

# TECHNICAL REPORT

**ISO**  
**TR 9511**

First edition  
1991-04-01

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## Road vehicles — Driver hand-control reach — In-vehicle checking procedure

**iTeh STANDARD PREVIEW**  
*Véhicules routiers — Portée des mains du conducteur — Méthode de  
vérification à bord du véhicule*  
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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.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future, but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 9511, which is a Technical Report of type 2, was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

This document is being issued in the type 2 Technical Report series of publications (according to subclause G.6.2.2 of part 1 of the IEC/ISO Directives) as a "prospective standard for provisional application" in the field of ergonomics because there is an urgent need for guidance on how standards in this field should be used to meet an identified need.

This document is not to be regarded as an "International Standard". It is proposed for provisional application so that information and experi-

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ence of its use in practice may be gathered. Comments on the content of this document should be sent to the ISO Central Secretariat.

A review of this type 2 Technical Report will be carried out not later than two years after its publication with the options of: extension for another two years; conversion into an International Standard; or withdrawal.

Annex A of this Technical Report is for information only.

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# Road vehicles — Driver hand-control reach — In-vehicle checking procedure

## 1 Scope

This Technical Report defines a method for determination of the position of driver hand-controls in vehicles and for verification that the controls lie within the hand-reach envelopes.

NOTE 1 The hand-reach envelopes described in ISO 3958 are designed to be used at the initial design stages of a new vehicle programme. A further procedure is required for checking the actual hand-reach to controls in vehicles, which this Technical Report provides.

This Technical Report applies for checking purposes in road vehicles using the actual dimensions of the vehicle. It refers directly to left-hand drive motor vehicles designed for seated operators in full-width (bench) or single-width (bucket) seats having fore-and-aft seat adjustments that are approximately horizontal. Application to right-hand drive vehicles is assumed to be symmetrically opposite.

The ranges of the operator workspace dimensions for which the hand-reach envelopes apply are described in ISO 3958. Application to vehicles whose dimensions are outside these ranges should be done with caution.

## 2 Normative references

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

ISO 3958:1977, *Road vehicles — Passenger cars — Driver hand control reach*.

ISO 4130:1978, *Road vehicles — Three-dimensional reference system and fiducial marks — Definitions*.

ISO 6549:1980, *Road vehicles — Procedure for H-point determination*.

## 3 Definitions

For the purposes of this Technical Report, the following definitions apply. They are grouped here, for convenience, from various International Standards.

**3.1 fiducial marks:** Three or more physical points (holes, surfaces, marks or indentations), on the vehicle body, as defined by the manufacturer. (ISO 4130:1978, definition 3.2)

**3.2 hand-reach envelope:** Geometric description of the hand-reach capability for a specified proportion of a driver population and type of torso-restraint system. (ISO 3958:1977, definition 3.3)

**3.3 actual H-point:** Pivot centre of the torso line and thigh centreline of the three-dimensional H-point machine using one of the appropriate leg lengths, installed in the rearmost normal driving or riding position of the seat as specified by the manufacturer. The actual H-point is measured to the H-point sight buttons. (ISO 6549:1980, definition 4.2.2 but with reference to figure 2 deleted)

**3.4 three-dimensional H-point machine:** Device used for the determination of the actual H-point in a vehicle. (ISO 6549:1980, definition 4.1 but modified)

**3.5 three-dimensional reference system:** Three orthogonal planes established relative to the vehicle, one plane being parallel to the longitudinal axis of the vehicle. (ISO 4130:1978 gives a different definition, related to a figure.)

## 4 Measuring procedure

**4.1** Measuring equipment shall be such that the procedure can be satisfactorily applied using standard devices permitting accurate measurements in three axes.

**4.2** The vehicle attitude shall be set such that the body reference datum lines are horizontal and vertical, or inclined to a defined loaded condition as stipulated by the manufacturer. This should be accomplished by reference to fiducial marks or other recognizable points on the body as defined by the manufacturer.

**4.3** In special cases the reference datum lines shall be established in a horizontal plane parallel and perpendicular to the longitudinal axis of the vehicle, and outside the line of the vehicle. These define a three-dimensional reference system.

**4.4** The driver's seat shall be positioned to its R-point or Seating Reference Point position and the seat back shall be positioned according to its design seat back angle as specified by the manufacturer (see ISO 3958 and ISO 6549). An adjustable

steering-wheel/column shall be set in the design position stipulated by the manufacturer.

**4.5** A three-dimensional H-point machine shall be installed in the vehicle, in the driver's seating position. The location of the actual H-point shall be established relative to the three-dimensional reference system in accordance with ISO 6549.

**4.6** Measure, relative to the fiducial marks or to the three-dimensional reference system (see 4.3), the locations of the geometric centres of the control knob faces for the controls which are to be checked.

## 5 Verification procedure

**5.1** Verify that the location of the actual H-point and locations of controls are as specified in the manufacturer's drawings.

**5.2** Apply the hand-reach envelopes to the locations of controls specified in the manufacturer's drawings, in accordance with the procedures of ISO 3958, for the type of grasp required.

**5.3** Determine if each specified control is within the limiting value of reach.

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## **Annex A**

### **(informative)**

#### **Rationale**

ISO 3958 was published in 1977. This provides a means of assessing which hand-control locations can be reached by at least 95 % of drivers. It requires coordinates for the control locations and certain "package" dimensions for the driving position. These will normally be available for the designed conditions but there may be deviations from these on an actual vehicle.

This Technical Report describes the procedure required to extend the use of ISO 3958 to checking an actual vehicle or three-dimensional fixture (package buck). The methods described use standard vehicle measuring procedures.

There have been a number of studies of different methods of making the relevant measurements. These have been made in the USA and UK. Several special purpose fixtures have been produced, from which direct measurements to the reach contours can be made. These have generally involved a clamping system within the vehicle. Tests have shown that the results obtained from such devices are more variable than from good quality standard measuring devices. Since these are readily available to vehicle manufacturers and test stations, they are preferred.

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