

# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

## ISO RECOMMENDATION R 1726

MECHANICAL COUPLING BETWEEN TRACTORS AND SEMI-TRAILERS  
INTERCHANGEABILITY

1st EDITION

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## BRIEF HISTORY

The ISO Recommendation R 1726, *Mechanical coupling between tractors and semi-trailers – Interchangeability*, was drawn up by Technical Committee ISO/TC 22, *Autmobiles*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question led to the adoption of Draft ISO Recommendation No. 1726, which was submitted to all ISO Member Bodies for enquiry in October 1968 and was approved by the required majority thereof. As a result of certain difficulties, however, the Secretariat decided to undertake a further study of the subject, and a second Draft ISO Recommendation No. 1726 was adopted. In September 1970, this second Draft was submitted to all ISO Member Bodies for enquiry and was approved, subject to a few editorial comments, by the following Member Bodies :

Australia	Israel	Sweden
Belgium	Italy	Switzerland
Canada	New Zealand	U.A.R.
France	Poland	United Kingdom
Germany	Portugal	U.S.A.
Greece	Romania	U.S.S.R.
Hungary	South Africa, Rep. of	

The following Member Bodies opposed the approval of the second Draft :

Czechoslovakia  
Japan

This second Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

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## MECHANICAL COUPLING BETWEEN TRACTORS AND SEMI-TRAILERS

### INTERCHANGEABILITY

#### 1. SCOPE

This ISO Recommendation defines the various elements and dimensions concerning a tractor vehicle and a coupled semi-trailer (articulated vehicle) which allow interchangeability.

It specifies certain interchangeability dimensions of the gooseneck contour, operating dimensions relating to some angle values and some additional dimensions.

#### 2. FIELD OF APPLICATION

This ISO Recommendation is concerned with articulated vehicles for international commercial transport, in particular, the semi-trailer for large ISO 12 m (type 1 A) containers, with or without a tunnel, with a mass of 30 t, complying with the specifications of ISO Recommendation R 668, *Dimensions and ratings of freight containers*.

The provisions of this ISO Recommendation permit interchangeability of the same semi-trailer with a two-axle tractor or a three-axle tractor.

To take account of the gooseneck semi-trailer used for the carriage of these large containers it is necessary to allow for a gross vehicle mass of up to 44 t and a total vehicle length of up to 16 m.

#### 3. INTERCHANGEABILITY DIMENSIONS (see Figures 1 and 2)

3.1 Height of fifth wheel of laden tractor  $A$  : 1350 mm min.  
1350 mm max.

3.2 Forward clearance zone radius of the semi-trailer  $D$  : 2040 mm max.  
For a normal square-fronted semi-trailer,  $D' = 1600$  mm max.

In the case of a tunnel container semi-trailer,  $D'$  should be 914 mm max., not including the front crossmember carrying the container locking device or a similar device.

#### 3.3 Goosneck contour

The goosneck should be located on the outside of the surface of revolution generated about the vehicle coupling vertical axis, the generator of which is shown in Figure 2 and described below :

- a part AB of length  $S$  situated in the horizontal plane of the centre of the coupling and in the longitudinal plane of symmetry of the semi-trailer;
- a part BC situated in the same plane of symmetry making an angle  $\gamma$  with the horizontal plane;
- an arc of a circle of a radius  $R$ , tangent on one hand to the portion BC previously defined and on the other hand to a vertical portion DE situated in the plane of symmetry at a distance equal to  $G$  from the coupling axis.

During the rotation of the generator, AB describes a horizontal plane, BC describes a conical revolutionary surface, the arc of the circle describes a portion of a torus, and the vertical axis DE describes a portion of the surface of a cylinder of revolution.

The values adopted for the dimensions mentioned above are as follows :

$S$  : 750 mm min.  
 $\gamma$  : 4° max.  
 $R$  : 450 mm max.  
 $G$  : 2300 mm min.

These dimensions allow the determination of the centre of the circle of radius  $R$ .

This contour is suitable for all semi-trailers, including semi-trailers for tunnel containers having a goosneck length of 3214 mm and a height of 2590 mm.

#### 4. OPERATING DIMENSIONS

##### 4.1 Limit angles of inclination of fifth wheel coupling

- forward  $\beta_1$  : 8° min.
- rearward  $\beta_2$  : 8° min.
- lateral  $\alpha$  : 3° max.

##### 4.2 Angles of inclination of the semi-trailer in relation to the tractor

The tractor should be so constructed that the tractor and semi-trailer components, except for those concerned with articulation, do not make contact with each other when the articulated vehicle is running in a straight line, when the angle of inclination of the semi-trailer relative to the tractor does not exceed the following values :

- $\omega_1$  : 6° towards the front;
- $\omega_2$  : 7° towards the rear.

##### 4.3 Lateral inclination

When the trailer is at a lateral inclination of a maximum of 3° relative to the tractor chassis, there should be no contact between the tractor chassis and the semi-trailer.

##### 4.4 Angle of articulation $\varphi$ (Projection of the angle between the longitudinal axes of the tractor and semi-trailer in the horizontal plane.)

- 4.4.1 Articulation of the vehicle should be such that no contact is made between the semi-trailer and the tyres of the tractor, taking into account the maximum values already given

( $\alpha = 3^\circ$ ,  $\omega_2 = 7^\circ$ ) for all angles  $\varphi$  up to 25°, for both two-axle and three-axle tractors.

- 4.4.2 Under manoeuvring conditions the angle of articulation  $\varphi$  should be able to reach 90°, the angle of lateral inclination  $\alpha$  remaining at 3° max. and the angle of inclination  $\omega_2$  varying from 7° to 3° as the angle  $\varphi$  varies from 25° to 90°.

##### 4.5 Free space between tractor and semi-trailer

- 4.5.1  $J_1$  is the distance between two cylinders of revolution, both having the kingpin axis as their axis. One of these cylinders has radius  $G$  (lower part of the goosneck) and the other is the cylinder of smallest radius within which all points of the rear part of the tractor are located :

$$J_1 = 100 \text{ mm min.}$$

- 4.5.2  $J_2$  is the clearance between the surface of the cylinder of revolution having as its axis, the axis of the fifth wheel coupling, and of radius  $D$ , and a conical surface of revolution having the same axis. This conical surface is generated by a line making an angle of 6° from the vertical towards the front of the tractor. A point  $X$  of this surface is positioned on the plane of symmetry of the semi-trailer at a height of 250 mm above the fifth wheel coupling face.

$$\text{At this point } J_2 = 80 \text{ mm.}$$

#### 5. ADDITIONAL DIMENSIONS

- 5.1 Distance between the fifth wheel kingpin axis and the front of the tractor  $L = 4675$  mm max.
- 5.2 Forward distance of the fifth wheel coupling : this distance depends directly on the interchangeability and operating dimensions defined above.