

# Motorcycles – Measurement method of rear-view mirror

## 1 Scope

This standard specifies the measurement method of rear-view mirrors for motorcycles.

The measurement method of this standard is applicable to motorcycles with a design riding position angle between  $-45^{\circ}$  (inclined forward) and  $10^{\circ}$  (inclined backward).

## 2 Normative reference

The following standards, when referenced in this standard, constitute provisions of this standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

**JASO T005** Motorcycles - Rider's eye range

**JASO T006** Motorcycles - Procedure for H-point determination

## 3 Definitions

Definitions of main terms used in this standard shall be as follows.

### 3.1

#### Two-dimensional manikin for motorcycles

Equipment used to determine the H-point and E-point for motorcycles.

### 3.2

#### H-point

The pivot centre of the torso and thigh of the two-dimensional manikin for motorcycles.

### 3.3

#### H'-point

The cross point of the vertical line that passes through the H-point and the upper surface of the seat.

### 3.4

#### S-point

The pivot centre of the torso and arm of the two-dimensional manikin for motorcycles.

### 3.5

#### S'-point

A point shifted 250 mm outward from the S-point of the two-dimensional manikin for motorcycles.

### 3.6

#### E-point

The point corresponding to the eyellipse centroid.

### 3.7

#### G-points

The points located at the centre of the upper part of the effective portion of the handle grips.

### 3.8

#### G'-points

Points shifted 45 mm outward from the G-points of the two-dimensional manikin for motorcycles.

**3.9****Armline**

A line connecting the S'-point and the G'-point.

**3.10****Standard inscribed circle**

A 50 mm radius circle used for determining the reflective surface reference point of the rear-view mirror.

**3.11****Standard inscribed triangle**

A right-angled isosceles triangle with 50 mm equal sides used for determining the reflective surface reference point of the rear-view mirror.

**3.12****Reflective surface reference line**

A horizontal line with the rear-view mirror placed at the designed position. The location is specified by the manufacturer.

**3.13****J-point**

The joint centre of the rear-view mirror.

**3.14****Reference eye point**

The point established as the representative rider's eye location. There are monocular and binocular reference eye points.

**3.15****Zero "Y" plane <sup>1)</sup>**

A vertical plane constituting a reference in measurement, which corresponds to the longitudinal median plane of the motorcycle (see **Figure 1**).

**3.16****Zero "X" plane <sup>1)</sup>**

A vertical plane constituting a reference in measurement, normal to the zero "Y" plane (see **Figure 1**).

**3.17****Zero "Z" plane <sup>1)</sup>**

A horizontal plane constituting a reference in measurement, normal to the zero "Y" plane and the zero "X" plane (see **Figure 1**).

**3.18****Riding position <sup>2)</sup>**

The riding position of the motorcycle rider as determined on the zero “Y” plane, according to the following factors for drawings (see **Figure 2**).

**a) Distance A**

The distance between the S-point and the G-point.

**b) Distance B**

The distance between the S-point and the H-point.

**c) Distance C**

The distance between the S-point and the E-point.

**d) Design position angle  $\beta$** 

The angle formed between the straight line connecting the S-point and the H-point, and the vertical line passing through the H-point. This angle shall be specified by the manufacturer.

**e) Neck angle  $\gamma$** 

The angle formed between the straight line connecting the S-point and the E-point and the straight line connecting the S-point and the H-point.

**3.19****M-point**

The reflective surface reference point of the rear-view mirror. The location is specified by the manufacturer (see **Figure 3**).

**3.20****Seating reference line**

An arc described about the H-point sight button on the two-dimensional manikin for motorcycles, indicating the vertical distance from the H'-point to H-point.

**Note: <sup>1)</sup>**

As specified in **JIS D0030** (Three-dimensional reference system for automobiles.)

**Note: <sup>2)</sup>**

As specified in **JASO T003** (Motorcycles - Riding position.)

**4 Riding position**

**Figure 2** shows the marking method for the riding position related to measurement of rear-view mirrors for motorcycles.

## 5 Evaluation of field of rear-view mirror

The evaluation method of the field of the rear-view mirror using a computer simulation shall be as follows (see **Figure 6**).

### a) Eye point determination

Determine the reference eye point for the binocular condition by inputting the H'-point height from the ground surface, and the coordinates of the H-point and G-point.

### b) Determination of rear-view mirror specifications

Determine the specifications of the rear-view mirror by inputting curvature of the rear-view mirror, the shape and dimensions of the reflective surface, and the coordinates of the joint centre of the rear-view mirror (J-point).

### c) Mirror aiming angle determination

Adjust the mirror aiming angle so that the optical axis going toward the reflective surface reference point (M-point) from the reference eye point reflects horizontally and in parallel with the longitudinal median plane of the test motorcycle. In this adjustment, the optical axis from the left eye shall be used for the left rear-view mirror, and the right eye optical axis for the right rear-view mirror (see **Figure 4**)

It shall be noted that the mirror aiming angle may be readjusted while keeping the reflected optical axis horizontal in order to obtain the suitable rearward field of view.

### d) Armline determination

The armline shall be determined by inputting coordinates of the S'-point and G-point.

### e) Calculation and drawing of field of rear-view mirror

The field of the rear-view mirror shall be calculated and obtained as an output (see **Figure 5**).

### f) Measuring items

The following items shall be measured from the field of the rear-view mirror projected on the screen.

- 1) Outside field of view on the ground surface.
- 2) Inside field of view on the ground surface (determined by the armline or rear-view mirror reflective surface).
- 3) Outside field of view on the horizontal plane passing through the reflective surface reference point (M-point)
- 4) Inside field of view on the horizontal plane passing through the reflective surface reference point (M-point) (determined by the armline or rear-view mirror reflective surface).