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**Road vehicles — Frontal fixed barrier or  
pole impact test procedure**

*Véhicules routiers — Procédure d'essai de choc frontal contre barrière fixe  
ou poteau*

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## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3560 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 10, *Impact test procedures*.

This second edition cancels and replaces the first edition (ISO 3560:1975), which has been technically revised.

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# Road vehicles — Frontal fixed barrier or pole impact test procedure

## 1 Scope

This International Standard specifies frontal fixed barrier and pole impact test procedures applicable to road vehicles that will ensure such tests are conducted under the same conditions.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 612:1978, *Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions*

ISO 1176:1990, *Road vehicles — Masses — Vocabulary and codes*

ISO 3784:1976, *Road vehicles — Measurement of impact velocity in collision tests*

ISO 6487:—<sup>1)</sup>, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

ISO 6549:1999, *Road vehicles — Procedure for H- and R-point determination*

SAE J211:1995, *Instrumentation for impact tests*

49 CFR, Part 572 E, *Anthropomorphic test devices — Hybrid III test dummy*, subpart E of FMVSS 208:1997, *Occupant crash protection*

## 3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 612 and the following apply.

### 3.1

#### impact angle

angle between the longitudinal median plane (of the vehicle) and a vertical plane perpendicular to the contact plane of the barrier face

NOTE The longitudinal median plane (of the vehicle) is also called the longitudinal plane of symmetry or zero Y plane (see ISO 4130).

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1) To be published. (Revision of ISO 6487:2000)

**3.2**  
**vehicle width**

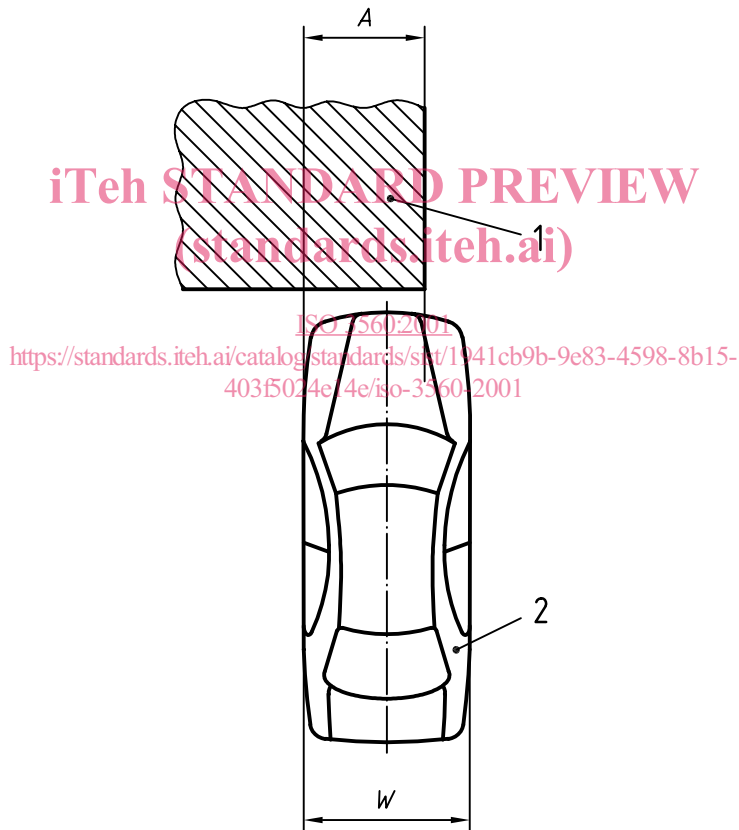
*W*  
distance between two planes parallel to the longitudinal median plane (of the vehicle) and touching the vehicle on either side of the longitudinal median plane

NOTE All parts of the vehicle, including any lateral projections of fixed parts (wheels, hubs, door-handles, bumpers, etc.) are contained between these two planes, except for the rear-view mirrors, side marker lamps, tyre pressure indicators, direction indicator lamps, position lights, customs seals, flexible mud-guards, door-edge guards, hinged side windows in the open position, fuel filler flaps in the open position, retractable steps, snow chains and the deflected part of the tyre walls immediately above the point of contact with the ground.

**3.3**  
**overlap**

percentage of the vehicle width covered by the barrier face (see Figure 1)

NOTE The overlap may be left or right. Figure 1 shows a left side overlap.



$$\text{Overlap} = \frac{A}{W} \times 100$$

**Key**

- 1 Barrier
- 2 Vehicle

**Figure 1 — Overlap**

### 3.4 offset

*B*

perpendicular distance between the longitudinal median plane (of the vehicle) and the centreline of the pole

NOTE The offset may be left or right. Figure 2 shows a left side offset.

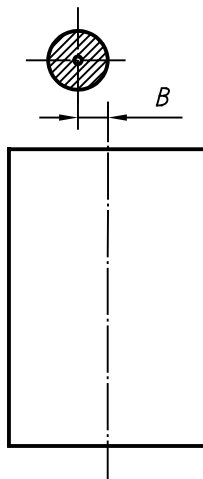


Figure 2 — Offset  
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### 3.5 Types of impact

#### 3.5.1

##### full frontal, 0° angle impact, 100 % overlap

impact in which the barrier face is wider than the impacting vehicle and the direction of travel of the vehicle is perpendicular to the barrier face

#### 3.5.2

##### frontal, angled impact

impact in which the barrier face is wider than the projected width of the impacting vehicle (see Figure 3) and the angle of impact is other than zero

NOTE The barrier face can be angled so that the initial contact is to the right or left of the longitudinal median plane (of the vehicle).

#### 3.5.3

##### offset frontal impact

impact in which the vehicle impacts a barrier face with an overlap of less than 100 %

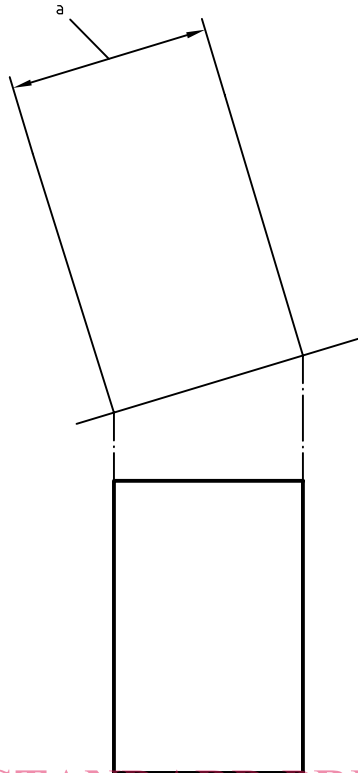
NOTE Any angle of impact can be used.

#### 3.5.4

##### pole impact

impact in which the vehicle impacts a circular pole considerably narrower than the width of the vehicle

NOTE The pole can be offset to either side of the longitudinal median plane (of the vehicle).



<sup>a</sup> Projected width of vehicle.

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**Figure 3 — Frontal, angled impact**  
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## 4 Impact test set-up

### 4.1 Test site

The test area shall be large enough to accommodate the run-up track, barrier and technical installations necessary for the test.

The crash site surface shall be hard, horizontal, flat and smooth for a length of at least 10 m in front of the impact object. There shall be no more than a 1 % slope measured over any 1 m length for at least the last 10 m.

### 4.2 Barrier

#### 4.2.1 Fixed barrier

The barrier shall consist of a block of reinforced concrete at least 3 m wide and at least 1,5 m high.

The barrier shall have a mass of at least 70 000 kg. The barrier specifications given in 4.2.2 may be varied as necessary provided the barrier face is large enough to accommodate the frontal crash area of the test vehicle.

#### 4.2.2 Barrier face

##### 4.2.2.1 General

A variety of barrier faces may be used. Some are specified below.



#### 4.2.2.2 Flat barrier face

The barrier face shall be flat and vertical and shall be covered with fir plywood 18 mm to 26 mm thick.

#### 4.2.2.3 Anti-slide device (ASD) on flat barrier face

The ASD, which shall be 40 mm thick, 40 mm wide and at least 1 500 mm long, fabricated from steel and positioned to permit  $20 \text{ mm} \pm 2 \text{ mm}$  projection in front of the plywood, shall be mounted vertically at a distance of 350 mm left and right of the theoretical (projected) point of impact of the longitudinal median plane (of the vehicle).

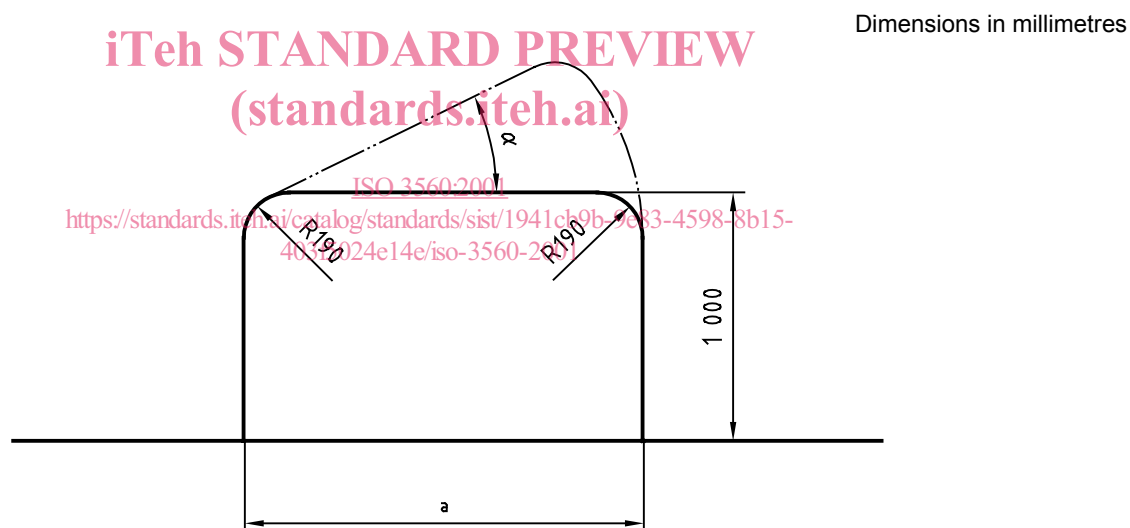
#### 4.2.2.4 Deformable barrier face

The deformable barrier face shall be vertical and either flat or with a bumper simulation. It shall have sufficient height, depth and width to allow the desired test to be carried out.

The ground clearance shall be  $200 \text{ mm} \pm 5 \text{ mm}$ .

#### 4.2.2.5 Offset barrier face

The offset barrier face shall have a sufficient width to allow the desired overlap, a height of at least 1 500 mm and a depth of at least 1 000 mm. The edge radius on both sides shall be  $190 \text{ mm} \pm 2 \text{ mm}$ . The face may be set at an angle to the barrier and may include an ASD (see Figure 4).



<sup>a</sup> As desired.

Figure 4 — Offset barrier face

In the case of an offset deformable barrier face, the edges of this face shall be in line with the sides of the main offset barrier and fully supported.

#### 4.2.3 Ground clearance

The tests may be conducted using a variety of barrier face ground clearances, including zero.