

# INTERNATIONAL STANDARD

ISO  
8717

First edition  
1988-06-15



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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION  
ORGANISATION INTERNATIONALE DE NORMALISATION  
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

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## Commercial road vehicles — Fifth wheel couplings — Strength tests

*Véhicules routiers utilitaires — Sallettes d'attelage — Essais de résistance*

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ISO 8717:1988

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Reference number  
ISO 8717:1988 (E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8717 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

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Annex A forms an integral part of this International Standard.

# Commercial road vehicles — Fifth wheel couplings — Strength tests

## 1 Scope

This International Standard lays down test conditions and strength requirements to be met by 50 and 90 fifth wheel couplings.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 337 : 1981, *Road vehicles — 50 semi-trailer fifth wheel coupling pin — Basic and mounting/interchangeability dimensions*.

ISO 1176 : —<sup>1)</sup>, *Road vehicles — Masses — Vocabulary and codes*.

ISO 3842 : 1984, *Road vehicles — Fifth wheel mounting*.

ISO 4086 : 1982, *Road vehicles — 90 semi-trailer fifth wheel coupling pin — Basic and mounting/interchangeability dimensions*.

## 3 General test requirements

**3.1** The strength tests described in 5.1 are dynamic tests which shall be performed on a test bed. Special requirements for fifth wheels intended for forced semi-trailer axle steering (through a steering wedge) are specified in annex A.

**3.2** The fixing arrangements for the fifth wheel on the test bed shall be those intended for its attachment to the towing vehicle in accordance with the coupling manufacturer's fitting instructions.

**3.3** At the discretion of the manufacturer, any flexible components may be neutralized.

## 4 Determination of $F_h$ rating

The horizontal load  $F_h$  shall be taken as a basis for the assumed loads given below. This is a comparative value determined by calculation for the longitudinal forces occurring between the towing vehicle and semi-trailer.

The  $F_h$ -value, expressed in kilonewtons, shall be calculated with the equation :

$$F_h = g_n \frac{0,6 \cdot m_1 \cdot m_2}{m_1 + m_2 - m_3}$$

where

$m_1$  is the maximum design total mass of the towing vehicle, including  $m_3$ , which is to tow the semi-trailer, in tonnes;

$m_2$  is the maximum design total mass of the semi-trailer which is to be drawn with the fifth wheel, in tonnes;

$m_3$  is the maximum design vertical load borne by the towing vehicle of the semi-trailer, in tonnes;

$g_n$  is the acceleration due to gravity:

$$g_n = 9,806\ 65 \text{ m/s}^2$$

Terminology for the different masses shall be taken with the meanings given in the corresponding definitions in the revision of ISO 1176 : 1974.

## 5 Test conditions

The following test loads, simulating practical loads under driving conditions, shall be applied:

$F_{v,t}$  = vertical test load;

$F_{h,t}$  = horizontal test load.

### 5.1 Application of test load

**5.1.1** The vertical test load  $F_{v,t}$  and the horizontal test load  $F_{h,t}$  shall be applied simultaneously (see 5.3).

1) Second edition to be published (revision of ISO 1176 : 1974).

5.1.2 The vertical test load  $F_{v,t}$  shall be a pulsating force applied in the direction as shown in figure 1.  $F_{v,t}$  shall be applied by means of a rigid counter-plate simulating the semi-trailer skid-plate. To ensure constant friction between these plates, suitable measures shall be undertaken (e.g. inserting polyamid foil).

$F_{v,t}$  shall pulsate between  $0,4 m_3 g_n$  and  $1,2 m_3 g_n$ .

5.1.3 The horizontal test load  $F_{h,t}$  shall be an alternating force applied in the direction as shown in figure 1.  $F_{h,t}$  shall be applied by means of a fifth wheel coupling pin.

$F_{h,t}$  shall alternate between  $+0,6 F_h$  and  $-0,6 F_h$ .

5.2 Loading cycle

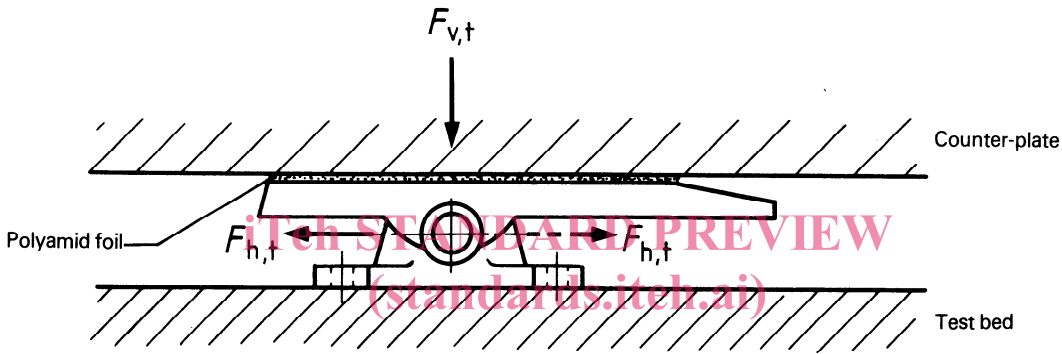
The dynamic test shall be carried out sinusoidally and the number of cycles shall be  $2 \times 10^6$  for each  $F_{v,t}$  and  $F_{h,t}$  load.

5.3 Frequency

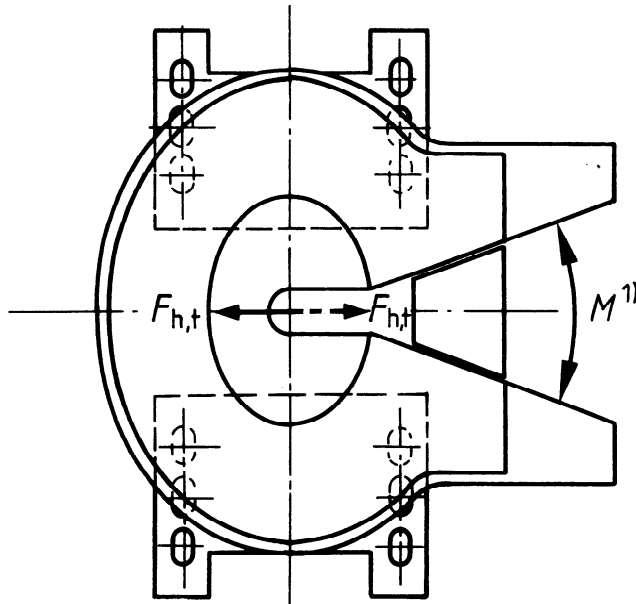
The selected frequency shall not exceed  $5 \text{ Hz}^{1)}$  and shall not coincide with the natural frequency of the system. Since  $F_{v,t}$  and  $F_{h,t}$  are applied simultaneously, the cycle rates shall differ by about 5 %.

6 Strength criteria

The dynamic test in 5.1 shall not cause permanent deformation, breaks or cracks.



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1) Moment  $M$  applies only to the additional test specified in annex A.

Figure 1 – Application of vertical test load,  $F_{v,t}$  and horizontal test load,  $F_{h,t}$

1) Upon agreement between the test authority and the manufacturer, a higher frequency may be used to accelerate the test.

## Annex A (normative)

### Additional requirements for fifth wheels intended for forced semi-trailer axle steering

#### A.1 Dynamic test

In case of fifth wheels intended for forced semi-trailer axle steering, the load  $F_{h,t}$  specified in 5.1 shall alternate between  $+0,675 F_h$  and  $-0,675 F_h$ .

#### A.2 Additional static test

**A.2.1** Fifth wheels intended to accept a steering wedge or similar device to correct the trajectory of the semi-trailer shall be subjected to the following additional test.

**A.2.2** On the fifth wheel, kept in its normal working position, the vertical load  $F_{v,t} = m_3 g_n$  shall be applied downward by  $M = 0,75 F_h$

means of a rigid plate of such dimensions as to cover the fifth wheel completely; the resultant of the pressure applied shall pass through the centre of the horizontal articulation of the fifth wheel.

**A.2.3** At the same time, a horizontal transverse force representing the force required to correct the trajectory of the semi-trailer shall be applied on the flanks guiding the insertion of the coupling pin.

The magnitude of this force and the line on which it acts shall be selected in such a way as to create the following moment, expressed in kilonewton metres, around the centre of the king-pin:

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**UDC 629.114.2.013 : 620.17**

**Descriptors** : road vehicles, commercial road vehicles, couplings, tests, performance tests.

Price based on 3 pages

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