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Commercial road vehicles — Mechanical coupling between towing vehicles with coupling mounted forward and below, and centre-axle trailers — Interchangeability

*Véhicules routiers utilitaires — Accouplement mécanique entre véhicules
tracteurs à dispositif d'attelage avancé et surbaissé et remorques à
essieux centraux — Interchangeabilité*



Reference number
ISO 11407:1993(E)

Foreword

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International Standard ISO 11407 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Sub-Committee SC 15, *Interchangeability of components of commercial vehicles and buses*.

Annexes A, B and C of this International Standard are for information only.

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Introduction

In many countries the total length of road trains is limited by law. In view of the increasing demand for large volume transports, vehicle manufacturers have developed solutions to optimize the loading space of road trains within the legal specification. Centre-axle trailers are a well proven means to reduce the necessary free space between towing vehicles and trailer, and thus increase the loading space within the legal limitations.

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Commercial road vehicles — Mechanical coupling between towing vehicles with coupling mounted forward and below, and centre-axle trailers — Interchangeability

1 Scope

This International Standard lays down the requirements for the various elements and dimensions of a towing vehicle coupling mounted forward and below, and of a centre-axle trailer to ensure interchangeability.

NOTE 1 Annex B gives examples of different vehicle combinations: this International Standard deals only with No. B.2.2.

This International Standard applies to road trains for commercial transport of low-density, high-volume cargo of the greatest possible variety: it does not cover dedicated or special combinations such as coupling systems with an extensible drawbar. Nor does it specify limitations of maximum gross mass and overall dimensions, which are generally laid down by legislative requirements.

Vehicles whose couplings form the subject of this International Standard are not interchangeable with vehicles whose couplings are rear-mounted (which form the subject of ISO 11406[2]).

2 Interchangeability dimensions

2.1 Distance between drawbar coupling axis and rear end of towing vehicle

This dimension, dimension A in figure 1, shall be selected from table 1.

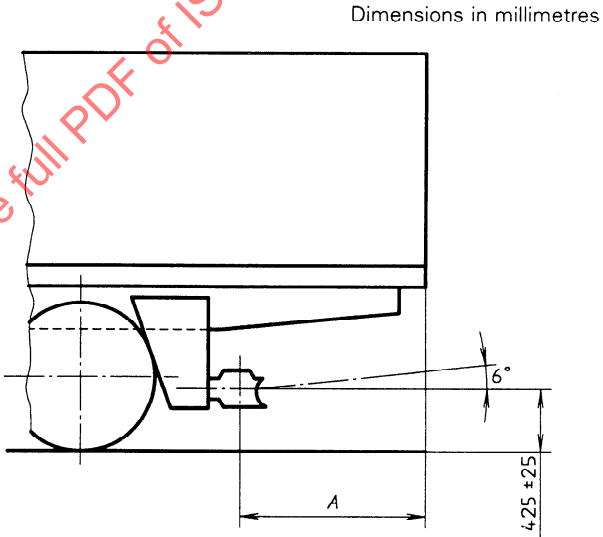


Figure 1 — Rear end of towing vehicle

Table 1 — Distances between drawbar coupling axis and rear end of towing vehicle

Class designation	Dimension A
	$\begin{matrix} 0 \\ -100 \\ \text{mm} \end{matrix}$
1 400	1 400
1 600	1 600
1 900	1 900

2.2 Turning front of trailer

The turning front of the trailer, dimension C in figure 2, is the distance between the drawbar coupling axis and the front of the trailer.

The minimum value of C , in millimetres, is determined by the equation

$$C_{\min} = \sqrt{\left(\frac{W}{2}\right)^2 + A^2} + S$$

where

- W is the vehicle width, in millimetres;
- A is as defined in 2.1;
- S is the clearance between the turning circles of the towing vehicle and the trailer, in millimetres.

$S_{\min}$ shall be 250 mm. This ensures that no contact is possible between the towing vehicle and the front of the trailer under normal conditions of operation and turning.

Examples for $C_{\min}$ are given in annex A.

NOTE 2 A smaller dimension C , if required by the client of the trailer manufacturer, does not exclude the risk of contact and damage to the bodies of towing vehicle and trailer, depending on the angle of articulation and on height of the vehicles. In this case, such a combination is considered a dedicated combination and is not covered by this International Standard.

2.3 Height of couplings

The height of the drawbar coupling on the laden towing vehicle shall be as shown in figure 1. The height of the towing eye on the laden centre-axle trailer shall be as shown in figure 3.

2.4 Drawbar contour

Drawbars shall comply with the dimensions shown in figures 3 and 4.

Dimensions of drawbar couplings are specified in ISO 1102[1]. However, centre-axle trailers may require reinforced drawbar eyes having dimensions larger than those specified in ISO 1102.

2.5 Rear end of towing vehicle

The configuration of the rear end of the towing vehicle shall take into account the worst case dimensions shown in figures 3 and 4.

2.6 Angle of inclination and articulation

The towing vehicle shall be so constructed that the towing vehicle and trailer components, except for those concerned with articulation, do not make contact with each other, when the angle of inclination of the centre-axle trailer relative to the towing vehicle does not exceed 6° (see figure 1).

Under manoeuvring conditions, the angle of articulation shall be able to reach 90° to either side of the towing vehicle median longitudinal plane and the angle of inclination shall be able to vary from 0 to 6° .

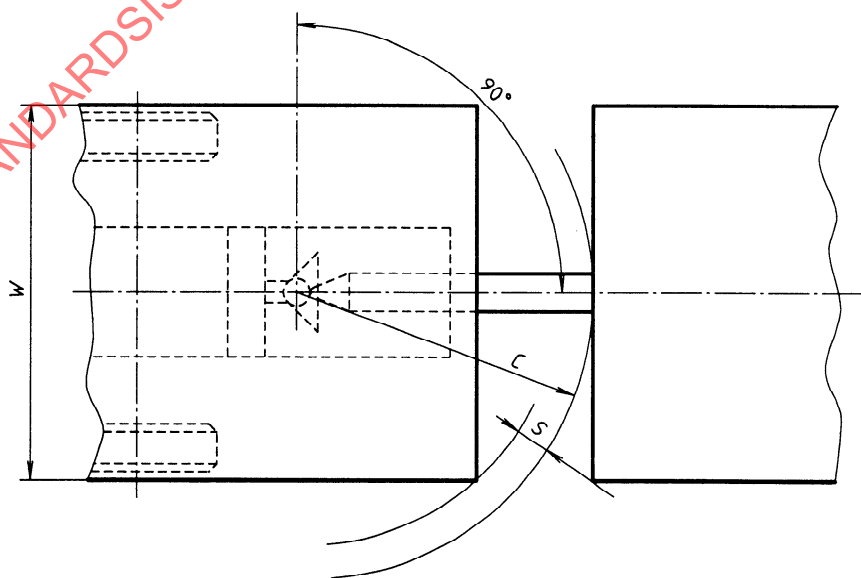


Figure 2 — Turning front of trailer

Dimensions in millimetres

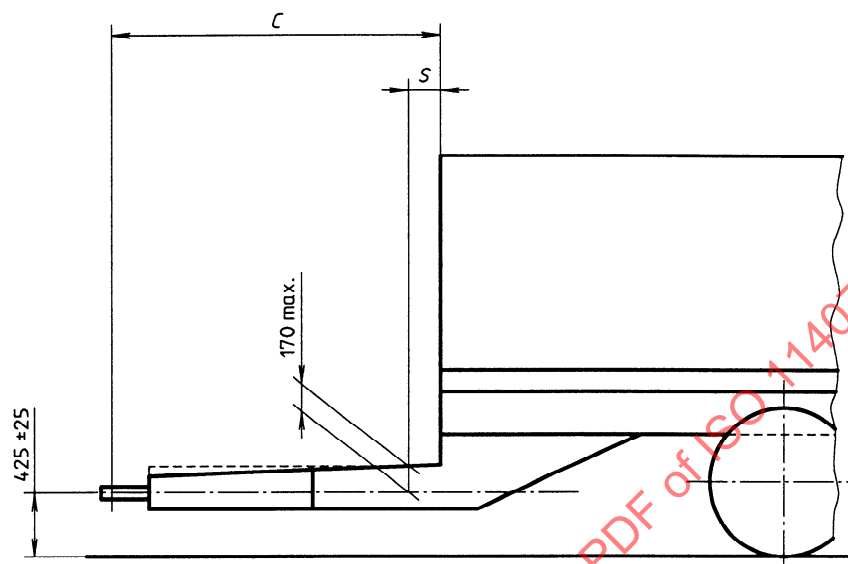


Figure 3 — Front end of centre-axle trailer

Dimensions in millimetres

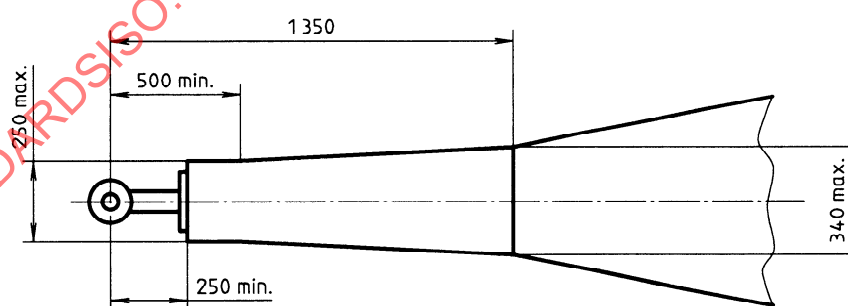


Figure 4 — Drawbar

3 Marking

Possible combinations of towing vehicle and trailers are shown in table 2.

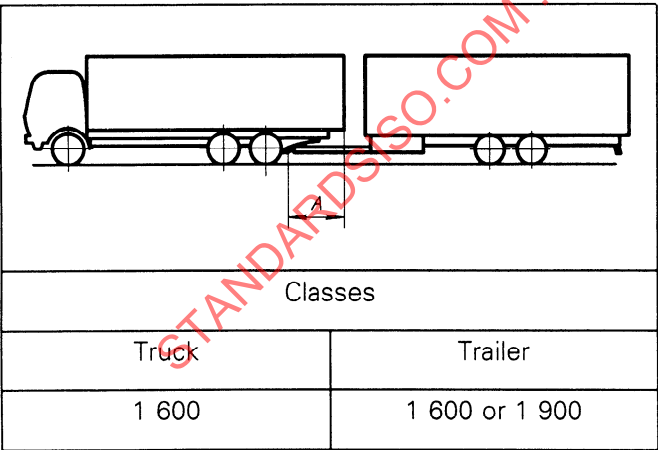
So as to ensure easy recognition of the important but variable parameter dimension A, it is recommended

that towing vehicles and trailers which comply with this standard be marked as follows.

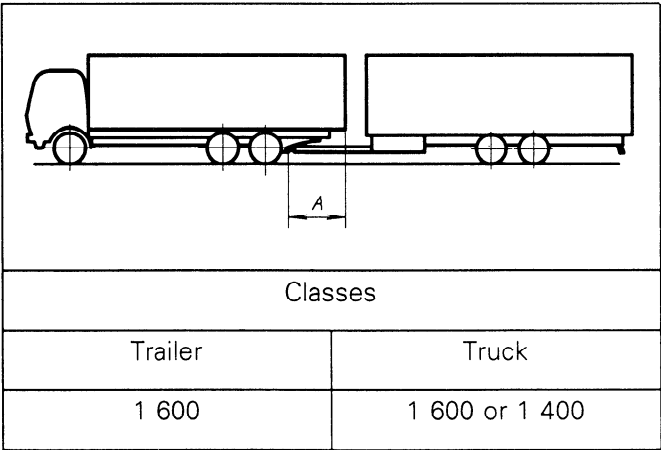
A plate measuring 150 mm × 150 mm min. is affixed permanently on the rear end of the towing vehicle and the front of the trailer. Markings on the plate are as shown in figure 5.

Table 2 — Combinations of towing vehicle and trailers

		Towing vehicle		
		Class		
		1 400	1 600	1 900
Trailer	1 400	⊗		
	1 600	x	⊗	
	1 900	x	x	⊗
⊗ = ideal combination				
x = possible combination				



a) marking plate for towing vehicle



b) marking plate for trailer

Figure 5 — Examples of markings

Annex A

(informative)

Determination of dimension C

Dimension $C_{\min}$ (see figure 2) is calculated with the equation in 2.2. Table A.1 gives classes of dimensions.

Table A.1

Dimensions in millimetres

Dimension	Example					
	1	2	3	4	5	6
A 1)	1 900	1 600	1 400	1 900	1 600	1 400
W	2 500			2 600		
S _{min}	250					
C _{min} 2)	2 550	2 300	2 160	2 550	2 300	2 160
1) For the class indicated (see table 1). 2) Rounded values.						