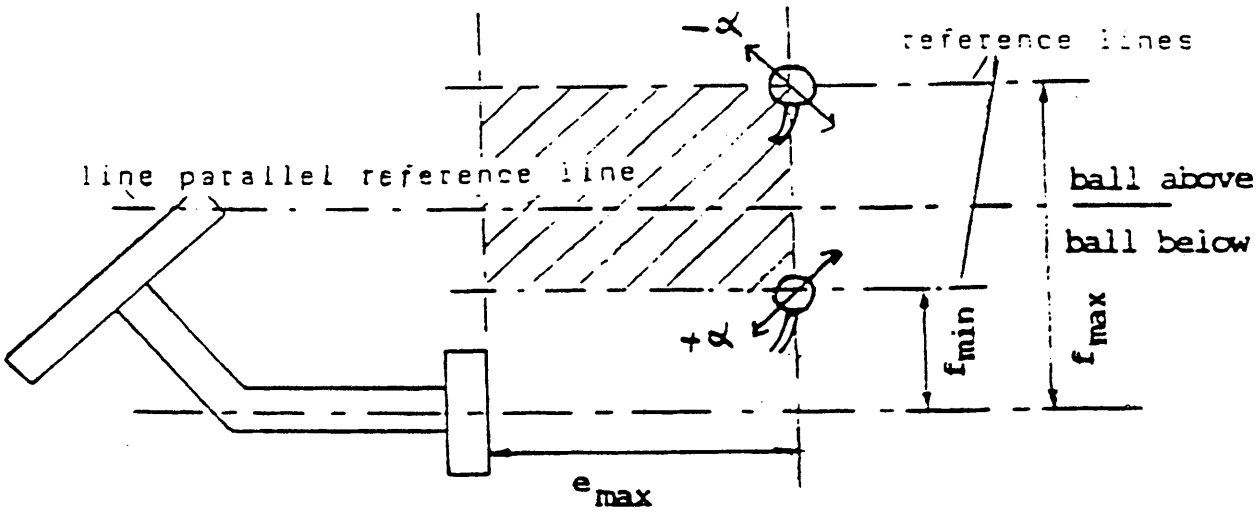


Fig. 26c Towing bracket and support for a various number of ball positions

4.2 Coupling heads

4.2.1 The basic test is an endurance test with an alternating test force and a static test (lifting test) on each test specimen.

4.2.2 The dynamic test must be performed with a Class A coupling ball of appropriate strength. On the test rig the ball coupling and coupling ball must be arranged as instructed by the manufacturer and in a way corresponding to their attachment in a vehicle. There should be no possibility of extra forces in addition to the test force acting on the specimen.
The test force must be applied along a line passing through the centre of the ball and inclined downwards to the rear at 15° (see Fig. 27). An endurance test must be performed on a test specimen with the following test force:

$F_{hs\ res\ w} = \pm 0.6\ D$

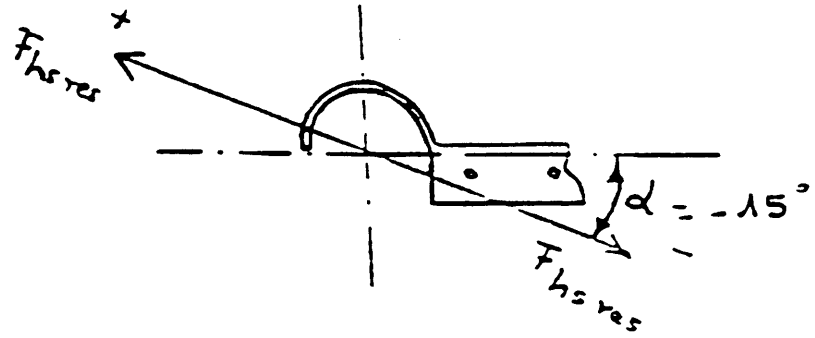


Fig. 27 Dynamic test

4.2.3 A static lifting test must also be performed. The coupling ball used for the test must have a diameter of

$$49\ ^{+\ 0,13}_{-\ 0}\ mm$$

in order to represent a worn coupling ball. The lifting force F_A must be increased smoothly and quickly to a value of C +S

and be held for 10 seconds (see Fig. 28). The coupling head shall not separate from the ball or exhibit any permanent distortion which could have an adverse effect on its functional capability.

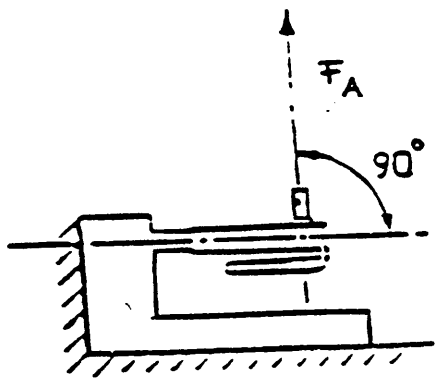


Fig. 28 Lifting test

4.3 Drawbar couplings and mounting frames

4.3.1. An endurance test must be performed on one test specimen. The drawbar coupling must be equipped with all the fixings needed to attach it to the vehicle frame.
Any intermediate devices fitted between the drawbar coupling and the vehicle frame (i.e. mounting frames) must be tested with the same forces as the coupling.

4.3.2. Drawbar couplings for hinged drawbars (S=0)

The dynamic tests must be performed with a horizontal alternating force of $F_{hw} = 0.6\ D$ acting in a line parallel to the ground and in the longitudinal median plane of the towing vehicle passing through the centre of the coupling pin.

4.3.3. Drawbar couplings for use with centre axle trailers (S > 0).

4.3.3.1. Centre axle trailer masses up to and including 3.5. t

Drawbar couplings for use with centre axle trailers up to and including a mass of 3.5 t must be tested in the same way as coupling balls and towing brackets described in 4.1 of this Annex.

4.3.3.2 Centre axle trailer masses exceeding 3.5. t

The test loads are applied to the specimen in the horizontal and vertical directions in an asynchronous endurance test. The horizontal line of action must be parallel to the ground in the longitudinal median plane of the towing vehicle and pass through the centre of the coupling pin. The vertical line of action must be perpendicular to the ground in the longitudinal median plane of the towing vehicle and pass through the centre of the coupling pin (see Fig. 29).

The fixing arrangements for the drawbar coupling and the drawbar eye on the test bed shall be those intended for its attachment to the vehicle in accordance with the manufacturer's fitting instructions.

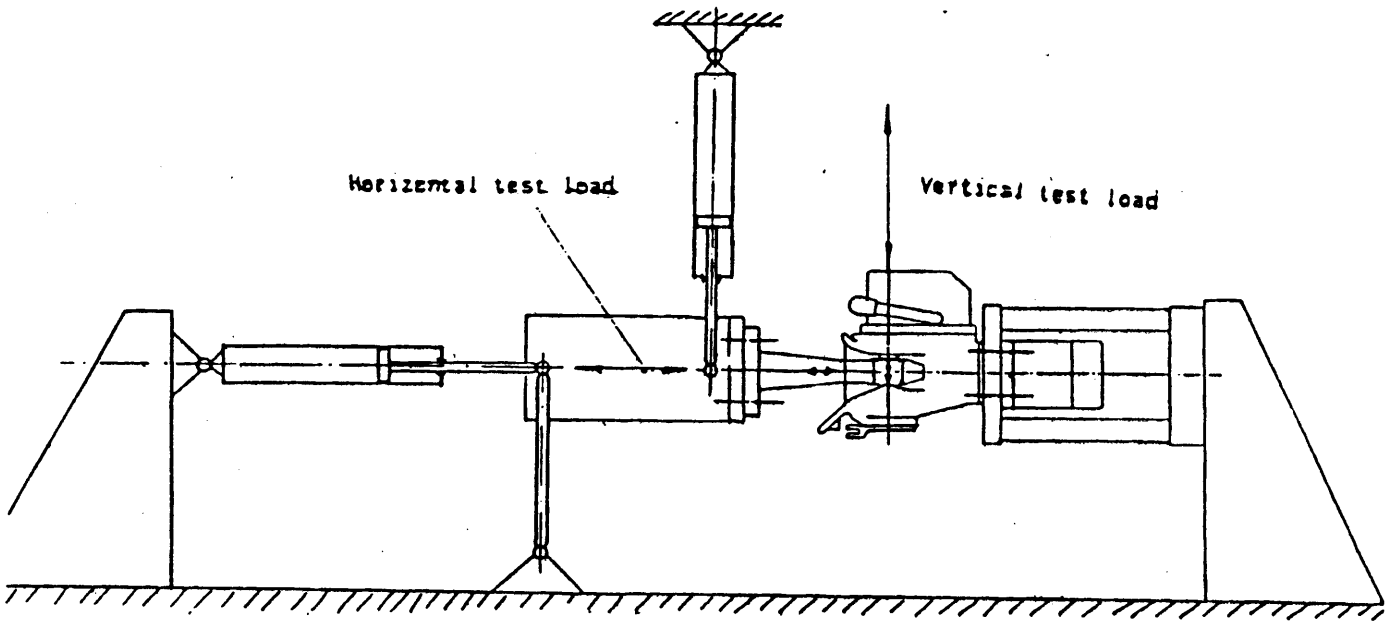
The following test loads shall be applied to the coupling point

test load	mean value (KN)	amplitude (KN)
horizontal load	0	+/- 0.6 * D
vertical load	$\frac{g * S}{1000}$	+/- 0.6 * V

The test force is the geometrical sum of the vertical and the horizontal components. This can be achieved by the test bed configuration shown in Fig. 29. The vertical and the horizontal components shall be sinusoidal in shape and shall be applied asynchronously, where the difference of their frequencies shall be between 1% and 3%, so that resulting test forces in all directions are created.

4.3.4. Static test on coupling pin locking device

With drawbar couplings it is also necessary to test the closure and any locking devices by means of a static force of 0.25 D acting in the direction of opening. The test must not cause the closure to open and it must not cause any damage. A test force of 0.1 D is sufficient in the case of cylindrical coupling pins.



Example of test bed configuration

Fig. 29 Testrig for drawbar couplings (example)

4.4 Drawbar eyes

4.4.1 Drawbar eyes must be subjected to the same dynamic testing as drawbar couplings. Drawbar eyes used solely for trailers having hinged drawbars allowing free vertical movement must be subjected to an alternating load as described in 4.3.2. Drawbar eyes also intended for use on centre axle trailers must be tested in the same way as ball couplings (4.2.) for trailer masses C up to and including 3.5 t and in the same way as drawbar couplings (4.3.3.2.) for centre axle trailer with a mass C exceeding 3.5 t.

4.4.2 The testing of drawbar eyes must be conducted in such a manner that the alternating load also acts on the parts used for attaching the drawbar eye to the drawbar. All flexible intermediate components must be clamped.

4.5 Drawbars

4.5.1. Drawbars shall be tested in the same way as drawbar eyes (see 4.4).
The technical service may waive an endurance test if the simple design of a component makes a theoretical check of its strength possible.
The design loads for the endurance test or the theoretical verification of the drawbar of centre axle trailers with a mass C of up to and including 3.5 t shall be taken from ISO 7641/1 (1983).

The design loads for the theoretical verification of drawbars for centre axle trailers having a mass C over 3,5 t must be calculated as follows:

$$F_{sw} = \pm 0.6 \left(1000 + V \right) \frac{s \cdot g}{}$$

where the force amplitude V is that given in Annex I, Section 2.1.19.

The asynchronous nature of the horizontal and vertical force components must be taken into account by multiplying the sum of the bending moments by a factor 0.75. This reduced total bending moment must not be less than the maximum individual bending moment.

4.5.2 In addition to the endurance test or theoretical verification of strength, the resistance to buckling must be verified either by a theoretical calculation with a design load of 1,8 X D or by a buckling test with a design load of 3 X D.

4.5.3. In the case of steered axles, theoretical calculation must verify the maximum permitted bending stresses due to lateral forces.

design loads :

$$F_{qw} = g \cdot 0.18 \cdot A_H \cdot \frac{r}{} \text{ (for stub axle steering)}$$

$$F_{qw} = g \cdot 0.18 \cdot A_{\Sigma n} \cdot \frac{s}{} \text{ (for fifth wheelr steering)}$$

4.6. Fifth wheel couplings

4.6.1 The basic strength tests are a dynamic test and a static test (lifting test). Fifth wheel couplings intended for the positive steering of semi-trailers must be subject to an additional static test (bending test).
For the purpose of the tests the fifth wheel coupling must be equipped with all the fixings needed to attach it to the vehicle. The method of mounting must be identical to that employed subsequently on the vehicle itself.

4.6.2. Static tests

4.6.2.1 Standard fifth wheel couplings designed for a steering wedge or similar device for the positive steering of semi-trailers (see Annex V, Section 7.9) must be tested for adequate strength by means of a static bending test within the working range of the steering device with the simultaneous application of fifth wheel load. The maximum permitted fifth wheel load U must be applied vertically on the coupling in its operating position by means of a rigid plate of sufficient size to cover the coupling completely.

The resultant of the applied load must pass through the centre of the horizontal joint of the fifth wheel coupling. Simultaneously, a horizontal lateral force, representing the force needed for positive steering of the semi-trailer, must be applied to the flanks of the guide for the coupling pin. The magnitude of this force and the direction in which it acts must be chosen so that a moment of 0.75 m X D is exerted about the centre of the coupling pin.
The moment should be applied by means of a force acting on a lever arm 0.5 m long. Permanent (plastic) distortion up to 0.5 % of all nominal dimensions is permitted. There must be no cracking.

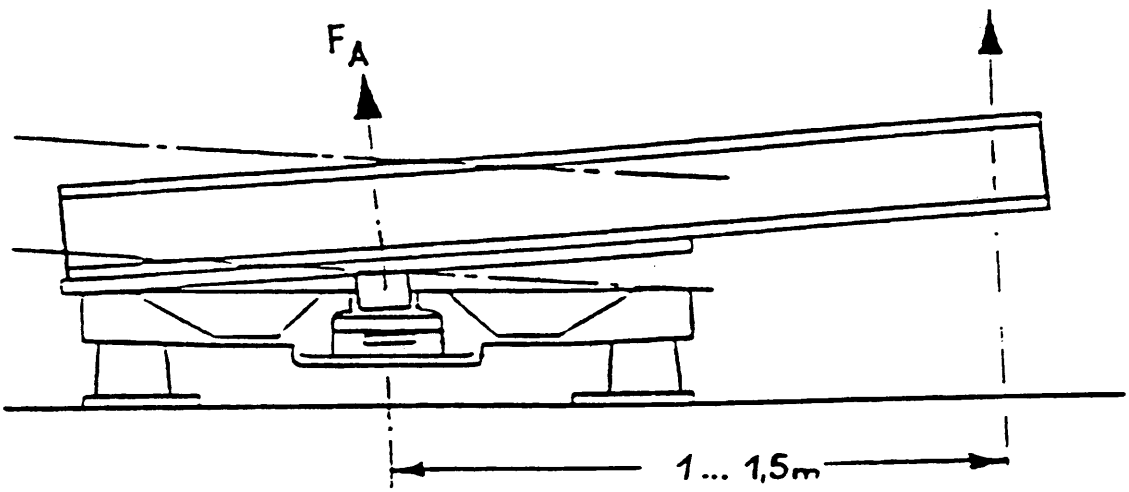
4.6.2.2 A static lifting test must be performed on all fifth wheel couplings. Up to a lifting force of $F_A = g \cdot U$ there must be no major permanent bending of the coupling plate over more than 0.2 % of its width.
In the case of Class G50 standard fifth wheel couplings and comparable couplings for the same coupling pin diameter there must be no separation of the coupling pin from the coupling with a lifting force of

$$F_A = g \cdot 2.5 \cdot U.$$

The force should be applied by means of a lever bearing on the coupling plate at one end and being raised at the other end at a distance of 1.0 to 1.5 m from the centre of the coupling pin (see Fig. 30).
The lever arm must be at 90° to the direction of entry of the coupling pin into the coupling. A second test with the lever arm repositioned at 180° shall be performed.

For the second test a new specimen may be used.

Sketch of the test rig



Looking from the rear

Fig. 30 Lifting test on fifth wheel couplings

4.6.3 Dynamic test

The fifth wheel coupling must be subjected to alternating stress on a test rig (asynchronous dynamic test) with horizontal alternating and vertical pulsating forces acting simultaneously.

4.6.3.1 In the case of fifth wheel couplings not intended for the positive steering of semi-trailers the following forces must be used:

Horizontal: $F_{hw} = \pm 0.6 \cdot D$

Vertical: $F_{F_{sO}} = g \cdot 1.2 \cdot U$

$F_{sU} = g \cdot 0.4 \cdot U$

These two forces must be applied in the longitudinal median plane of the vehicle with $F_{sO,U}$ passing through the centre of the joint of the coupling. The vertical force $F_{sO,U}$ alternates between the limits

$+1.2 \cdot U$ and $+0.4 \cdot U$

and the horizontal force between

$+0.6 \cdot D$ and $-0.6 \cdot D$.

4.6.3.2 In the case of fifth wheel couplings intended for the positive steering of semi-trailers the following forces must be used:

horizontal: $F_{hw} = \pm 0.675 \cdot D$

vertical: $F_{sO,U}$ as in 4.6.3.1

The lines of action of the forces are shown in 4.6.3.1.

4.6.3.3 For the dynamic test of fifth wheel couplings, a suitable lubricating sheet material shall be placed between the coupling plate and the trailer plate so that a maximum friction coefficient of $\mu = 0.15$ is assured.

4.7 Mounting plates for fifth wheel couplings

The dynamic test for fifth wheel couplings described in 4.6.3 and the static tests described in 4.6.2 must be applied appropriately to mounting plates. With mouting plates it is sufficient to perform the lifting test on one side only. The test must be based on the maximum assigned installation height for the coupling, the maximum assigned width and the minimum assigned lenght of the mounting plate design. It is not necessary to carry out this test if the mounting plate is narrower and/or longer and the total height lower, but otherwise identical to a design which has already undergone this test.

4.8 Fifth wheel coupling pins of semi-trailers

4.8.1 A dynamic test with alternating stress must be performed on a specimen on a test rig. The testing of the coupling pin must not be combined with the testing of the fifth wheel coupling. The test must be conducted so that the load is also applied to the fixings needed for attaching the coupling pin to the semi-trailer.

4.8.2 A dynamic test with a horizontal load of F must be applied to the coupling pin in the operating position.

The line of action of the force must pass through the centre of the smallest diameter of the cylindrical part of the coupling pin having a diameter of 50.8 mm for Class H50 (see annex V, Fig. 17).

ANNEX VII

Requirements relating to the type-approval of the vehicle type with regard to the optional attachment of mechanical coupling devices to this vehicle.

1. General requirements

1.1 The vehicle manufacturer shall state which types and classes of coupling devices may be fitted to the vehicle type giving the values of D, V, S or U (if applicable) which are based on the construction of the vehicule type in combination with the type(s) of the coupling device(s) intended to be used. The characteristics D, V, S or U of the coupling devices approved in accordance with this Directive shall be equal or greater than the characteristics given for the combination concerned.

1.2 The coupling device shall be attached to the vehicle type according to the installation instructions, given by the vehicle manufacturer in agreement with the coupling manufacturer and the Technical Service. The vehicle manufacturer shall state the appropriate attachment points for the coupling device on the vehicle type and, if necessary, mounting brackets, mounting plates, etc. to be fitted on the specific vehicle type.

1.3 Only automatic coupling devices which allow an automatic coupling procedure on motor vehicles shall be employed for the coupling of trailers having a maximum mass of more than 3,5 t.

1.4 When mounting coupling devices of Classes B, D, E and H on trailers, a value of 32 t for the maximum mass T of the towing vehicle must taken into account for D-value calculation. If the D-value of the coupling device is not sufficient for T = 32 t, the resulting restriction on the mass T of the towing vehicle or the mass of the vehicle combination must be stated in the EEC vehicle type approval certificate of the trailer (AnnexIX).

2. Special requirements

2.1 Attachment of coupling balls and towing brackets

2.1.1 Coupling balls and towing brackets must be attached to a vehicle in a manner which conforms to the clearance and height dimensions given in Fig. 31.

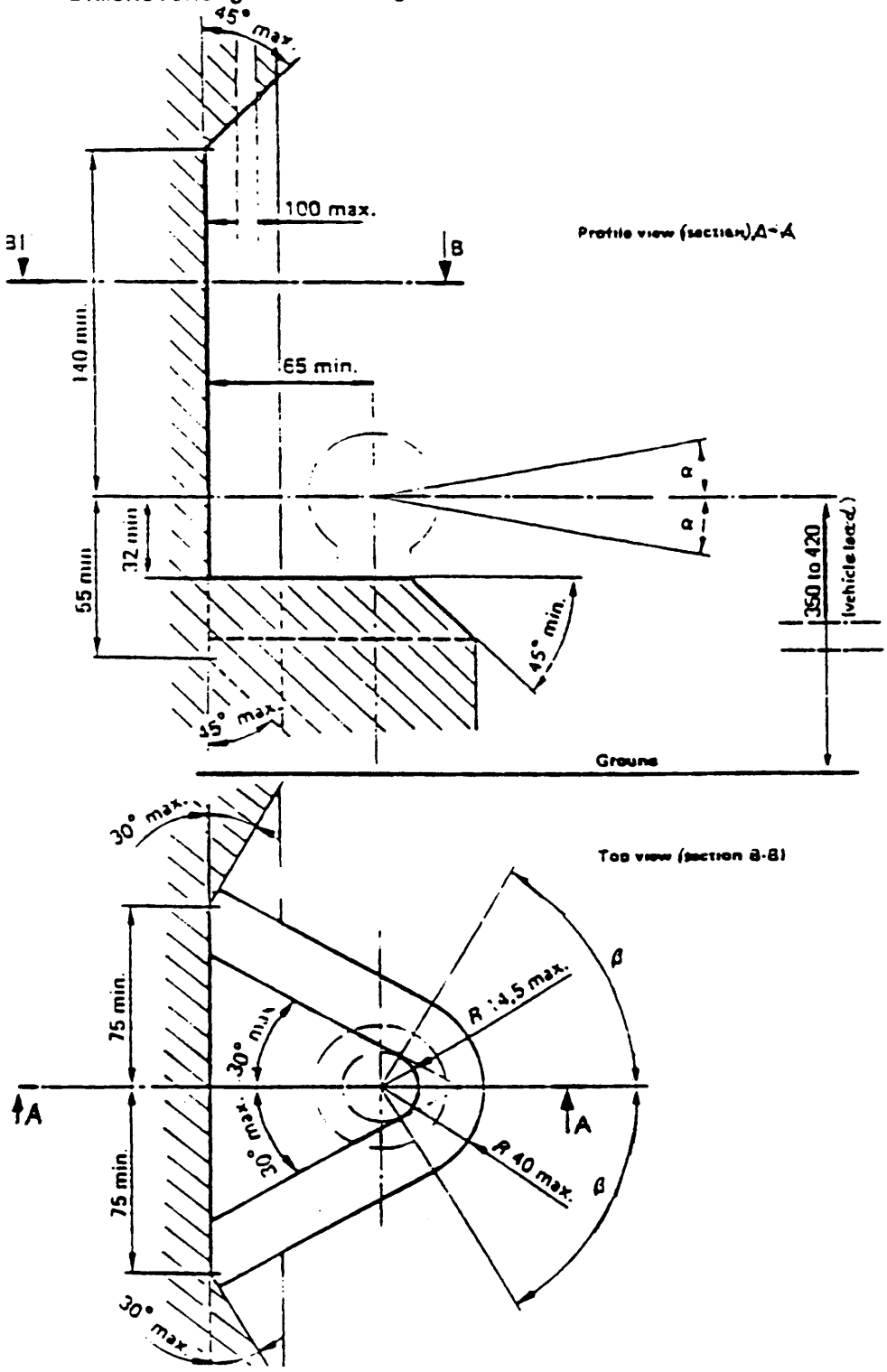


Fig. 31 Clearance space for coupling balls
Any details not given must be selected appropriately.
The dimensions and angles should be checked with suitable instruments.

2.1.2 For coupling balls and towing brackets the vehicle manufacturer must supply mounting instructions and state whether any reinforcement of the fixing area is necessary.

2.1.3 It must also be possible to couple and uncouple ball couplings when the longitudinal axis of the ball coupling in relation to the centre line of the coupling ball and mounting:

a) is horizontally $\beta = 60°$ to right or left (see Fig. 31)
b) is vertically $= 10°$ up or down (see fig. 31)
c) is axially rotated 10° to right or left.

2.1.4 The mounted coupling ball must not obscure the place or visibility of the rear license plate, otherwise a coupling ball which can be dismantled has to be used.

2.2 Attachment of coupling heads

2.2.1 Class B coupling heads are permitted for trailers of the maximum mass up to and including 3.5.t.
With the trailer horizontal and carrying the maximum permitted axle load, coupling heads must be attached so that the coupling point of the trailer is 430 ± 35 mm above the horizontal plane on which the wheels of the trailer stand (see Fig. 32).
In the case of caravans and goods trailers, the horizontal position is regarded as when the floor or loading surface is horizontal. In the case of trailers without such a reference surface (e.g. boat trailers of similar) the trailer manufacturer must give an appropriate reference line defining the horizontal position.

2.2.2 It must be possible to operate the coupling heads safely within the free space of the coupling ball given in Fig. 31. The hand lever must be shaped in such a manner that there is existing an adequate freer space for the hands withing the operating area of the hand lever including the removal of the coupling head from the coupling ball.

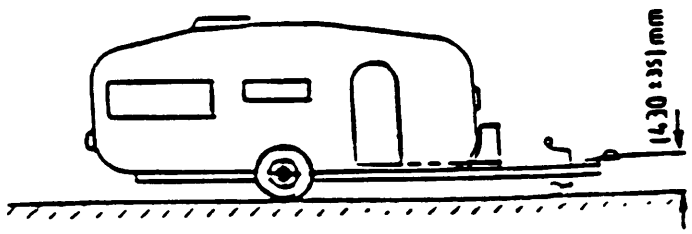


Fig. 32 Mounting height of a coupling head

2.3 Attachment of drawbar couplings and mounting blocks

2.3.1 Mounting dimensions for standard drawbar couplings

If types of standard drawbar couplings are intended to be fitted to the vehicle type, the mounting dimensions on the vehicle given in Fig. 33 and Table 8 must be met.

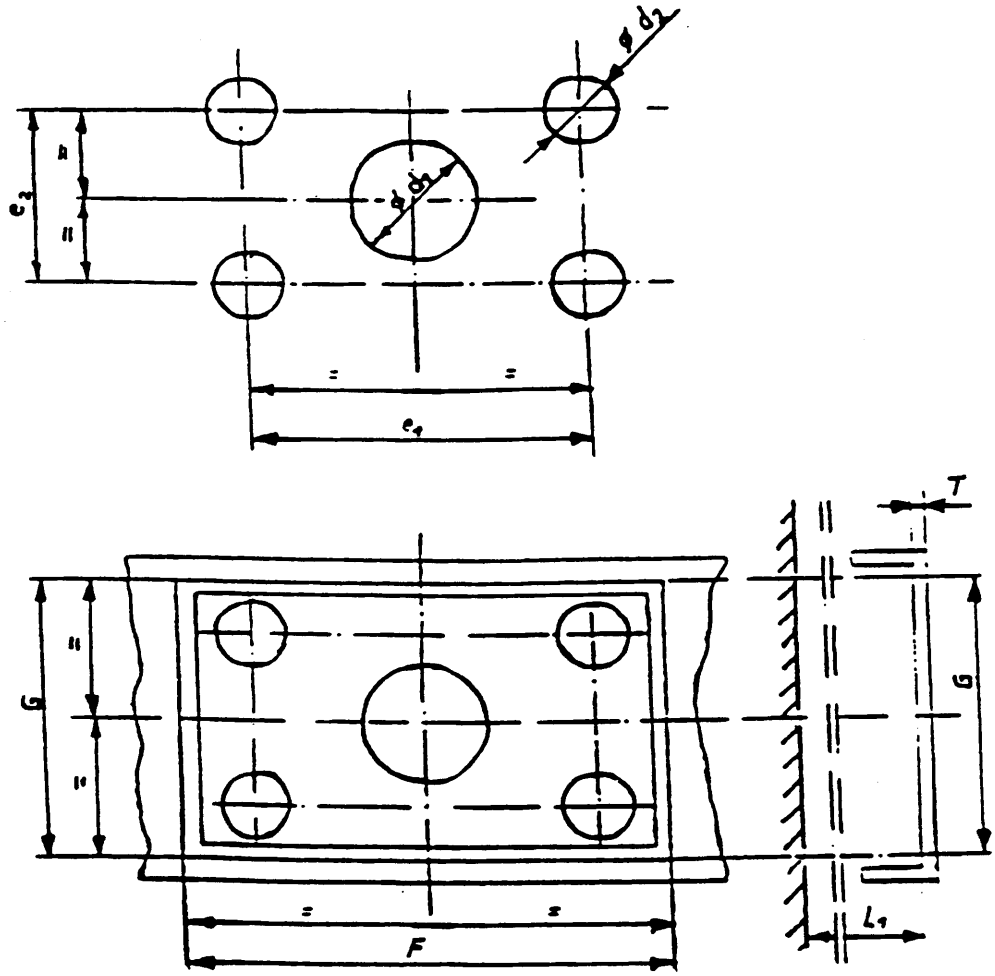


Fig. 33 Mounting dimensions for standard drawbar couplings (see Table 8)

2.3.2 Need for remote controlled couplings

If one or more of the following rules regarding easy and safe operation (2.3.3), accessibility (2.3.4) or clearance for the hand lever (2.3.5) cannot be met, a coupling with a remote control device as described in Annex V, Section 10.3 must be used.

2.3.3 Easy and safe coupling operation

Drawbar couplings must be mounted on the vehicle type in such a manner that they are easy and safe to operate.

In addition to the functions of opening (and closing, if applicable) this also includes checking the position of the indicator for the closed and secured position of the coupling pin (by sight and touch).

In the area in which the person operating the coupling must stand, there must be no points of possible danger such as sharp edges, corners, etc. inherent in the design or they must be protected so that injury is unlikely.

The way of escape from this area must not be restricted or barred on either side by any attached objects.

Any underrun protection device must not prevent the person adopting a suitable position to operate the coupling.

2.3.4 Accessibility

The distance between the centre of the coupling pin and the rear edge of the vehicle bodywork must not exceed 420 mm.

However, the distance of 420 mm may be exceeded if technical necessity can be demonstrated:

1. a distance of up to 650 mm for vehicles with tipping bodies or rear-mounted equipment
2. a distance of up to 1320 mm if the unobstructed height is at least 1150 mm
3. car transporters with at least two loading levels when the trailer vehicle is not separated from the towing vehicle in normal transport operation,

provided easy and safe actuation of the drawbar coupling is not adversly affected.

2.3.5 Clearance for the hand lever

In order to permit safe operation of drawbar couplings there must be adequate free space around the hand lever.

The clearance illustrated in Fig. 34 is regarded as sufficient.

If different types of standard drawbar couplings are intended to be fitted to the vehicle type, the clearance must be such that the conditions are also satisfied for the largest size of coupling of the appropriate class given in Annex V, Section 3.

The dimensions are also applicable as appropriate for drawbar couplings having hand levers pointing downwards or of a different design.

The clearance must also be maintained within the specified minimum angle for coupling-up and uncoupling given in Annex V, Section 3.6.

2.3.6 Clearance for free movement of drawbar coupling

The drawbar coupling attached to the vehicle must have a minimum clearance of 10 mm from every other part of the vehicle taking into account all possible geometrical positions of the coupling that can be adopted.

If different types of stadard drawbar couplings are intended to be fitted to the vehicle type, the clearance must be such that the conditions are also satisfied for the largest possible coupling of the appropriate class stated in Annex V, Section 3.

2.3.7 Admissibility of drawbar couplings with a special joint for vertical rotation (see Fig. 6)

Couplings having a cylindrical pin and which achieve vertical rotation for the coupled drawbar eye by means of a special joint will only be permitted in cases when technical necessity can be demonstrated. This may be the case, for example, on rear tippers when the coupling head must be hinged, or with the couplings of heavy transporters when for strength reasons the use of a cylindrical coupling pin is necessary.

Table 8 Mounting dimensions for standard drawbar couplings

	C50-1	C50-2	C50-3	C50-4	C50-5	C50-6	C50-7	remark
e1	83		120	140	160		200	+/-0,5
e2	56		55	80	100		120	+/-0,5
d1	-	54	75	85	95		125	+1/-0,5
d2	10,5		15	17	21		25	H13
T	-	15	20	25	25	30		max.
F	120		165	190	210		260	min.
G	95		100	130	150		180	min.
L1	-	200	300	400				min.

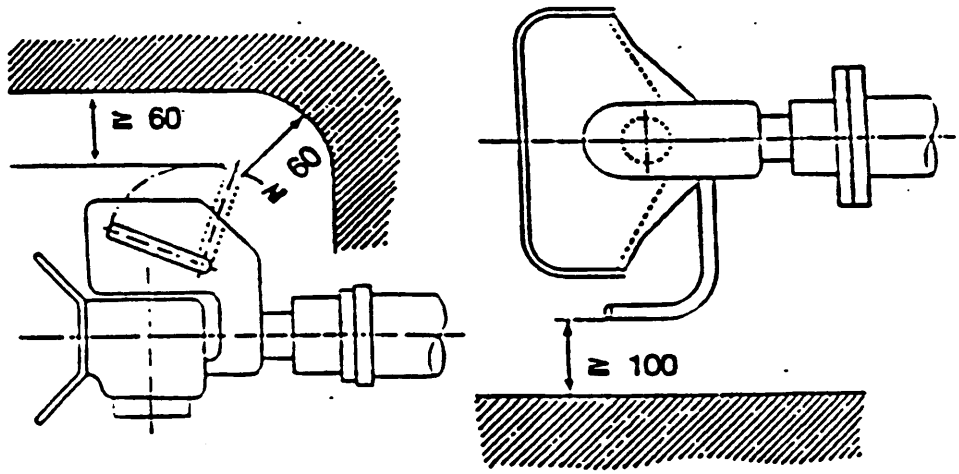


Fig. 34 Hand lever clearance

2.4 Attachment of drawbar eyes and drawbars on trailers

2.4.1 Drawbars for centre axle trailers must have a support device adjustable in height if the vertical bearing load at the drawbar eye on the trailer type exceeds 50 kg, when the trailer is uniformly loaded to its technically permissible maximum mass.

2.4.2 When attaching drawbar eyes and drawbars to centre axle trailers with a maximum mass C of more than 3.5 t and more than one axle, they must be equipped with a device for axle load sharing such that when one axle is lifted by 6 cm the load of this axle does not increase by more than 25%, when uniformly loaded to its technically permissible maximum mass.

2.5 Attachment of fifth wheel couplings, mounting plates and coupling pins on vehicles

2.5.1 Class G50 fifth wheel couplings must not be mounted directly on the vehicle frame unless permitted by the vehicle manufacturer. They must be fixed to the frame by means of the mounting plate, the installation instructions provided by the vehicle manufacturer or coupling manfacturer must be followed.

2.5.2 Semi-trailers must be equipped with landing gear or an other equipment which allows uncoupling and parking of the semi-trailer. If semi-trailers are equipped so that the connection of the coupling devices, the electrical systems and braking systems can be effected automatically, the trailer must have landing gear which retracts from the ground automatically after the semi-trailer has been coupled up.

2.5.3 The fixing of the fifth wheel coupling pin in the mounting plate on the semi-trailer must be as instructed by the vehicle manufacturer or manufacturer of the fifth wheel coupling.

2.5.4 If a semi-trailer is equipped with a steering wedge it must meet the requirements as described in Annex V, Sections 7.9.1 and 7.9.2.

ANNEX VIII

Information Document No.....
pursuant to Annex I of Council Directive 70/156/EEC
relating to EEC Type approval of a vehicle with respect to the
Fitting of Mechanical Coupling Devices (.../...EEC)

0.	GENERAL
0.1	Make (trade name of manufacturer):
0.2	type and commercial description(s):
0.3	Means of identification of type, if marked on the vehicle[b]:
0.3.1	Location of that marking:
0.4	Category of vehicle (see Annex II of 70/156/EEC):
0.5	Name and address of manufacturer:
1.	GENERAL CONSTRUCTION CHARACTERISTICS OF THE VEHICLE
1.1	Photographs and/or drawings of a representative vehicle:
1.4	Chassis (if any) (overall drawing):
1.5	Material used for the side-members[d]:
2.	MASSES AND DIMENSIONS[e] (in kg and mm) (refer to drawing where applicable)
2.2	In the case of tractive units
2.2.1	Fifth wheel lead (maximum and minimum)[g]
2.2.2	Maximum height of the fifth wheel (standardized)[h]
2.4.2	For chassis with bodywork
2.4.2.5	Rear overhang[n]
2.6	Mass of the vehicle with bodywork in running order, or mass of the chassis with cab if the manufacturer does not fit the bodywork (including coolant, oils, fuel, tools, spare wheel and driver)[p] (max. and min. for each version)
2.6.1	Distribution of this mass among the axles and, in the case of a semi-trailer, load on the fifth wheel coupling pin (max. and min. for each version):
2.8	Technically permissible maximum laden mass stated by the manufacturer (max. and min. for each version):
2.8.1	Distribution of this mass among the axles and, in the case of a semi-trailer, load on the fifth wheel coupling pin (max. and min. for each version):
2.9	Technically permissible maximum mass on each axle and, in the case of a semi-trailer, load on the fifth wheel coupling pin stated by the manufacturer:
2.10	Maximum mass of trailer which may be coupled
2.10.1	Full trailer:
2.10.2	Semi-trailer:
2.10.3	Centre-axle trailer:
2.10.3.1	Indicate the maximum ratio of the coupling overhang[q] to the wheelbase:

2.10.3.2 Maximum V-value (kN):

2.10.4 Maximum mass of the combination:
2.10.6 Maximum mass of unbraked trailer:

2.11 Maximum vertical load
2.11.1 On the vehicle's coupling point for a trailer:
2.11.2 On the drawbar of a trailer:

9. BODYWORK

9.1 Type of bodywork:

9.2 Materials used and methods of construction:

11. CONNECTIONS BETWEEN DRAWING VEHICLES AND TRAILERS AND SEMI-TRAILERS

11.1 Class and type of the coupling device(s):

11.2 Maximum D-value: .....kN(1)

11.3 Instructions of attachment of the coupling type to the vehicle and photographs or drawings of the fixing points at the vehicle given by the manufacturer; additional information, if the use of the coupling type is restricted to special types of vehicles:

11.4 Information of the fitting of special towing brackets of mounting plates(1):

Date, File

ANNEX IX

MODEL
(maximum format: A4 (210 X 297))

EEC TYPE-APPROVAL CERTIFICATE

Communication concerning the
- type-approval (1)
- extension of type-approval (1)
- refusal of type-approval (1)
- withdrawal of type approval (1)

of a type of a vehicle with regard to Directive.....

Type-approval number (2):

Reason for extension:

SECTION I

0.1 Make (trade name of manufacturer):
0.2 Type and commercial description(s):
0.3 Means of identification of type if marked on the vehicle (3)
0.3.1 Location of that marking:
0.4 Category of vehicle:
0.5 Name and address of manufacturer:

SECTION II

1. Additional information (where applicable): See Appendix I
2. Technical service responsible for carrying out the tests:
3. Date of test report:
4. Number of test report:
5. Remarks (if any): See appendix I
6. Place:
7. Date:
8. Signature:
9. The index to the information package lodged with the competent authority that has granted type approval, which may be obtained on request, is attached.

---

(1) Delete where not applicable

(2) In the case of components the EEC type-approval number appearing on document shall consist of all sections outlined in Annex VII to Directive 70/156/EEC, as last amended by Directive .../...EEC. The component itself shall be marked as prescribed in the relevant separ Directive.

(3) If the means of identification of type contains characters not relev to describe the vehicle, component or separate technical unit types covered by this information document/type-approval certificate such characters shall be represented in the documentation by the symbol:

Appendix I

to EEC type-approval certificate no.....
concerning the type approval of a vehicle with regard to
Directive .../...EEC

1. Additional information

1.1 Vehicle construction, bodywork/chassis:
1.1.1 Materials used:

1.2 Class of the coupling device, EEC type-approval number:

1.3 Use of towing brackets or mounting plates; attachment instructions of the coupling type:

1.4 EEC vehicle type approval is extended to the following type(s) of coupling device and class(es):

1.5 Maximum mass of the vehicle type T or R (1) fitted with the coupling device: .....t

1.6 Maximum vertical load S or fifth wheel load U (1) of the vehicle type fitted with the coupling device: ...kg/t

1.7 Maximum V-value of a centre axle trailer:.....kN

1.8 Maximum towable mass of the motor vehicle (1): .....t

5. Remarks:

IMPACT STATEMENT ON COMPETITIVENESS AND JOBS

Proposal for a Council Directive relating to the mechanical coupling devices of motor vehicles and trailers and their attachment to these vehicles

I. What is the main justification of the measure?

- Completion of the EEC type-approval procedure for road vehicles and coupling devices
- Harmonization of national laws
- Improvements to road safety
- Interchangeability of motor vehicles and trailers with regard to international transport within the Community

II. Characteristics of the companies involved
More particularly,

- Do they include a large number of SME? - No
- Are there any significant regional concentrations? - No
- Are they eligible for regional aid from the MS? - No
- Are they eligible for aid from the ERDF? - No

III. What obligations are imposed on those companies?

Merely the obligation to comply with what the Directive lays down with regard to type approval and the manufacture of coupling devices.

IV. What obligations are likely to be imposed indirectly upon these companies via the local authorities?

No additional obligation

V. Do any special measures apply to SME?
What are they?

None

VI. What is the foreseeable impact on

- company productivity? No foreseeable impact
- jobs? No foreseeable impact

VII. Have both sides of industry been consulted? Yes

- Opinion of the two sides of industry: no objections

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DOCUMENTS

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