

ICS 43.020



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43402-2023

Passenger cars - Driver hand-control reach

乘用车 驾驶员手控制区域

(English Translation)

Issued on: November 27, 2023

Implemented on: March 1, 2024

Issued by: State Administration for Market Regulation

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1 Scope

This document specifies the boundaries of hand-control areas accessible to groups of drivers with different male to female ratios.

This document is applicable to Category M1 vehicles with H30 value between 127 mm ~ 405 mm and H17 value between 530 mm ~ 838 mm.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 12673 Motor Vehicle Main Dimensions Measurement Method

3 Terms and Definitions

What is defined in GB/T 12673, and the following terms and definitions are applicable to this document.

3.1 vehicle coordinate system

It consists of three interrelated perpendicular orthogonal planes and is used to determine the positional relations among planes, axes and points.

NOTE: see Figure 1.

The design H point position set by the manufacturer, specifically designated as R point or SgRP, and satisfy all the following requirements:

- a) The basic datum point used to establish occupant adjustment tools and dimensions;
- b) Simulate the hinge center position of the human trunk and thigh;
- c) With coordinates established relative to the structure of the vehicle being designed;
- d) The H point at the rearmost position of each designated seating position or the normal driving and seating position specified by the manufacturer is established. It takes into account all adjustment states of the seat, including horizontal, vertical and tilting, but seat movement for non-normal driving and riding purposes is not included.

[source: GB/T 12673-2019, 3.2.3]

3.6 accelerator heel point; AHP

When the ankle angle is 87° , and the shoe is placed on the uncompressed accelerator pedal plane, the intersection of the heel of the shoe and the compressed floor covering.

NOTE: if the intersection of the shoe and the lateral support does not cause the AHP and BOFRP to shift, then, the lateral position (the Y coordinate) is the same as the BOFRP.

[source: GB/T 12673-2019, 3.3.10]

3.7 center plane of occupant

C/PO The Y coordinate plane of each designated riding position R-point.

NOTE: for single seats, it generally refers to the center plane of the seats. For bench seats, the center plane of occupant is specified by the manufacturer.

[source: GB/T 12673-2019, 3.3.16, modified]

3.8 general package factor

A single index value that characterizes the spatial position of the driver of a specific vehicle (see Formula 1).

NOTE: G is a comprehensive variable that provides a quantitative indicator of the geometric structure of the driver's workspace. It is calculated by substituting the main dimensions (see Figure 2) of the vehicle seat configuration into Formula (1), and the unit is (mm).

Appendix C (informative)

Verification Process

C.1 Determination of Reference Origin

Position the reference origin at R-point of the vehicle seat.

C.2 Determination of Datum Plane

In accordance with a set of orthogonal datum planes, position the hand-reach envelope inside the vehicle. The orthogonal datum planes are the X datum plane passing through R-point, the plane parallel to the Y datum plane and passing through R-point, and the Z datum plane passing through the R-point.

C.3 Selection of Hand-reach Table to be Used

Explicitly describe the dimensions of the geometric structure of the vehicle seat configuration and calculate the value of the general package factor G defined in 3.8. In accordance with the value of the general package factor G, the type of torso restraint and the male-female mix ratio, select the hand-reach table from Appendix D that is suitable for the vehicle and the designated driver group.

C.4 Determination of Whether the Control is within Reach

Method 1: in accordance with the following steps, respectively draw the hand-reach envelope on the left side of C/PO and the right side of C/PO.

- a) Based on the reference origin, position the horizontal angle as 30° , the vertical angle as 0° and the radius as the coordinate point of corresponding values in the hand-reach table. Along the vertical direction, successively position the coordinate points upward and downward when the vertical angle is -15° , 15° , 30° , 45° and 60° ;
- b) In accordance with the above steps, successively position the coordinate points when the horizontal angle is 45° , 60° , 75° and 90° , and the vertical angle is -15° , 0° , 15° , 30° , 45° and 60° ;
- c) Fit the coordinate points at the same horizontal angle to a straight line, fit the uppermost point in the Z direction to a straight line, and fit the bottommost point in the Z direction to a straight line;
- d) Fit all straight lines into a curved surface. Thus, the hand-reach envelope is obtained.

The deviation of the surface from the values in the Table does not exceed 1 mm.

If the geometric center of the surface of the control (in a normal or static state) closest to the driver is tangent to or inside the hand-reach envelope, then, it means that the control is within

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