UIC CODE 520

7th edition, December 2003

Translation

OR

Wagons, coaches and vans - Draw gear - Standardisation

Wagons, voitures et fourgons - Organes de traction - Normalisation
Güterwagen, Reisezugwagen und Gepäckwagen - Teile der Zugeinrichtung - Normung

UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBAHNVERBAND
INTERNATIONAL UNION OF RAILWAYS

Leaflet to be classified in Volume :

V - Rolling Stock

Application :

With effect from 1 January 1990 as regards obligatory provisions, for vehicles to be built in the future, with the exception of :
- point 2.6 (1.7.2003),
- point 2.7 (1.7.2003).

However, the following derogations have been granted, insofar as non-continuous draw gear is concerned, to :
- the ČD and ZSSK, as regards special coupling sleeves, base plates and draw bar with shackle,
- the DB-AG (ex. DR vehicles), as regards springs, drawbars, draw-springs seats, special sleeves and bolts, draw-hook pins and safety device.

All members of the International Union of Railways

Record of updates

6th edition, January 1990	6th edition and 3 amendments of 1.7.90, 1.7.93 and 1.7.95
7th edition, December 2003	Retyped in FrameMaker and addition of point 2.7. Important: the articles (points) in this leaflet have been renumbered in the new edition. The first digit of each point has been increased by one (i.e. 0 becomes 1, 1 becomes 2, and so on). Please take account of this when using cross-references from other leaflets.

The person responsible for this leaflet is named in the UIC Code

Contents

Summary

This Leaflet defines the draw gear systems to be used for wagons, coaches and vans, viz. the standard unified screw coupling, the coupling hook and the elastic draw systems. The use of the standardised screw coupler is compulsory for new stock with effect from 1 July 2003. It is recommended, however, that no further supplies of standard draw hooks or their component parts should be ordered.

1 - General

O **1.1 -** Vehicles must have spring buffing and draw gear at both ends.

Vehicles which are never split up when in service are considered as a single vehicle for the application of this provision.

R **1.2 -** *ERRI Document DG4* (see Bibliography - page 22) gives an overview of the standard sub-assemblies and component parts.

The document *ERRI B 12 - RP 63* (see Bibliography - page 22) describes the standardisation of the screw coupling.

2 - Standard provisions for coaches, vans and wagons - Strength - Interchangeable components

O **2.1 -** The minimum breaking strength shall be:

- 850 kN for screw couplings,
- 1 000 kN for draw hooks and other parts through which effort is transmitted.

O **2.2 -** The weight of the screw coupling shall not exceed 36 kg, and even 30 kg, if possible.

O **2.3 -** The coupling length measured from inside the loop of the coupling link to the joint pin of the coupling screw and draw hook must comply with the following conditions:

- 986^{+10}_{-5} mm for the fully loosened coupling,
- 750 ± 10 mm for the fully tightened coupling.

O **2.4 -** A mechanism to prevent spontaneous slackening of the screw coupler has been provided for.

O **2.5 -** The vehicles must be fitted at both ends with a mechanism on which to hang the screw coupler when out of use. This mechanism must be designed to avoid any part of the screw coupler from dropping to under 140 mm above rail level in the lowest admissible position for the buffers. This minimum value shall also apply for other coupling gear (brakes, heating, etc.).

O **2.6 - Interchangeable components**

All the component parts of the screw coupler must be interchangeable. The screw coupler itself is described in two sets of *ERRI standard drawings 100M 3220 001 and 100M 3220 002* (see Appendix A, Fig. 1 - page 8 and Fig. 2 - page 9).

Appendices I to L reproduce these different components:

- Appendix I - page 18 for the screw, standard handle (T-bar) housing and hook pin.
- Apppendix J - page 19 for the trunnion and D-shackle.
- Annexe K - page 20 for the trunnion (with and without rest) and coupling link.
- Annexe L - page 21 for the two types of handles.

NB : the interchangeability of the hinged-handle is linked to the trunnion (with rest) (Appendix K).

R **2.7 -** It is recommended that no further supplies of standard draw hooks or their components should be ordered.

3 - Provisions specific to wagons

o 3.1 - General

With effect from 1 January 1985, all wagons accepted for running in international traffic, irrespective of date of manufacture, must be fitted with draw gear with a minimum breaking strength of 850/ 1 000 kN[1].

All wagons built after 1 January 1969[2] must be fitted with the non-continuous draw gear as defined in this leaflet, unless they incorporate a spring device which can be used subsequently for automatic coupling.

In the latter case, however, the two extra holes designed for the anchor bolts of the base plate, according to Appendices E - page 13 and F - page 14, must be drilled in the wagon underframe.

o 3.2 - Provisions covering standard non-continuous draw gear, applicable since 1.1.1969

The design of the non-continuous draw gear involving the use of an eye-hook (Appendix C, Fig. 4 - page 11) is illustrated in Appendix B - page 10.

It shall be possible for the eye-hook to be replaced by a shouldered hook of the type previously used for continuous draw gear (point Appendix H, Fig. 10 - page 16), fitted with two special coupling sleeves (point Appendix H, Fig. 11 - page 16).

3.2.1 - Standard parts

Appendices C - page 11 to G - page 15 define the values guaranteeing interchangeability as well as the standardisation levels concerning the following components for non-continuous draw gear:

- eye hook (or shouldered hook and special coupling-sleeve assembly[3]);
- drawbar with shackle,
- joint pin and safety device,
- baseplate transferring the force in the spring to the rear traction stops of the automatic coupler.

Where the latter component is concerned, however, interchangeability is not ensured between the assembly with a bolted front baseplate (Appendix E) and the assembly with a welded front baseplate (Appendix F).

1. Wagons with continuous draw gear may however continue using continuous-traction rods with minimum breaking strength of only 850 kN until 31.12.1994.
2. With the exception of special wagons which, for design reasons, cannot observe the clearance currently defined for automatic coupling.
3. In the event of damage or wear occurring, the two special coupling sleeves must be replaced together, even if only one of them is no longer fit for use.

Moreover, in the case of an assembly with a bolted front baseplate, it is permissible for the drawbar with shackle and the baseplate not to comply individually with interchangeability requirements, so long as the whole of the assembly, with the spring, is interchangeable with the equivalent unit defined in this leaflet (Appendix E - page 13).

Appendix G - page 15 shows a guiding device for the drawbar shackle. This device is not obligatory, but it does reduce wear affecting the draw gear (drawbar, baseplate, etc.) occurring particularly when running in small radius curves.

3.2.2 - Static characteristics of the spring

- Final force after a stroke of 50 to 60 mm
  - obligatory minimum value 400 kN
  - recommended minimum value 550 kN
- Precompression:
  - obligatory minimum value 10 kN
  - recommended minimum value 20 kN
- Static storage capacity:
  - obligatory minimum value 8 kJ
  - recommended minimum value (general) 10 kJ
  - recommended minimum value in respect of wagons to be used in heavy trains 20 kJ
- Absorption rate:
  - obligatory minimum value 0,3

These characteristics shall be recorded at an ambient temperature of about 15 degrees centigrade. The decompression period shall follow the compression period immediately, and the maximum speed of movement of the drawbar in either direction must not exceed 5 cm per second. After a total release of the spring, the conditions must return to those prevailing initially.

R 3.3 - Provisions applicable to continuous draw gear

3.3.1 - The design of the draw hook and the fastening method with a coupling sleeve are defined in Appendix H, Fig. 10 and Fig. 11 - page 16.

In the event of damage or wear occurring to only of the coupling sleeves, both of them must be replaced.

3.3.2 - Characteristics of the spring:

Wagons built	before 1.1.1964	between 1.1.1964 and 31.12.68
Number of springs per wagon		1
Minimum force for flattening the spring	130 kN	160 kN
Type of spring		volute[a]
Height when released		250 mm
Outer diameter of base of spring		180 mm
Outer diameter of head of spring		84 mm
Mean flexibility		0,5 mm/kN

a. Other types of spring may be used providing they conform to the interchangeability conditions.

R

3.4 - Interaction of buffers and draw gear

The static characteristics of draw gear and side buffers must be coordinated in order to ensure that the train is able to negotiate curves of 150 m radius safely in normal coupling conditions for the train running.

In order to meet this requirement for long bogie wagons, a guideline value of 250 kN[1] should not, if possible, be exceeded for the compression force of a pair buffers in contact in a curve of 150 m.

To determine the compression force, the calculation method shown under *section 3 of RP 32 of ORE Specialists' Committee B 36* (see Bibliography - page 22) may be used.

This calculation method also allows stress levels to be determined on smaller radius curves.

1. This figure has been worked out on the basis of Gabs, Type 2, wagons (UIC Leaflet 571-2, point 2.1.2) with a length over buffers of 21,7 m.

4 - Provisions specific to coaches and vans

O 4.1 - General

With effect from 1 January 1983, all coaches and vans accepted for running in international traffic, irrespective of date of manufacture, must be equipped with draw gear with a minimum breaking strength of 850/1 000 kN.

R 4.2 - Mounting conditions

The distance from the point of contact of the opening of the draw hook when not taut to the front of the buffers when not compressed must be:

- a maximum of 400 mm,
- a minimum of 335 mm.

O 4.3 - Draw gear (interchangeability)

The interchangeability dimensions of the following components must be observed :

- eye draw-hook (Appendix C - page 11),
- joint pin (Appendix D - page 12).

Appendix A - Standard UIC coupling

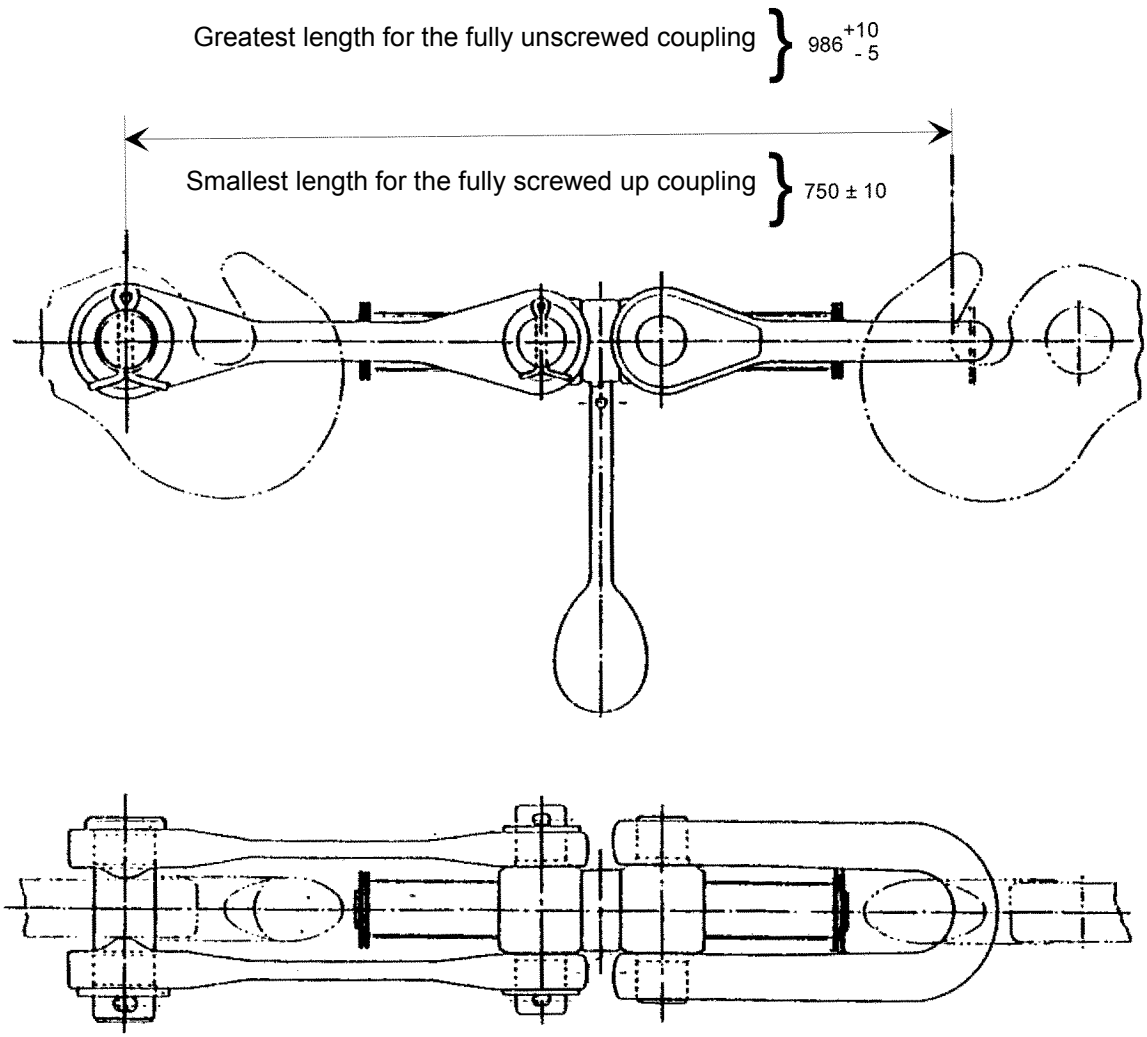


Fig. 1 - Wagons, coaches and vans - Standard screw coupling with non-loosening hinged ball handle

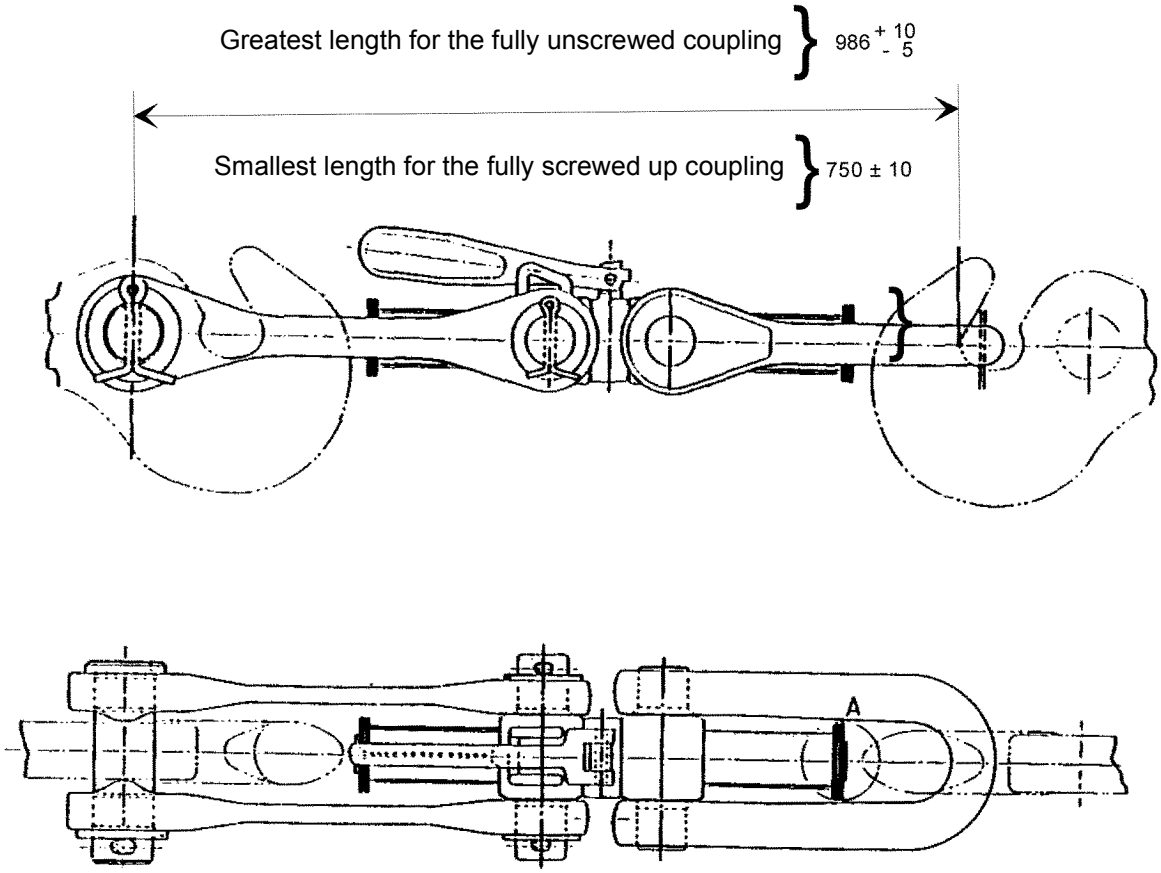
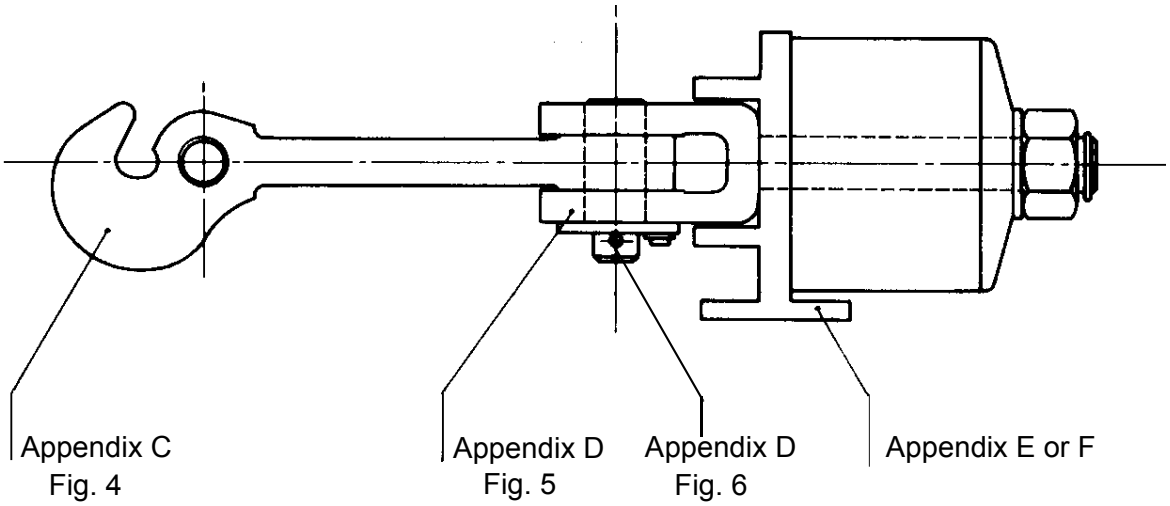


Fig. 2 - Wagons, coaches and vans - Standard screw coupling with hinged handle with non-loosening upper rest

Appendix B - Wagons - Diagram of standard non-continuous draw gear - Standardisation



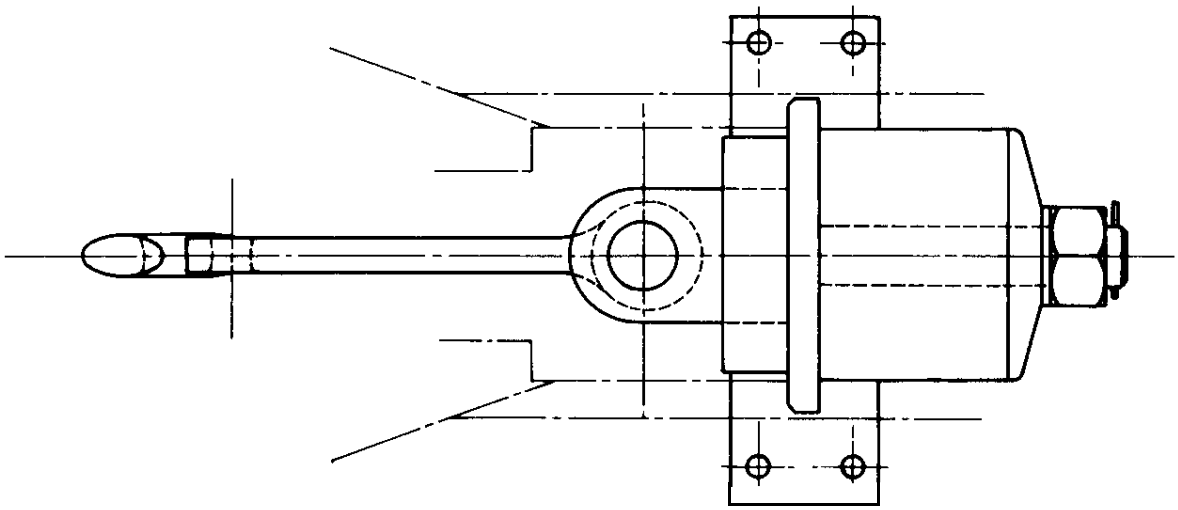
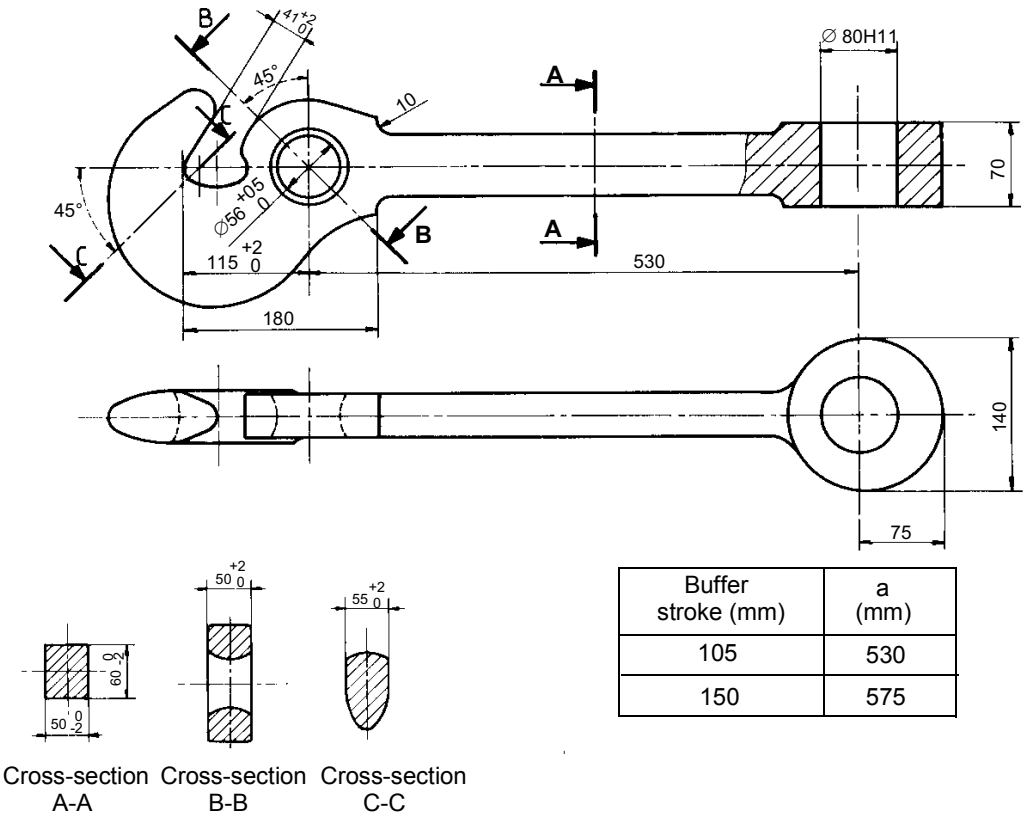


Fig. 3 - Non-continuous draw gear - Assembly

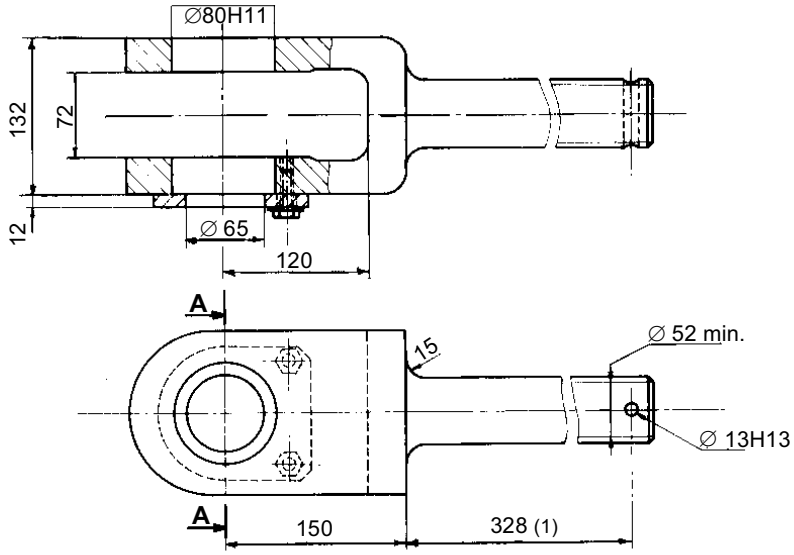
Appendix C - Non-continuous draw gear - Standardisation



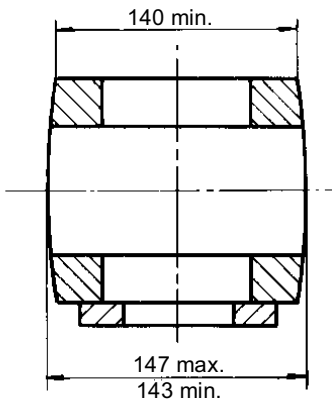
Buffer stroke (mm)	a (mm)
105	530
150	575

Fig. 4 - Coupling hook (also applicable to coaches and luggage vans)

Appendix D - Wagons - Non-continuous draw gear - Standardisation



Cross-section A-A



(1) This length may be increased when the absorption capacity of the draw-bar spring is at least 10 kJ. The standard length to be adopted in this case will be stated later.

Fig. 5 - Drawbar with shackle and safety device

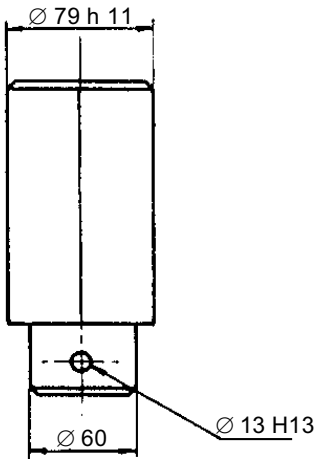
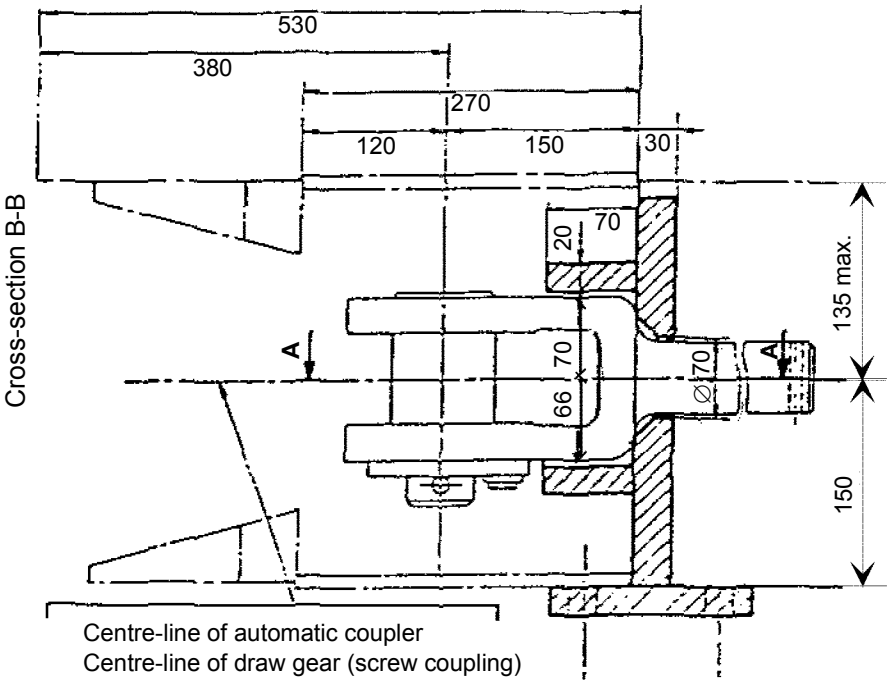
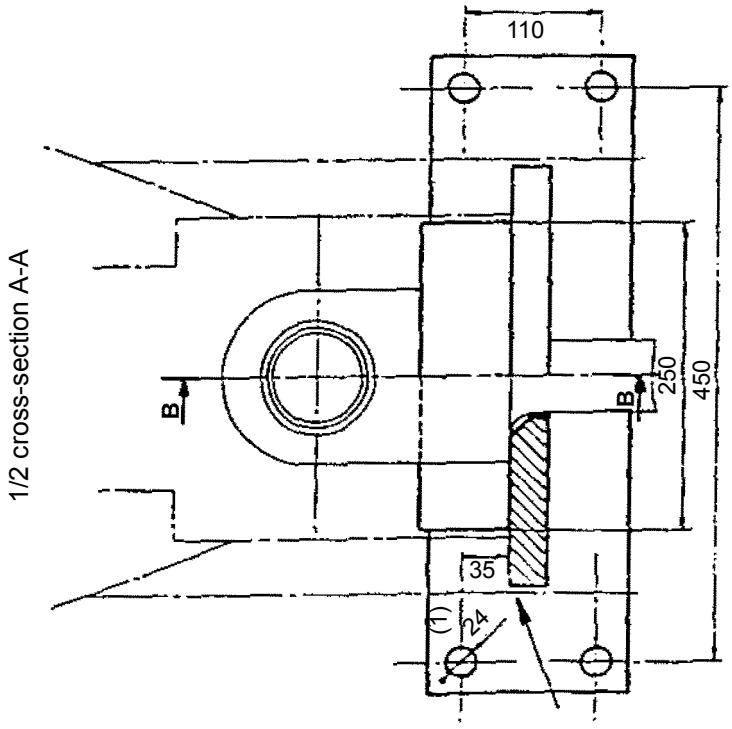


Fig. 6 - Joint pin (also applicable to coaches and luggage vans)

Appendix E - Wagons - Non-continuous draw gear - Support plate - Standardisation





(1) For existing wagons, bolt wholes in the base plates may be kept at diameter of 20 mm. In this case, M16 or M18 bolts, as available, shall be used for fixing the base plate on the underframe sections drilled with 20 or 24 mm holes, with washers inserted as required.

Fig. 7 - Arrangement for wagons with a bolted front base plate

Appendix F - Wagons - Non-continuous draw gear - Support plate - Interchangeability

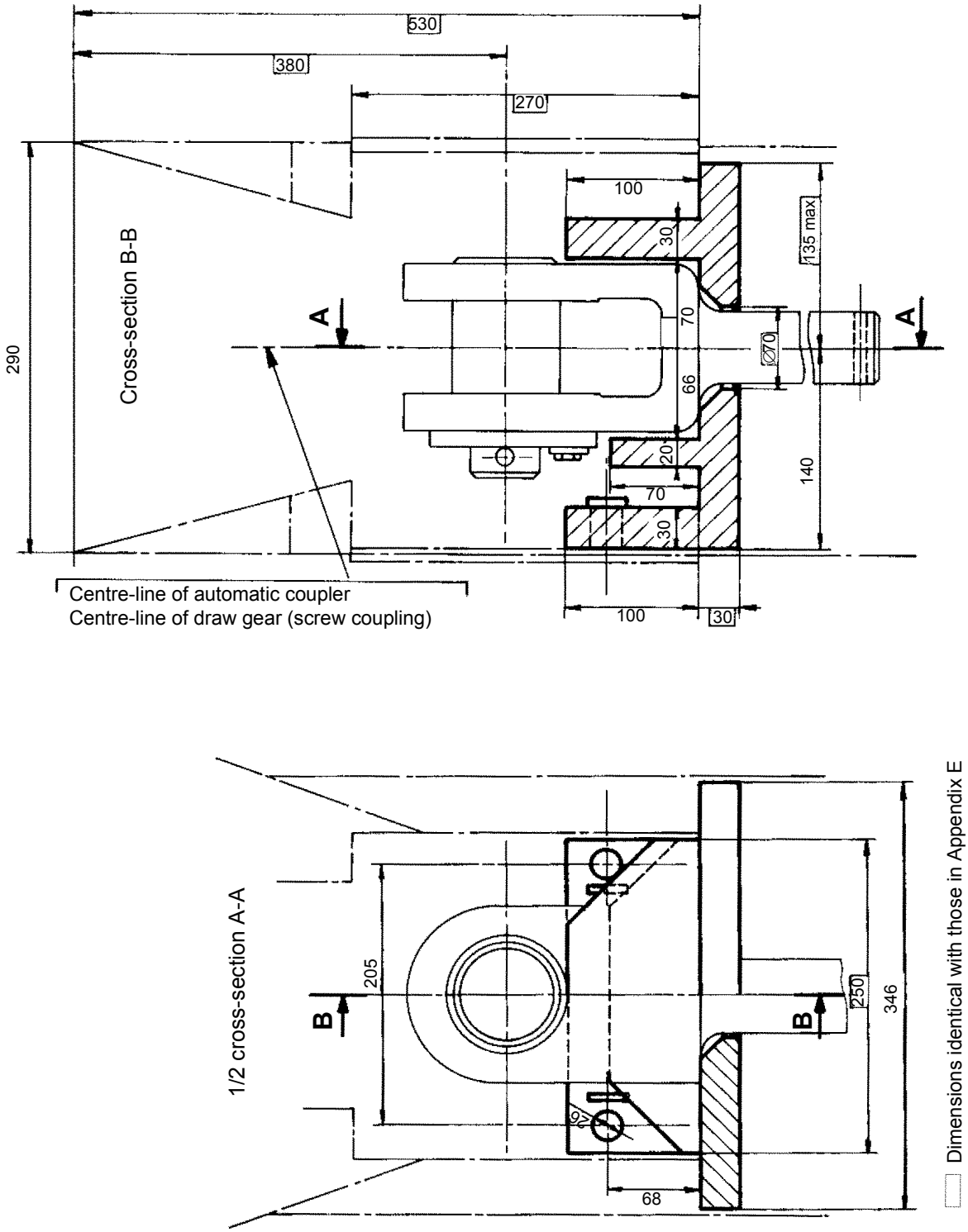


Fig. 8 - Arrangement for wagons with a front base plate

Appendix G - Wagons - Non-continuous draw gear

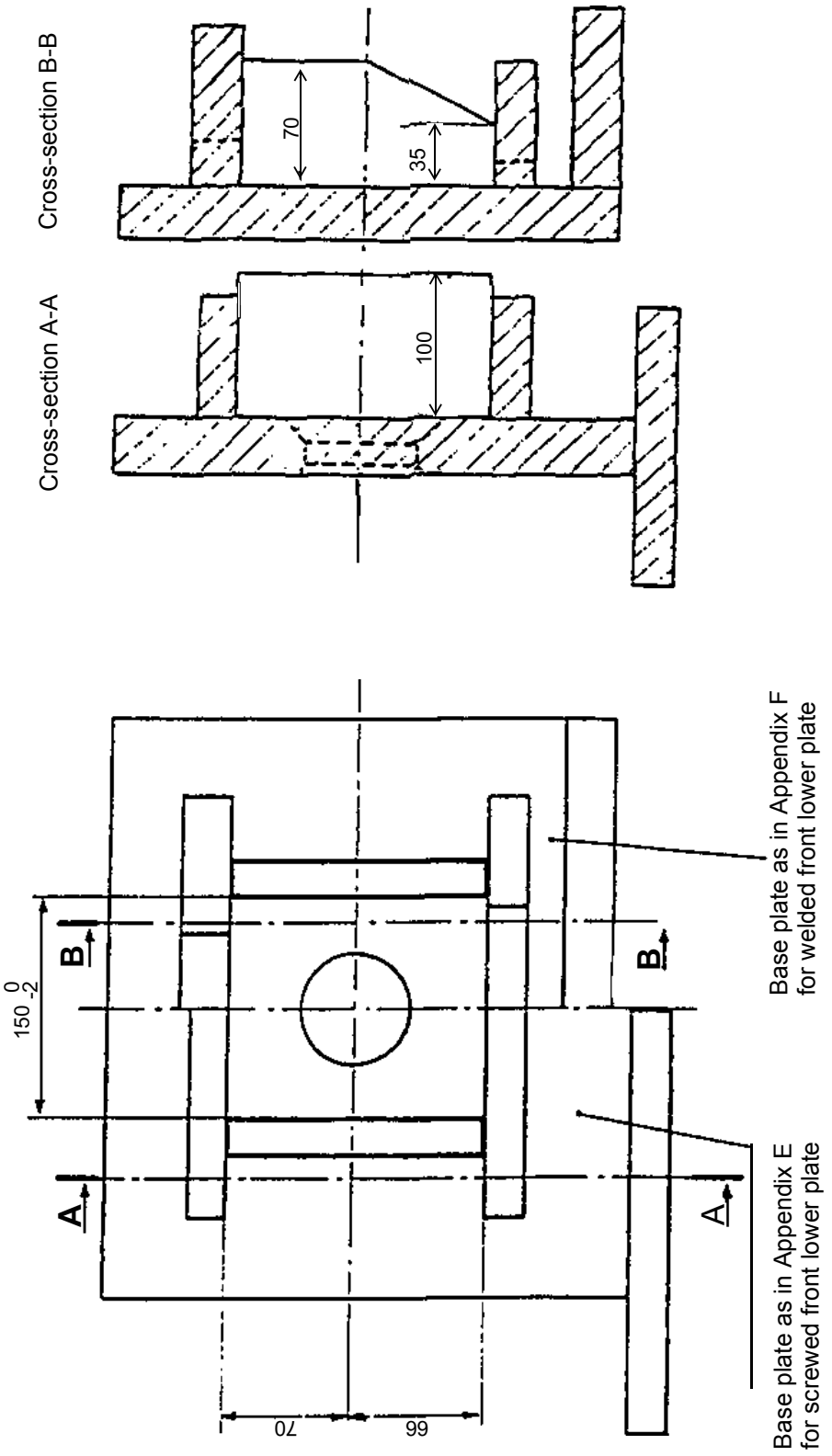


Fig. 9 - Base plate: guiding device

Appendix H - Wagons - Continuous draw gear - Standardisation

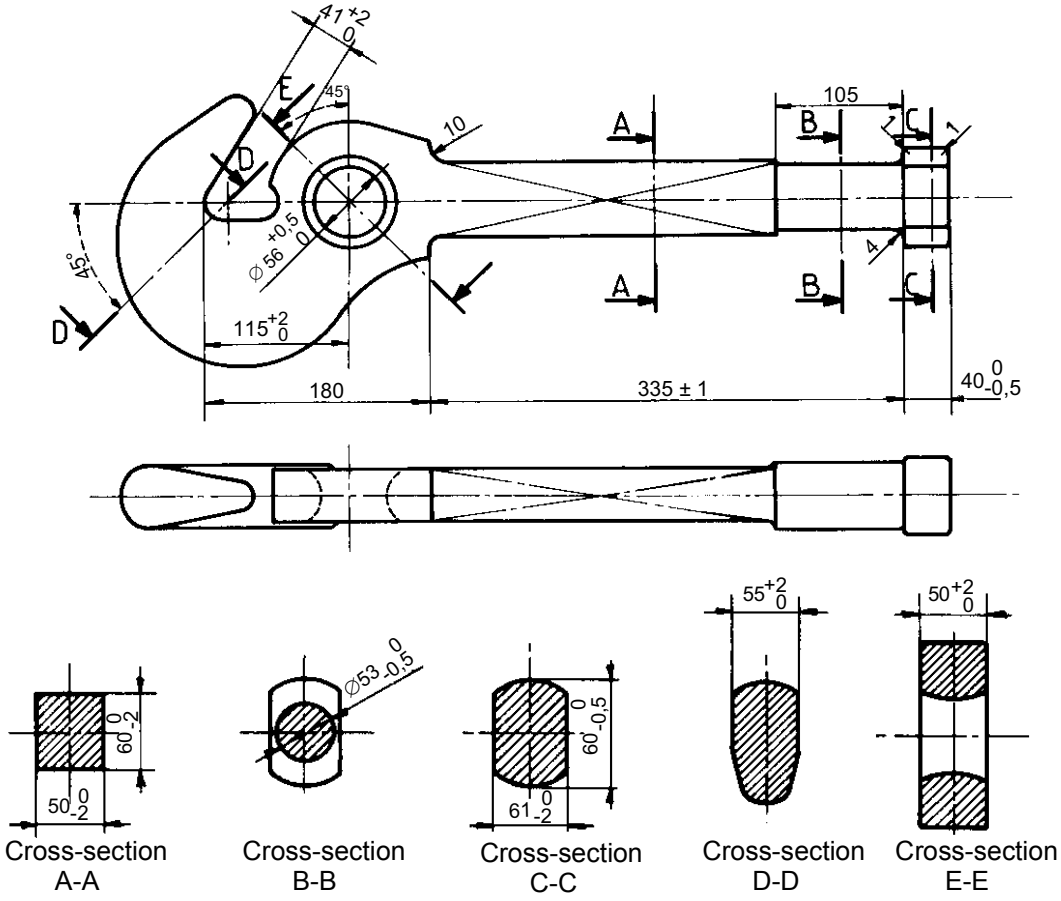


Fig. 10 - Coupling hook

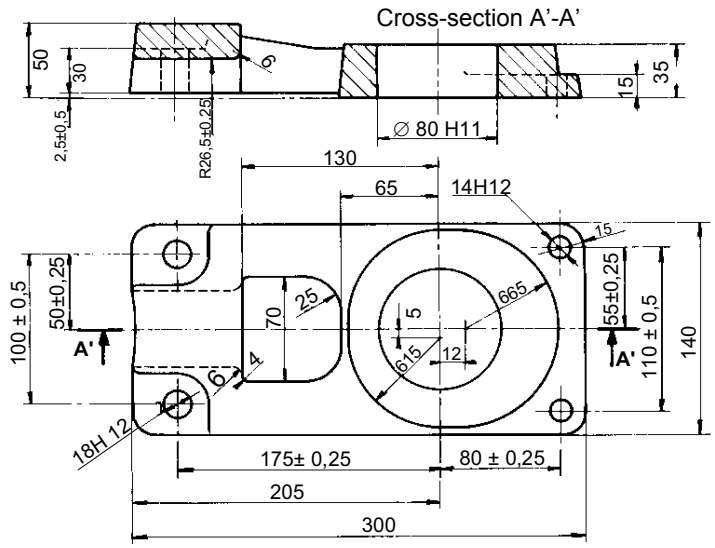


Fig. 11 - Coupling sleeve

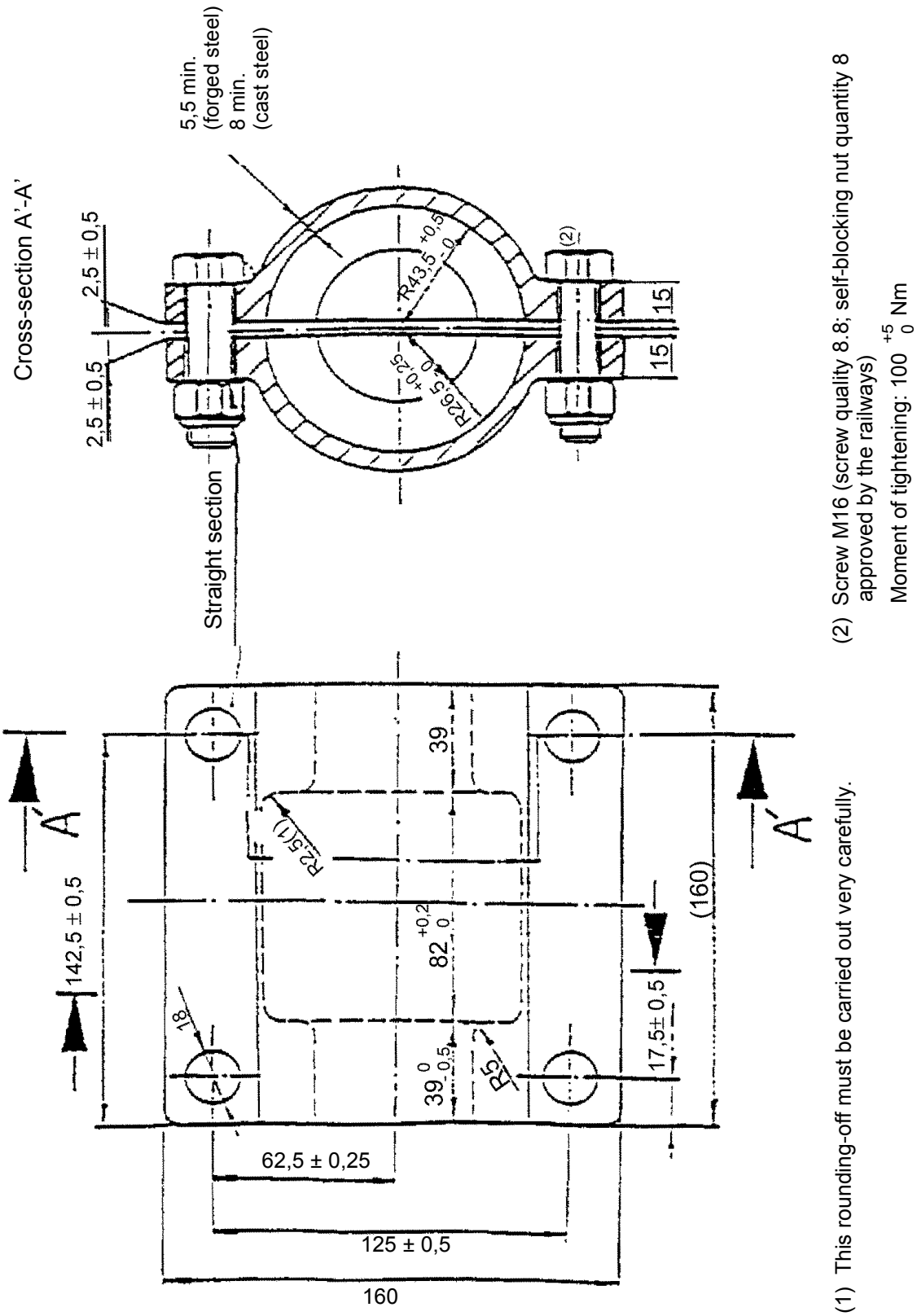


Fig. 12 - Recessed coupling sleeve

It is recommended that the coupling sleeve be fitted, placing the joint horizontally.

Only semi-drawbar spiral sleeves machined in pairs shall be fitted.

Appendix I - Handle (T-bar) housing, screw and coupling hook pin for standard screw coupler

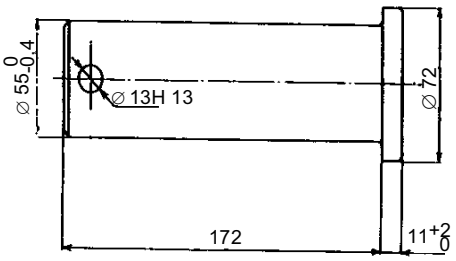


Fig. 13 - Coupling hook pin

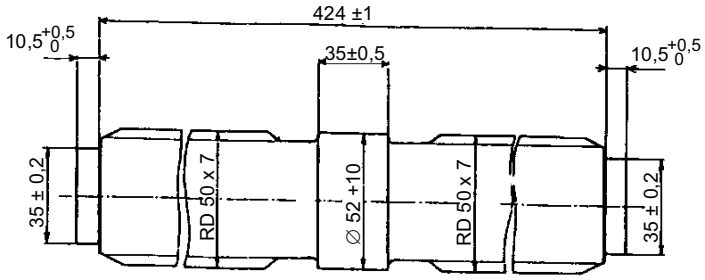


Fig. 14 - Screw

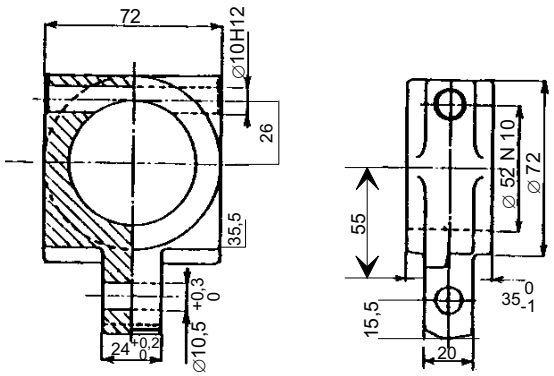


Fig. 15 - Handle (T-bar) housing

Appendix J - Trunnion and D-shackle for standard screw coupler

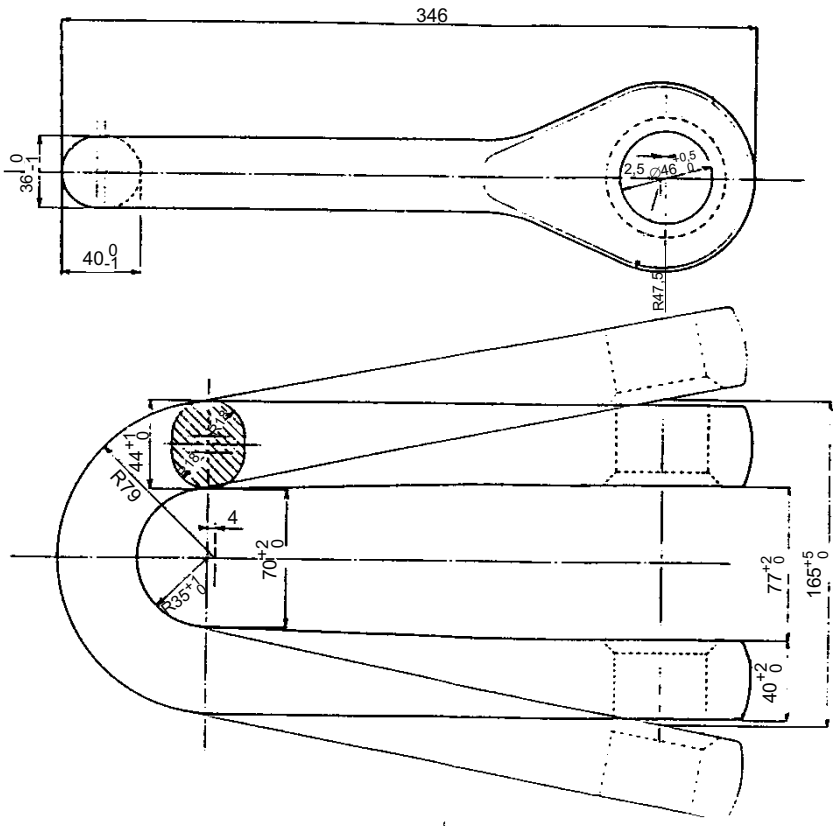


Fig. 16 - D-shackle

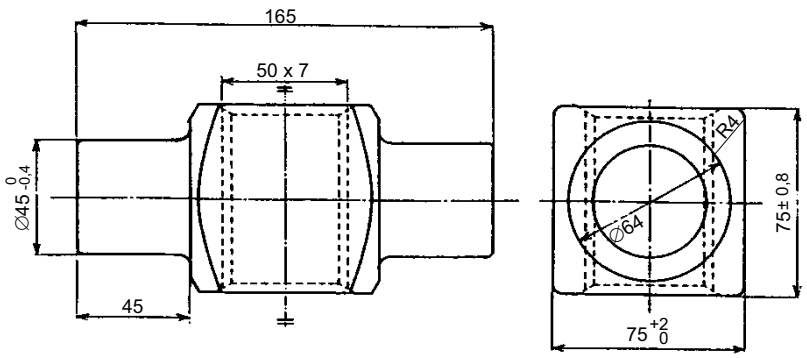


Fig. 17 - Trunnion

Appendix K - Trunnion (with and without rest) and coupling link for standard screw coupler

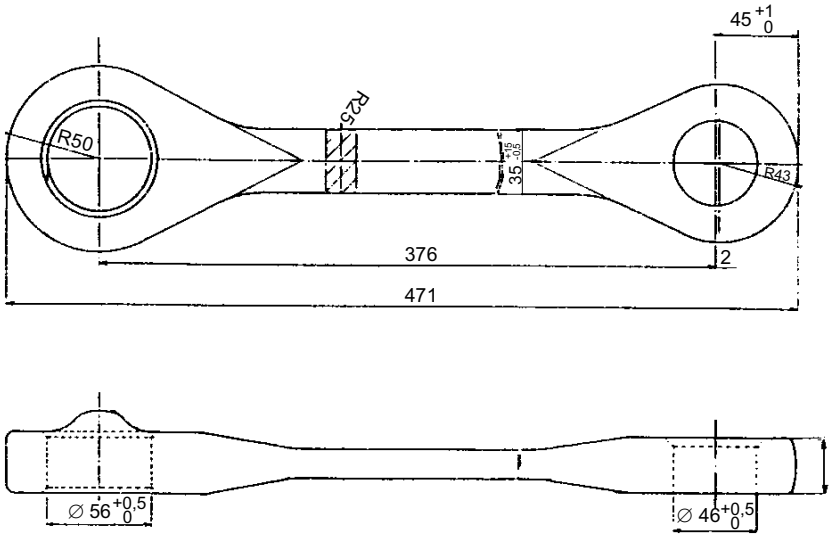


Fig. 18 - Coupling link

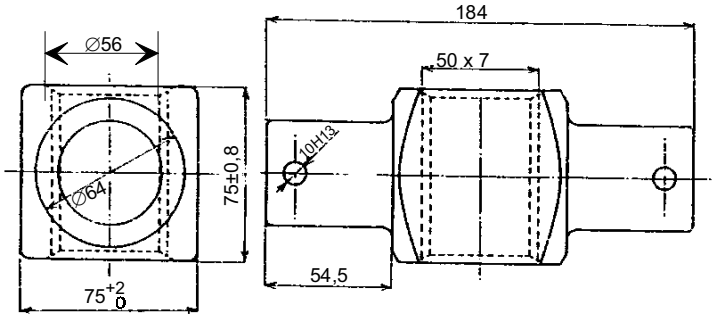


Fig. 19 - Trunnion for ball handle (T-bar)

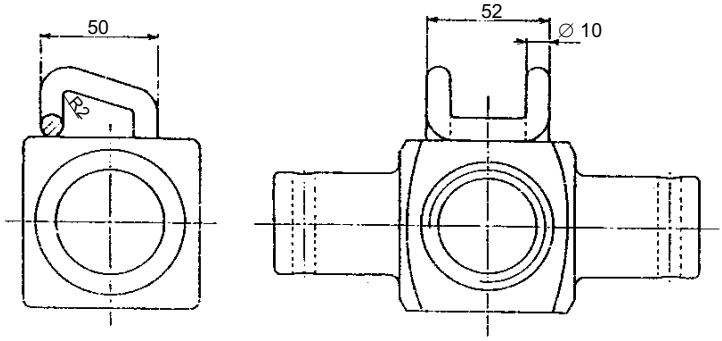
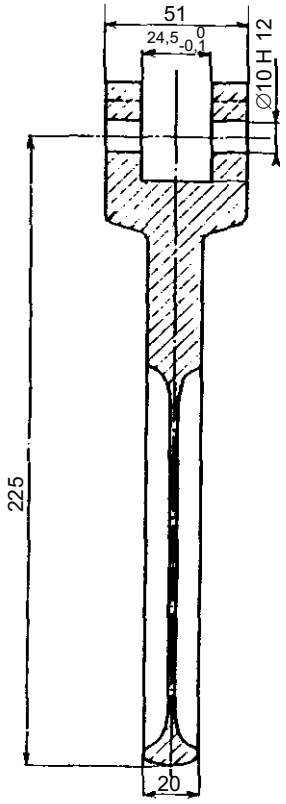


Fig. 20 - Trunnion for handle (T-bar) with top-mounted rest

Appendix L - Hinged handle (T-bar) and hinged ball handle (T-bar) for standard screw coupler



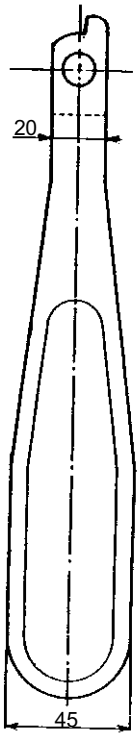
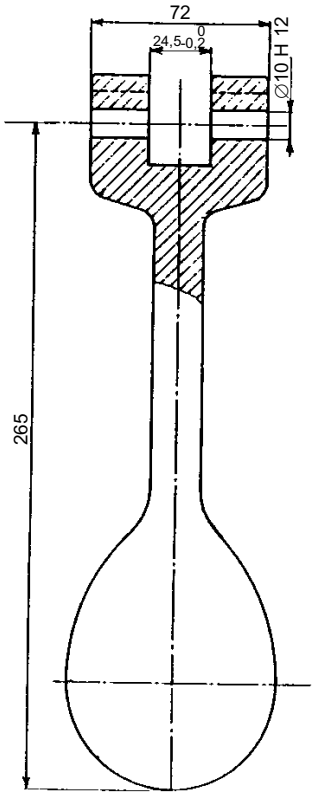


Fig. 21 - Hinged handle (T-bar)



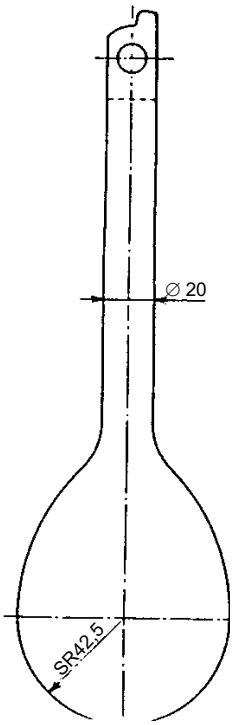


Fig. 22 - Hinged ball handle (T-bar)

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1. UIC leaflets

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UIC Leaflet 530-5: Leaflet withdrawn on 1.7.00,

UIC Leaflet 583: Wagons - Application of a special mark on interchangeable parts, 5th edition of 1.1.86 - Reprint dated 1.7.95

UIC Leaflet 825: Technical *specification for the supply of draw hooks with nominal load equal to 250 kN, 600 kN or 1000 kN for tractive and trailing stock,* 4th edition of 1.7.85

UIC Leaflet 826: Technical specification for the supply of screw couplings for tractive and trailing stock, 2nd edition of 1.7.73 - Reprint dated 1.1.96

UIC Leaflet 827-1: Technical specification for the supply of elastomer components for buffers, 2nd edition of 1.1.90

2. Minutes of meetings

International Union of Railways (UIC)
Joint Sub-Committee for Wagons (Question 45/B/FIC - Inclusion of buffers with 150 mm stroke - Respective elastic characteristics of buffing and draw springs), January 1990

Joint Sub-Committee for Wagons (Question 45/B/FIC - Revision of leaflets - Examination of proposed modifications to the Leaflet submitted by ERRI Specialists' Committee B 12), January 1993

Question 45/B/36 - Standardisation of wagon components and groups of components - Continued standardisation work on the standard screw coupler,

Joint Sub-Committee for Wagons (Approval of amendments to Leaflets 520 and 583 submitted by ERRI Specialists' Committee B 12), January 1995

Approval of modifications to Leaflet 520 (CTR.10.2002): change in date of application and addition of point 1.7,

3. ERRI reports

European Rail Research Institute (ERRI)
ORE B 36 - RP 32 : Characteristics of the buffing and draw gear of wagons to ensure the safe running of long vehicles in small-radius curves, 26.9.89

ERRI B 12 - RP 63 : Standardization of the screw coupler, 1.2.95

ERRI DG4 : Dessins pour matériel ferroviaire normalisé ; conditions d'acquisition et d'utilisation, 1.7.96

Warning

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